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CONTENTS

Research Papers

A STUDY OF AGRICULTURAL UNCERTAINTIES AND ITS IMPACT ON MENTAL HEALTH OF FARMERS

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ABSTRACT

Agriculture is the major sector of the Indian economy and it provides livelihood to a majority of the Indian population . This sector faces multiple challenges like uncertain climatic conditions, fragmented land holdings, lack of mechanisation, non availability of finance and many more. These challenges significantly affect the mental health of farmers, a vulnerable population often overlooked in public health discussions. This paper examines the multifaceted nature of agricultural uncertainties and their psychological impact on farmers. It highlights how unpredictable weather patterns, including droughts and floods, aggravate stress levels, leading to anxiety and depression. Market volatility, characterized by sudden price drops and input cost surges, contributes to economic instability, further straining mental well-being. Moreover, the study explores the role of debt burdens in compounding psychological distress, particularly in regions where access to financial resources is limited. Social isolation in rural areas amplifies these challenges, reducing access to mental health support systems. Sometimes these problems become unbearable which leads to suicide. The Government policies and climate adaptation strategies have shown a limited effectiveness in mitigating these unfavourable impacts. Recommendations emphasize the need for targeted interventions, such as mental health outreach programs, financial literacy workshops, and sustainable farming practices. The paper also underscores the importance of community support networks in fostering resilience among farmers. By addressing these issues, this research contributes to a holistic understanding of how agricultural uncertainties shape the mental health landscape in rural areas. It advocates for an integrative approach, combining mental health services with agricultural policy reforms, to ensure the well-being of farming communities.

Keywords: *Stress, mental health, uncertainties*

INTRODUCTION

Agriculture is the backbone of the Indian economy, and the majority of the population relies on agriculture for their livelihood. Even after having an important role in human life and providing self sufficiency for food, agriculture has been one of the most vulnerable sectors. This is basically due to the numerous uncertainties to which agriculture is exposed. These uncertainties are due to uncertain monsoon, climatic conditions, financial crises, changes in government policies etc. Farmers frequently face the problems of variations in market prices, rising prices of inputs, and lack of awareness of cheap credit or insurance. Intense competition and changing market situations have created financial pressure on farmers and they land up in taking loans at very unfavorable terms. The worst impact of this financial burden is it creates mental stress on the farmers which is not noticed by anyone. The constant pressure of dealing with uncertain output, financial uncertainty, and the worry of loss of crops simulates anxiety and depression amongst farmers. In rural area the farmers have a great social pressure and do not share their problems with anyone as they want to maintain their dignity in the society. Moreover, they spend huge funds for marriages and social functions which aggravates their financial stress and consequently the mental stress. They do not realize that they should take medical help for reducing this stress and rather in many cases such medical help is not available. This unattended mental stress becomes unbearable for the farmers and ultimately they unfortunately end their life. Over the years the percentage of farmers suicide has increased.

In 2022, a total of 11,290 persons involved in the farming sector (5,207 farmers and 6,083 agricultural labourers) have committed suicide in India, accounting for 6.6% of total suicide victims in the country. In order to prevent this unfortunate suicides there is a need for social and government intervention.

This research aims to explore the complex relationship between agricultural uncertainties and the mental health of farmers, addressing the root causes of these issues and their far-reaching consequences. By understanding the main causes of agricultural uncertainty, such as environmental changes, economic instability, and policy gaps, this study seeks to provide valuable suggestions to the challenges faced by farmers. Furthermore, it examines the psychological impacts of these challenges, throwing light on the widespread presence of mental health issues such as stress, anxiety, depression, and suicidal tendencies among farmers.

The study also investigates the coping mechanisms to be adopted by farmers to manage these uncertainties, as well as the role of social, familial, and community support systems in alleviating mental health burdens. By focusing on the gaps in existing support systems, this research advocates for the development of holistic strategies that integrate mental health care with agricultural policies and programs.

STATEMENT OF THE PROBLEM

Uncertainty in agriculture is an enduring challenge that affects millions of farmers worldwide. Factors such as unpredictable weather patterns, pest infestations, and volatile market prices compound the stress associated with farming. With agriculture being a cornerstone of rural economies, the mental health of farmers plays a pivotal role in sustaining agricultural productivity and rural development. These uncertainties affect the mental well-being of the farmers and their families. In rural areas the people don't understand the fact that mental illness also needs to be treated and they are reluctant to take help of psychologists. This mental frustration in some cases increases to such an extent that it leads to unfortunate suicide of the sufferer.

OBJECTIVES

This study aims:

1. To understand the causes of uncertainty in agriculture.
2. To examine the impact of these causes on farmers' mental health.
3. To propose suggestions to address the mental health issues of farmers.

RESEARCH METHODOLOGY

The paper is descriptive in nature. It is based on the primary data collected from respondents through structured questionnaires to arrive at a conclusion. Information is also obtained from secondary sources like media articles, research papers, and government reports available on different websites which have complemented the conclusions arrived at.

. Researchers have analyzed, interpreted, and presented the information in their own words and arrived at a just and fair conclusion along with valid suggestions.

REVIEW OF LITERATURE

1. **The Impact of Agricultural Insurance on Farmers' Mental Health:** What We Can Learn from the Literature" (2024) Rezwanul et al. In this the researcher examined whether access to agricultural insurance enhances farmers' mental well-being by mitigating farming-related uncertainties. The study found no conclusive evidence supporting the hypothesis that agricultural insurance positively affects farmers' mental health, highlighting the complexity of the issue.
2. **"Farmer Mental Health Interventions:** A Systematic Review" (2022) Teresa Younker et al. the researchers examined various mental health interventions targeting farmers over 50 years, assessing their effectiveness and constraints. It reveals a wide range of programs aimed at addressing mental health issues in the farming community, though effectiveness varies, suggesting the need for more robust intervention strategies.

CAUSES OF AGRICULTURAL UNCERTAINTY

Uncertainty in agriculture in India arises due to a combination of natural, economic, and policy-related factors which are as under:

A) **Natural Factors**

- **Unpredictable Weather Conditions:** Erratic rainfall patterns, prolonged dry spells, and unseasonal rains disrupt agricultural activities.
- Loss of output due to insects, pests and diseases.
- Reckless use of land leading to loss of fertility of the soil

B) Economic Factors

- **Volatility of the Market Prices:** Fluctuations in the prices of agricultural inputs and outputs creates income instability for farmers.
- **Insufficient to Credit:** Farmers often rely on informal credit sources with high-interest rates, making investments risky.
- **Insufficient Storage Facilities:** Loss of output due to lack of sufficient and appropriate storage facilities.

- **Lack of Insurance Coverage:** Many farmers remain uninsured against crop failure, leaving them vulnerable to financial losses.

C) Technological Factors

- Limited mechanization due to lack of knowledge and financial resources.
- Insufficient irrigation and over reliance on the monsoon which is uncertain.

D) Policy and Governance Factors

- Inconsistent policy frameworks on subsidies, pricing, and procurement lead to unpredictability.
- Poor infrastructure for transportation and sale of produce affects market accessibility and prices.
- Delays in announcing minimum support prices (MSP) and procurement policies create uncertainty in planning.

E) Social and Demographic Factors

- Small and fragmented farms limit economies of scale
- Seasonal migration of agricultural laborers to urban areas leads to labor shortages during peak times.

Addressing these challenges requires a multi-dimensional approach involving infrastructure development, policy reforms, technological adoption, and climate adaptation strategies.

IMPACT ON FARMERS' MENTAL HEALTH

1. Stress and Anxiety

Unpredictable weather, fluctuating market prices, and rising input costs cause chronic stress and anxiety, as farmers struggle to manage risks and sustain their livelihoods.

2. Depression

Continuous exposure to financial losses, crop failures, and mounting debts can lead to feelings of hopelessness and despair, resulting in clinical depression.

3. Increased Suicide Risk

Farmers facing prolonged financial distress and social stigma are at a higher risk of considering or committing suicide, especially in regions with recurring agricultural crises.

4. Loss of Self-Esteem

Inability to fulfill family and societal expectations due to uncertain income diminishes self-worth and confidence among farmers.

5. Social Isolation

Farmers experiencing repeated failures may withdraw from community interactions, feeling shame or fear of judgment, leading to loneliness.

6. Family Conflicts

Economic hardships often strain familial relationships, resulting in disputes, emotional detachment, and tension within households.

7. Substance Abuse

Some farmers may turn to alcohol or drugs as a coping mechanism to escape the stress caused by financial and agricultural uncertainties.

8. Sleep Disorders

Chronic worries about crop yields, loan repayments, or survival strategies can disrupt sleep patterns, leading to insomnia or other sleep-related issues.

9. Physical Health Issues from Stress

Mental health problems often manifest physically in the form of headaches, gastrointestinal issues, or cardiovascular problems, compounding their distress.

10. Lack of Resilience and Decision-Making Ability

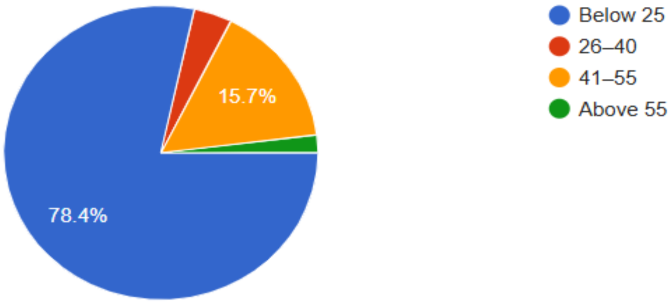
Continuous exposure to stress reduces cognitive clarity, making it harder for farmers to make informed decisions about farming practices, investments, or long-term strategies.

RESULTS AND DISCUSSION

Data was collected from 51 respondents by means of a structured questionnaire to assess the impact of agricultural uncertainties on the mental health of farmers. The results of the data is summarised as under

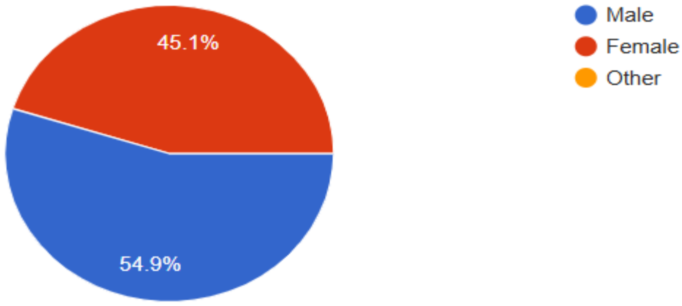
Age

51 responses



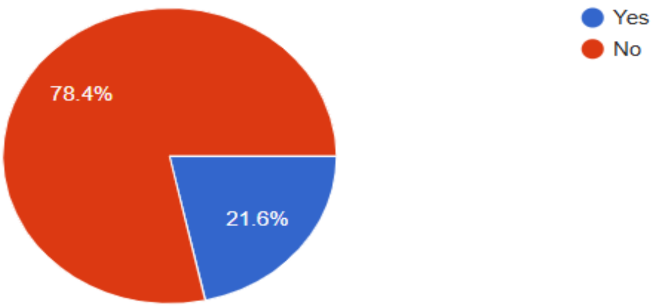
Gender

51 responses



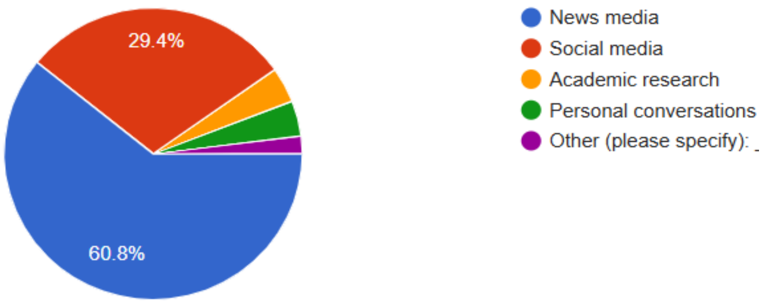
Do you have any family members or acquaintances who are farmers?

51 responses



What is your primary source of information about farmers' challenges?

51 responses



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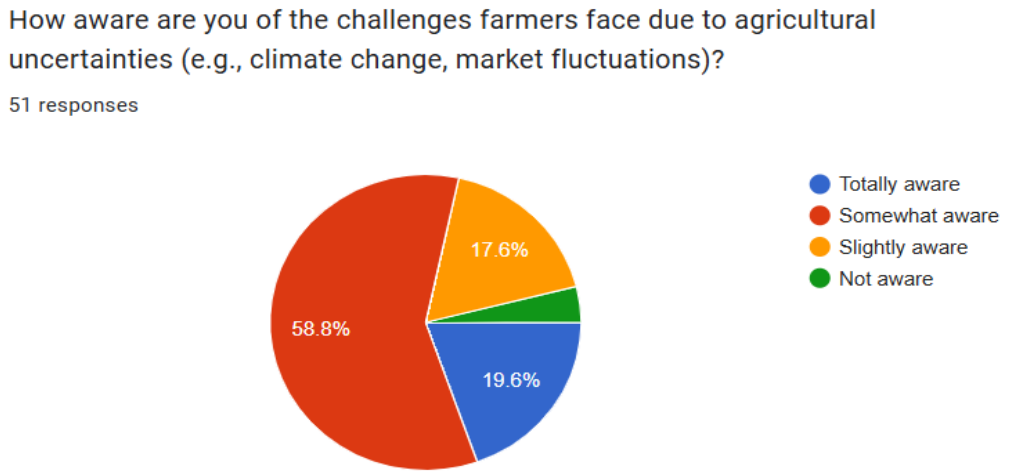

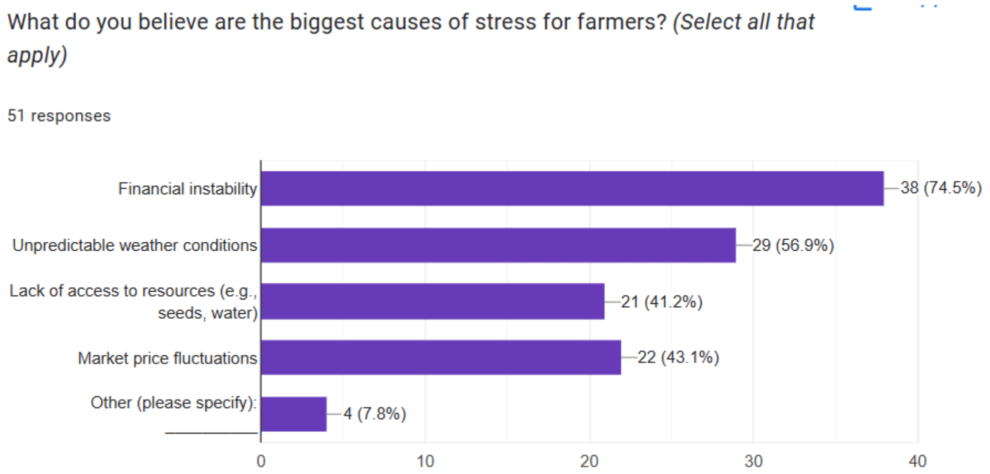

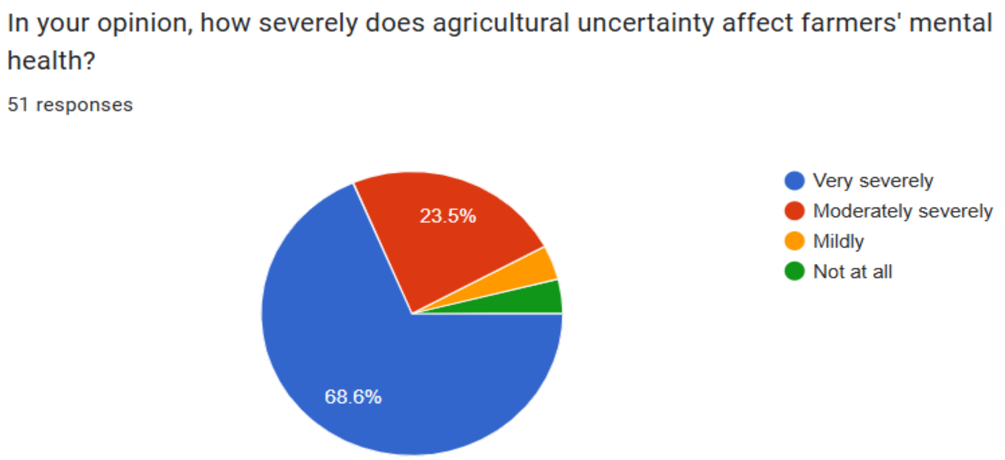

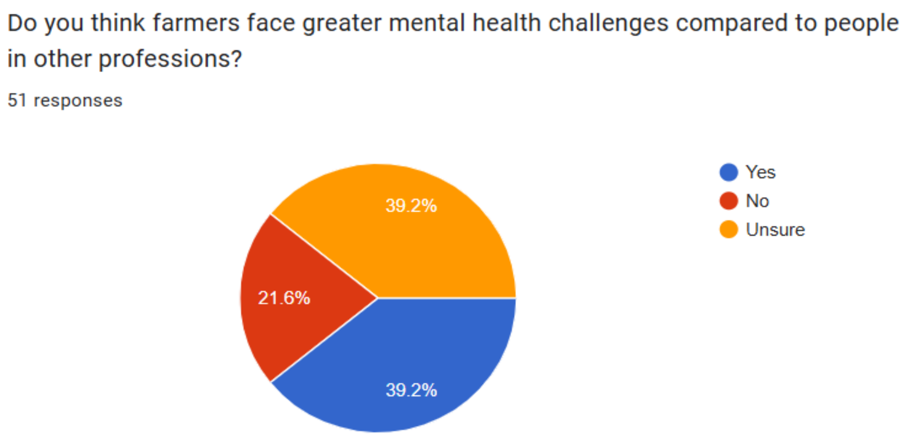

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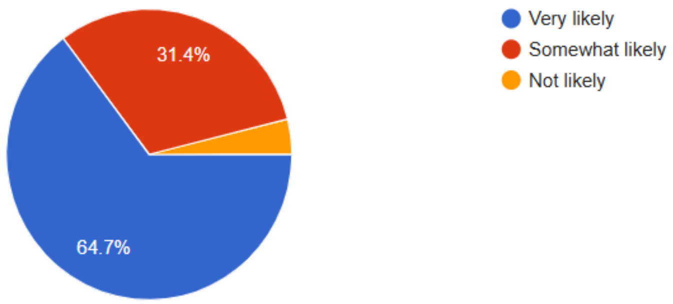
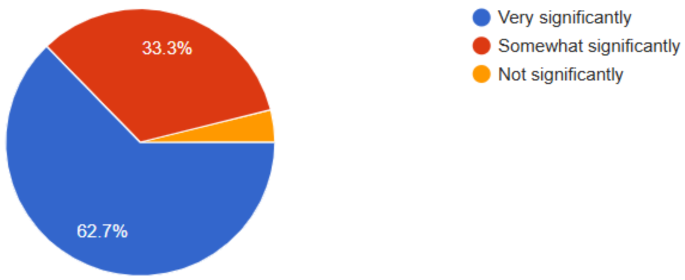
How likely is financial instability to contribute to farmers' mental health challenges?

51 responses



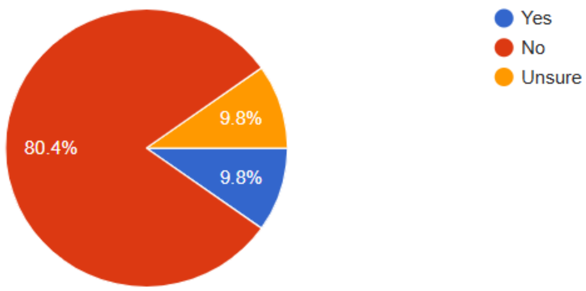
How much do you believe extreme weather events impact farmers' mental health?

51 responses



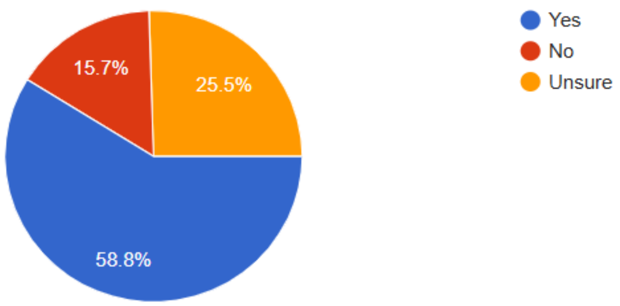
Do you think farmers have adequate access to mental health resources?

51 responses



In your opinion, do cultural or societal factors discourage farmers from seeking mental health support?

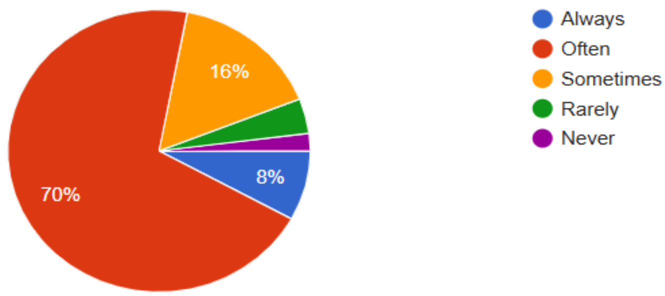
51 responses



ISSN 2394 - 7780

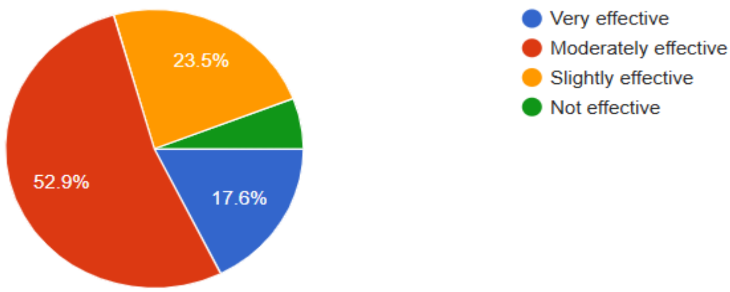
How often do you think farmers experience feelings of hopelessness or depression due to agricultural challenges?

50 responses



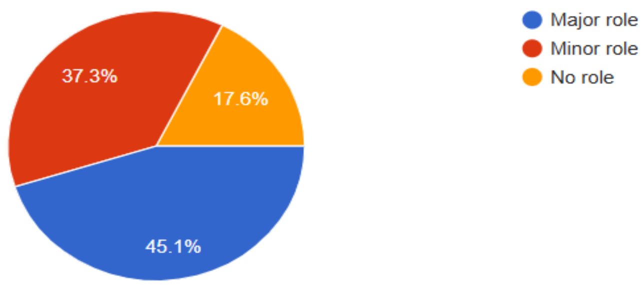
How effective do you think government support (e.g., subsidies, insurance) is in alleviating farmers' stress?

51 responses



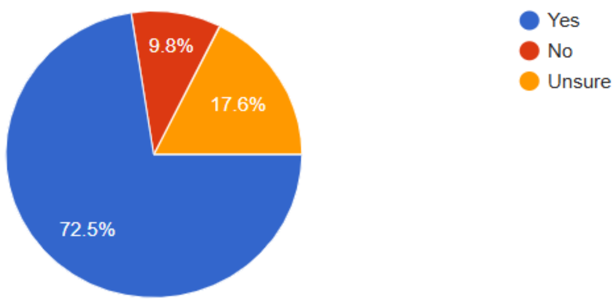
What role do you think community and peer networks play in supporting farmers' mental health?

51 responses



Do you believe technology (e.g., weather forecasting, smart farming) can reduce the mental stress of farmers?

51 responses



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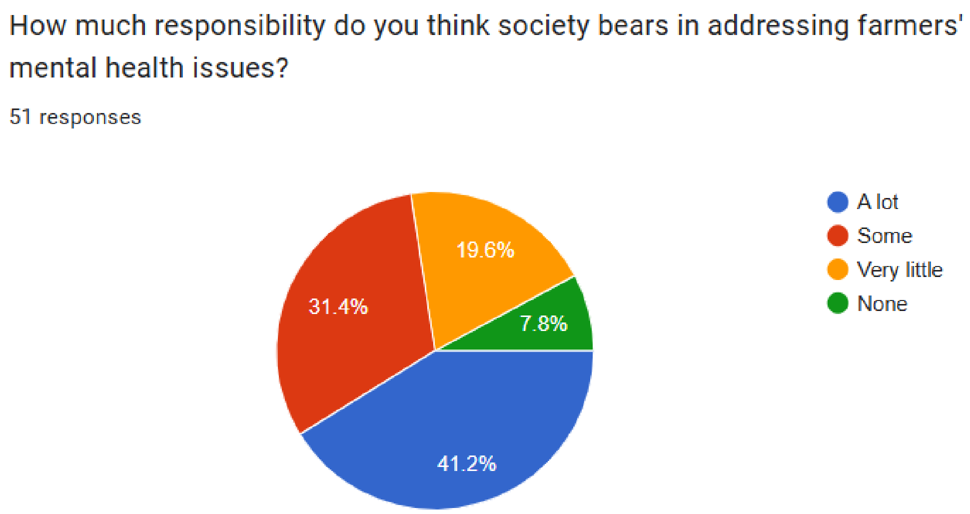

STRATEGIES FOR IMPROVING FARMER'S WELL BEING

The mental health of farmers is deeply intertwined with the uncertainties of agriculture. Addressing these impacts requires targeted interventions that combine financial stability, mental health support, and community-based programs. Improving the mental health of farmers requires a combination of policy, community-based, and individual-level interventions which are enumerated hereunder:

1. Comprehensive Debt Relief Programs and debt-waiver schemes to reduce financial stress among farmers.
2. Provide health and crop insurance facility which is readily available to small and marginal farmers also.
3. Ensure consistent and fair MSP to reduce income uncertainty.
4. Establish national and state-level policies specifically targeting farmer suicides with timely interventions.
5. Train farmers on financial management to help them make informed decisions about loans and investments.
6. Establish dedicated mental health centers in rural areas with trained professionals .Deploy mobile teams to provide on-the-spot mental health support and counseling in remote villages.
7. Facilitate the formation of local support groups where farmers can share experiences and find emotional support.
8. Promote group farming and cooperatives to reduce isolation and foster a sense of community.
9. Conduct village-level programs to educate families about mental health issues and reduce stigma. Form committees to identify and support farmers showing signs of stress or distress.
10. Organize cultural or recreational events to foster relaxation and social interaction.
11. Educate farmers about sustainable and climate-resilient farming techniques to reduce risks.

CONCLUSION

In conclusion, addressing the impact of agricultural uncertainties on farmers' mental health requires urgent attention and a comprehensive, collaborative response. By understanding the interconnected nature of these challenges, society can better support the individuals who form the backbone of food production. A concerted effort to improve farmers' mental health and mitigate agricultural uncertainties will not only enhance their quality of life but also strengthen the resilience of agricultural systems, ensuring a brighter future for generations to come.

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A STUDY OF PATANJALI'S YOGA SUTRAS OF PATANJALI IN THE LIGHT OF MENTAL HEALTH

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ABSTRACT

The word Yoga is derived from the Sanskrit word "Yuj" which means "to unite or integrate" It is a physical, mental and spiritual discipline originated in ancient India. Simply speaking, Yoga is balancing the body and mind. Patanjali's thoughts reflected in his Yoga Sutras clearly state the importance of both physical and mental well being for a peaceful life. He has emphasised on the eight limbs of Yoga namely Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana, Samadhi. If the practitioner concentrates on the daily practice of yoga exercises then it improves the physical as well as mental being of the person. The present paper focuses on Patanjali's thoughts reflected in his Yoga Sutras of Patanjali. It is a collection of Sanskrit Sutras on the theory and practice of Yoga. It is made up of 196 phrases that dwells upon the essential things to be done while practising yoga. It investigates the teachings of Patanjali on the physical and mental well being. Human body is a combination of body and mind. Due to ignorance towards body and mind humans do not identify the reasons behind their physical and mental illness. In modern times, it has been observed that people like going to gyms and performing exercise which strengthens their muscles. However, there is no provision for improving mental awareness. Yoga is such an exercise that it strengthens not only the body but also the mind. Therefore, the Yoga practitioners experience the complete health benefits and remain healthy. The paper points out the benefits of doing Yoga and recommends doing it for sustainable health.

***Keywords**: Yoga, Patanjali's Yog Sutras, Eight Limbs of Yoga, Physical and mental health, Enlightenment etc.*

I. INTRODUCTION

The main purpose of human life is to find happiness. How to achieve this goal of achieving happiness? The ancients sages from Indian tradition have successfully given the ways to attain this eternal happiness. Patanjali is one of such sages who has contributed in the field of physical and mental well being. His masterpiece Yoga Sutra of Patanjali is popular in the field of Yoga Tradition and has created its everlasting impact upon the minds of Yoga practitioners who pursue the practice of Yoga. According to Patanjali happiness can be found in the union of body and mind which is possible only with the practice of Yoga. Patanjali compiled Yoga Sutra 3000 years back, he has described Yoga as "liberation from suffering and union with the Universal Energy " (Desigachar 1995). This union is the highest state and can be understood at different levels – a union of the mind, body and soul; mind and body etc. The journey to achieve this physical and mental well being is not easy. Therefore, Patanjali developed a tradition of Yoga with ' Ashtanga Yoga' (Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi) which means eight limbs of yoga. The practitioner needs to follow the path of ' Ashtanga Yoga' in order to achieve physical and mental well being. No doubt, patanjali has done a matchless work in the field of mental health.

II. REVIEW OF LITERATURE

There are many significant texts written on Patanjali's Yoga Sutras. A book entitled as Yoga Sutras of patanjali written by Charles Johnston does a comprehensive study of Yoga Sutras of patanjali. The research paper entitled 'Effect of Patanjali yoga sutra on personality development: A randomised controlled trial' studies Patanjali's Yoga Sutras and its positive impact on body and mind. Sanjoy's Sarkar's ' Exploring Patanjali's Yoga Sutras for the Essence of Happiness: A Holistic Approach' discusses the significance of Yoga as a tool to pursue a balanced life. It recommends doing Yoga for a happy and sustainable life.

III. PATANJALI'S YOGA SUTRAS OF PATANJALI

While studying the philosophical base of maharishi Patanjali's ideology of yoga sutra one should know the Samkhya philosophy which talks about the fundamental ideas of *Purusha* and *Prakriti.*

The philosophical approach to yoga psychology is grounded primarily in the teachings of Samkhya philosophy, and other sacred texts and practices that were prevalent in the time of Patanjali, which is supposed to be around 200 BCE. Within this paradigm, two fundamental principles Purusha and Prakriti are postulated as ultimate realities in the universe Purusha is the principle of consciousness and Prakrti is the principle of materiality (Ajaya, 1983).

The Yoga practitioner experiences the feelings of oneness with the universe and that is the ultimate benefit of Yoga. The Yoga Sutras stand for the affirmations which guide the practitioner to be on the path of Yoga. It is worthy to mention here one of the Yogsutras here that is ‘ Atha Yoganushasanam’. This first Yogsutra from Patanjali’s Yoga Sutra has been interpreted by many scholars which itself shows its holistic meaning and approach.

As A. K. Aruna observes,Patañjali himself here indicates that there was this earlier body of literature from which he was summarising this topic of yoga. The prefix ‘anu-’ in this initial sūtra is often used in the sense of anurūpe, meaning in conformity with. When applied to the term śāsana (teaching), it indicates that this will be the traditional teaching of yoga. This text is then meant to be in conformity with the prior traditional texts that deal with the topic of yoga and the topic of liberation, the goal of yoga. (26)

In this sutra Patanjali advises the practitioner to start doing Yoga at the present moment. This idea of the present moment is very significant in Yoga teachings. It believes in the present moment. It can also be interpreted as that one should be committed towards following the Yoga practice at the present moment without pondering much neither in the past nor in the future.

Patanjali’s Yoga Sutras are divided into four chapters – samadhi pada, sadhana pada, vibhuti pada, and kaivalya pada. They provide a detailed account of the nature of mental activities, their types, the steps to stop their activities, the difficulties one encounters in this process, ways of overcoming them, the different levels of concentration one can achieve, the associated effects, the types of extraordinary powers that manifest, and the ultimate liberated state. (Jayasheela, S. 3)

Maharshi Patanjali has rightly been called the Father of Yoga. It is strongly believed that Maharshi Patanjali systematised yoga on the basis of the foundational metaphysics of Samkhya. Yoga sutras of Maharshi Patanjali are considered as a key work on yoga during the classical era. According to Dr. Radhakishnan, Maharshi Patanjali codified the nebulous tradition evolved under the pressure of life and experience. Yoga sutra of Maharshi Patanjali which has also been termed as Yoga Philosophy or Raja Yoga is considered as the first coherent philosophical system. It is believed to have been compiled between 200 BCE- 200 CE. As yoga darshana of Maharshi Patanjali adopted the concepts of Prakriti and Purusha, metaphysical rationalism and methods of acquiring knowledge, yoga philosophy of Maharshi Patanjali is also called Ishwar Samkhya, owing to the presence of concept of Ishwara or God which is missing in the Samkhya philosophy of Kapila.

Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi are the eight limbs of Yoga taught by Maharshi Patanjali. It is significant to study these teachings.

1. **Yama**:

‘Yama’ is about the practices we need to follow while living day to day life. It includes: Ahimsa (non-violence), satya (truthfullness), Asteya (non- stealing), Brahmacharya(following the right path) and Aparigraha (lack of greed).

2. **Niyama**:

The second limb of Yoga ‘Niyama’ refers to the five duties of the individual which can help him to go inward and sustain well being. These five duties are: Saucha, santosh, Tapas, Swadhyaya, Ishwarpranidhan. Saucha means taking care of cleanliness. Patanjali wants to make the people aware about the importance of cleanliness. After cleaning the body only one has to aspire towards yoga practice. Santosh refers to the contentment that means living a life full of satisfaction. The one who has contentment within only can pursue happiness in the long run. ‘Tapas’ means to create passion towards the goal that one has set. For example the Yoga practitioner has to practise yoga on a daily basis in a disciplined way to achieve perfection. Swadhya insists on self study means one needs to understand the inner self rather than the outer self. It is very important for one to realise his/her true self to find happiness.’ Ishwarpranidhan’ refers to one’s faith upon the higher self. As an individual one lives in physical and mental bondages which limit one’s existence. With practising Ishwarpranidhan the yoga practitioner develops a sense of courage with the belief that there is God, Universe or a collective consciousness to guide. So one needs to surrender to that higher self in order to live a life full of faith, joy, and bliss.

3. **Asana**:

It means a posture, one of the physical aspects of Yoga. Patanjali refers to Asana as a pose which is comfortable and motionless. The position which relaxes the human body and mind is considered as ‘asana’. As he writes, *“sthira sukham asanam”*.

4. **Pranayama**:

It is a yoga practice related to breathing exercise. Simply speaking, it teaches the aspirants to have control over breathing. The regular practice of Pranayama strengthens the physical and mental well being.

5. **Pratyahara**:
The meaning of ‘ pratyahara’ is a sense of withdrawal. It refers to focus on a certain posture and to remain focused on it. It is the ability not to get distracted by outside objects. It is very important quality of the individual which is helpful while performing yoga exercise.

6. **Dharana**:
As pratyahara refers to not getting distracted , ‘ Dharana’ refers to hold that concentration for a longer time. There are different yoga postures which the individuals can practise for a longer time in order to develop concentration and mental stability.

7. **Dhyana:**
It refers to meditation, which means to sit quiet and observe the thinking process . It is very difficult to find the source of the thought process. While doing meditation one is expected to minimise the thinking and to concentrate on certain mantra chanting or thought etc. The practice of meditation helps the individuals to remain stable and calm even in the crisis time if it is practised on a regular basis.

8. **Samadhi**:
If the practitioner of Yoga follows all above limbs of yoga taught by Maharshi Patanjali, he/she can achieve the state of ‘Samadhi’ which means enlightenment. It is a state where one is able to control one’s body and mind. The disciplined body and mind results into this blissful state. Thus, the learning of Yoga is nothing but a kind of a journey from ignorance to enlightenment.

IV. PRACTICE OF YOGA AND MEDITATION AND MENTAL AWARENESS

As the eight limbs are discussed earlier, it has been very much clear that the practice of Yoga exercise makes a tremendous impact upon physical fitness. It creates positive vibrations in the body while performing the yoga exercise because the poses which were developed by the ancient sages are the products of meticulous research over the anatomy of the body. For example, the simplest exercise , Vrikshasana, creates awareness in humans when it is done on a regular basis. In this asana the practitioner is supposed to stand on a single foot and to set the other feet on the knee of the feet which are on the floor. He needs to look straight with concentration without disturbing the pose. It seemed easy earlier. But when one increases the duration of the pose it remains challenging for the practitioner to remain calm and stable. The simple also teaches concentration, perseverance and discipline if done with patience and faith. The other simple practice is ‘ Tratak Dhyan’. It is an ancient spiritual practice which is a type of meditation. In this meditation the practitioner needs to sit in Sukhasana and concentrate at a certain point without closing the eyebrows. It also seems like simple practice . However, if one increases the duration it becomes very challenging to hold attention at a certain point for a long time. Thus, while practising such meditation like Tratak, one experiences the unstable nature of mind as well as body. In day to day lives if one wants to perform better this practice of yoga is very essential.

As Dr. K.P.V Ramanakumar and P. Selvakumar write, “Yoga helps us to realise ourselves. It can be a great tool for improving our leadership qualities. The concept of self- awareness (or) knowing yourself is central to both yoga and leadership. Learning to be an effective leader requires introspection, adherence to ethics and moral standards which is available in Yogic practices.” (25) The doer realises that they are only body and mind which are continuously fluctuating and if one maintains silence and remains calm they can be controlled. The understanding of this human nature has prime significance in the practice of Yoga. Patanjai through his Yoga Sutras and Yoga exercise wants humans to attain this tranquillity of body as well as mind. The successful union of body and mind takes humans to the level of consciousness. It is the actual purpose of Yoga. It is clearly mentioned as ‘ Kaivalya Pada’ in the fourth division of the book, the Yoga Sutras of Patanjali. The meaning of Kaivalya is liberation. The practitioner seeks ultimate joy and pleasure while doing Yoga which is considered to be the final goal of humans as narrated by the ancient scriptures like Upnishads. Ancient knowledge believes in the tranquillity of body and mind. It is taught in the Vedic philosophy that one needs to acquire such a self where there is no conflict in body as well as mind. This attainment is called nothing but ‘ Kaivalya’. It is considered as a final goal of every human being. This goal can be achieved by practising Yoga.

V. CONCLUSION

Thus, Patanjali’s *Yoga Sutras of Patanjali* teaches humans the foundations of physical and mental well being. It is not only limited to just physical exercise but also dwells upon the inner psyche of the human mind. Today in the world of technological advancement where humans are facing a lot of distractions, physical and mental illness, Patanjali's Yoga Sutra remains a torch bearer for those who want to pursue a journey from ignorance to enlightenment. Human life is full of challenges and physical and mental stability is required to overcome those challenges. Therefore, understanding Patanjali’s Yoga Sutras is significant for physical and mental well being

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FROM DIGITAL DISTRACTIONS TO DIGITAL DETACHMENT: THE PATHWAY OF DIGITAL DETOXIFICATION AND DISCONNECTION FOR DIGITAL DISCIPLINE - A CRUCIAL STEP TOWARDS HEALTH, WELL-BEING, AND SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

In an age defined by the incessant hum of connectivity, the concept of 'digital detoxification' emerges as a beacon of hope—a conscious rebellion against the omnipresence of screens that tether our minds and hearts to an insatiable digital realm. As humanity thrives on the precipice of a hyper-connected existence, where smartphones and social media permeate every waking moment, the struggle for authentic human connection becomes ever more poignant. The terms 'digital detoxing' and 'digital disconnection' have gained popularity in both scholarly and popular discourse. This study investigates the idea of digital detoxification, looks at its advantages, and offers practical solutions to help mitigate any potential harm to mental and physical health. The concept of digital detoxification surfaces as a vital remedy—a practice that invites individuals to reclaim their agency, immerse themselves in the present, and rediscover the world beyond their screens. This article explores the concepts of digital detoxification, digital disconnection, digital distractions, digital detachment, and digital discipline as essential practices for reclaiming mental well-being and enhancing the quality of human experience. By engaging in digital disconnection, we foster an environment conducive to self-reflection, nurturing genuine relationships, and ultimately enhancing our quality of life. This paper articulates the benefits of digital detoxification—an awakening to the richness of human experience that exists beyond the glowing screens. This paper highlights the advantages of digital detoxification, presenting it as a pathway to rediscovering the richness of life beyond digital distractions. This approach also supports a number of Sustainable Development Goals (SDGs), including SDG 11 (Sustainable Cities and Communities) and SDG 3 (Good Health and Well Being), which both highlight the promotion of psychological and emotional well-being through mindful disconnection. Additionally, by promoting more deliberate and sustainable technology use, the practice supports SDG 12 (Responsible Consumption and Production). In addition to supporting global environmental initiatives, this paper emphasizes the importance of digital detoxification and frames it as a way to improve life by eschewing the distractions of the digital world.

***Keywords**: Digital Detoxification, Digital Disconnection, Digital Distractions, Digital Detachment, Digital Discipline, Mental Health, Sustainable Development Goals (SDGs), Technology*

INTRODUCTION

In the modern digital age, smartphones, laptops, and other devices have become integral to daily life, but their overuse has sparked concerns regarding digital addiction. Refusing to use digital devices, or 'digital detoxification,' has become popular as a behavioral strategy to lessen the harmful impacts of excessive digital engagement (Basu, 2019). The paper examines the idea of digital addiction, how it relates to drug misuse, and how digital detoxification might enhance both physical and mental health. Smartphones will be a ubiquitous thing in daily life by 2023 (Howarth, 2023). They give users access to most, if not all, of the functions of a typical desktop computer together with remarkable mobility, enabling them to use these features whenever and wherever they choose. Because of this, consumption has increased dramatically worldwide, reaching almost four hours per day (Laricchia, 2024). Concerns regarding overexposure to digital technology have been raised by its ubiquitous integration into daily life. 'Digital detoxification' refers to a deliberate withdrawal from digital devices, aiming to alleviate stress and enhance overall health (Sitepu, & Harahap, 2020).

The Digital Dilemma

Digital Distractions: The Constant Pull of Technology

Digital distractions can take many different forms, such as constant scrolling, social media notifications, and the appeal of online entertainment that never goes away. Studies show that overuse of smartphones is associated with worsening interpersonal interactions, shorter attention spans, and more anxiety (Berryman et al., 2017). The problem of 'digital zombies,' or those who are engrossed in their displays to the point of losing awareness of their surroundings, emphasizes how urgently awareness and action are needed (Adam, 2017).

Digital Detachment: The First Step to Reconnection

Regaining control over one's time and attention through deliberate reduction of digital gadget use is known as digital detachment. This approach can involve establishing limits on phone use, disabling notifications, or designating particular windows of time for using digital devices. Studies show that those who practice digital separation report higher levels of productivity and mental clarity (Basu, 2019). Through raising awareness about digital usage, people can make room for introspection and more meaningful relationships.

The Digital Zombie Phenomenon

The term 'digital zombie' refers to individuals who are so absorbed in their smartphones and digital devices that they become oblivious to the physical world around them. The constant use of these devices has turned many into passive consumers of digital content, unable to disengage from their screens. For the younger generation—often referred to as Generation Z—who has never known life without the internet, this is especially true. Given that social media and telephones are so widely used, many find it difficult to differentiate between their digital and conventional lives (Adam, 2017).

Maslow's Hierarchy of Needs: Redefining the Basics

Maslow's hierarchy of needs is a psychological framework that describes five tiers of human needs, starting with basic physiological necessities and progressing toward the need for self-actualization. Traditionally, these needs include food, water, shelter, safety, and social belonging (Maslow, 1943). However, in today's digital age, Wi Fi, smartphones, and social media have seemingly become as essential as food and water for many individuals. This can be seen as an extension of Maslow's theory, where connectivity to the digital world is now perceived as a prerequisite for fulfilling more advanced needs like social belonging and self-esteem (Baran, 2010).

According to Bassett et al. (2016), the increasing reliance on digital technology has elevated it to a basic necessity, akin to the fundamental physiological needs outlined by Maslow. The modern individual, especially youth, often feels that they need constant access to the internet to sustain their relationships and social status. With platforms like Instagram, TikTok, and Facebook becoming central to social interactions, being online is not merely a luxury but a social obligation. This constant connection leads to the phenomenon of 'digital attachment,' where the fear of being offline is as distressing as hunger or thirst (Kemp, 2019a).

The Impact of Digital Attachment

The adverse effects of digital attachment are well-documented, with research pointing to links between excessive phone use and deteriorating mental health. Studies have shown that constant connectivity can lead to issues such as anxiety, depression, and attention deficit disorder (Berryman, Ferguson, & Negy, 2017). Additionally, there is growing evidence that excessive social media use contributes to feelings of inadequacy and social comparison, further exacerbating mental health problems (Borzekowski & Rich, 2011). Digital zombies are ensnared in a constant cycle of consumption without thoughtful reflection, diminishing their capacity to engage meaningfully with the real world. Chang et al. (2018) found that children and adolescents in Taiwan who excessively used mobile devices exhibited signs of addiction, with symptoms ranging from difficulty concentrating to poor emotional regulation. This trend is mirrored globally, as smartphones increasingly monopolize users' attention, replacing more traditional forms of social engagement and self-reflection (Hadlington & Scase, 2018).

Digital Detachment, Disconnection, and Detox

While digital connectivity has become a central part of modern life, the increasing recognition of its adverse effects has led to a growing interest in strategies such as digital detachment, disconnection, and detox. These approaches offer a means to reclaim balance by reducing dependence on digital devices and promoting more meaningful engagement with the physical world.

Digital Detachment

Digital detachment involves consciously choosing to reduce digital engagement and regain control over one's life. This may involve turning off notifications, setting time limits for phone usage, or deliberately scheduling time away from digital devices (Newport, 2019). By setting boundaries, individuals can better focus on the present moment, enhancing their productivity and improving their relationships with others. A study by Basu (2019) on employees revealed that those who engaged in digital detachment experienced improved performance and well-being. Similarly, Van Velthoven, Powell, and Powell (2018) argue that strategies for digital detachment can significantly reduce the stress and anxiety caused by continuous online engagement, particularly for young adults. In essence, digital detachment allows individuals to break the cycle of constant digital consumption and regain control over their mental and emotional health.

Digital Disconnection

Digital disconnection goes a step further by advocating for periods of complete disconnection from the digital world. This can involve anything from short-term disconnection during specific hours of the day to more extended periods of digital fasting, where individuals refrain from using their devices for days or even weeks

(Basu, 2019). Wilcockson, Osborne, and Ellis (2019) found that smartphone withdrawal, while initially causing anxiety, ultimately led to decreased cravings and improved mood among participants. These findings suggest that periodic disconnection from digital devices can help reset the brain, reducing the compulsive need to check devices and improving overall well-being (Carr, 2010).

Digital Detoxification

Digital detox refers to the intentional reduction of smartphone and digital media use, allowing individuals to regain control over their time and attention. Mark Prigg (2012) discusses how major tech companies, such as Microsoft and Apple, have introduced features that promote digital well-being, including app timers and screen time trackers. These tools help users monitor their usage patterns and set limits on screen time. Kantar Media (2012) provides insights into how healthcare professionals are increasingly advocating for digital detoxification as a way to mitigate the mental and physical health risks associated with smartphone addiction. Detox programs encourage individuals to take breaks from their devices, engage in offline activities, and establish healthier boundaries between their digital and personal lives.

Digital detoxification takes digital disconnection a step further by advocating for a complete break from digital devices for a set period, often with the aim of resetting one’s relationship with technology (Parekh, 2017). Digital detox programs are becoming increasingly popular, particularly among those seeking to reclaim control over their digital habits. These programs often include activities such as spending time in nature, engaging in face-to-face social interactions, and practicing mindfulness, all of which help individuals reconnect with the real world. A digital detox allows individuals to rediscover the joys of offline life, improving their mental health and relationships (Wilcockson et al., 2019). According to research by Bassett et al. (2016), people who took part in digital detox programs said they felt more rested, concentrated, and productive following their break. Digital detoxes offer a way to modify one’s behavior for the long term in addition to assisting with the symptoms of digital addiction.

Consequences of Smartphone Use

Given its widespread integration, utilizing a smartphone in current culture has both benefits and drawbacks. Positive effects include the ability to utilize social networking apps on smartphones, play games, surf the internet, take and view pictures and videos, send and receive emails and texts, and converse on the phone.. According to Gowthami and Kumar (2016), these features and capabilities enable users to connect, communicate, and access information at any time. However, in spite of their convenience and use, popular and scholarly concern over the negative impacts of smartphones has increased recently. Particularly, there has been a suggestion that smartphone use may be harmful to users’ health and wellbeing. According to studies by Vallally and D’Souza (2019), Yang et al. (2020), Wacks & Weinstein (2021), and others, numerous hazardous lifestyle behaviors, such as eating disorders (e.g., skipping meals), lack of sleep, reduced physical activity, increased passive living, use of substances, and poor mental health, including feelings of anxiety and sadness, have been linked to smartphone use. Furthermore, users are more likely to participate in socially awkward activities like phubbing, which is the practice of ignoring others in favor of a phone in public. They also have an increased chance of developing disorders such as nomophobia (King et al., 2014), which is the fear of not having a smartphone or being unable to use one, or digital versions of FOMO (fear of missing out), which is the worry about missing out on activities that friends are doing (Hunt et al., 2018).

Digital Detoxes

Numerous words have already been used to characterize the times when smartphone users do not interact with their devices. Terms such as “abstinence, break, disconnection, detox, time-out, and unplugging” have been applied, according to Radtke et al. (p. 192). Nevertheless, based on their thorough research analysis, they suggest utilizing the phrase ‘digital detox’ as a catch-all to refer to all of these categories. They additionally contended that the Oxford English Dictionary’s definition of "digital detox"—a period of time during which a person refrains from using electronic devices, such as telephones, in an attempt to reduce stress or enhance social interaction in the real world—is inadequate and should be revised. Their recommendations state that a digital detox can include giving up one or more electronic devices (e.g., giving up a smartphone while using other devices, or giving up all devices); it can also involve giving up specific apps (e.g., all social media apps like Facebook, Instagram, TikTok, and Twitter, or just one, like TikTok); it can involve giving up branded media; and it can involve giving up specific features, interactions, or messages. Additionally, they stressed that in order to promote gains in health, the detox must be completed willingly and consciously (Wacks & Weinstein, 2021).

Social-Media-Specific Detoxes

Social networking apps, such as Instagram and TikTok, are among the most popular and time-consuming smartphone applications, particularly for younger generations who have grown up with continuous internet access. An average of two hours are spent using social media per day worldwide, primarily on smartphones. The term "social media" refers to “Web-based programs that facilitate the production and sharing of user-generated content and are based on the ideas and technical developments of Web 2.0” (Carr & Hayes, 2015). Researchers and the general public are becoming increasingly concerned about the possible detrimental consequences of social networking sites on users’ health due to the extensive use of these apps. As a result, instead of outright prohibiting the use of devices, interest in more targeted digital detox programs has increased, especially those that aim to limit the use of specific application categories, such as social media. Given that cellphones have become a necessary component of modern life, concentrating on social media detoxes rather than complete device removal may strike a better balance between enhancing health outcomes and enabling users to continue with their regular routines (Radtke, 2021).

Addiction: From Substances to Digital Devices

Addiction and substance abuse, such as drug dependency, have historically been associated. But according to Holden in Niculovic et al. (2012), current research has broadened the definition to encompass behavioral addictions such compulsive internet and smartphone use. According to Griffiths (quoted by Chang et al., 2019), smartphone addiction is a type of technological addiction and is categorized as a subset of behavioral addictions. Behavioral addiction is described as an addictive condition that does not entail the use of psychoactive substances in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V) published by the American Psychiatric Association (APA) (Wilcockson, Osborne, & Ellis, 2019). Despite the fact that the DSM-V does not presently identify smartphone addiction, research has found parallels between the symptoms of drug use disorders and smartphone addiction. Chang et al., 2018 referenced Lin et al.’s research, which found similarities between substance abuse and smartphone addiction, such as reduced control, social issues, dangerous use, and withdrawal symptoms (Parekh, 2017).

Psychological, Social, and Physical Impacts of Digital Addiction

Excessive smartphone use and constant connectivity to the internet can lead to a range of negative effects. These include psychological impacts like anxiety and sleep disorders, social issues such as the deterioration of personal relationships, and physical consequences like accidents caused by distractions (van Velthoven, Powell, & Powell, 2018). Further, ‘Fear of Missing Out’ (FOMO) is a phenomena brought on by digital addiction, where people feel pressured to always be updated, which increases their reliance on digital gadgets (Hadlington & Scase, 2018). The psychological consequences of smartphone use are widely known, and a number of studies have shown a link between mental health problems and smartphone addiction. For instance, the report by eWeek (2012) shows how the rise of smartphones and tablets has contributed to declining attention spans and increased impulsivity.

This shift in cognitive behavior has made it more challenging for individuals to focus on tasks without the distraction of their devices. Additionally, the psychological effects of smartphones extend to social behaviors. As Whitbourne (2011) points out, the constant presence of smartphones in social situations often diminishes the quality of interpersonal interactions. Individuals may prioritize their digital connections over real-life conversations, leading to weakened relationships and feelings of loneliness.

Digital Detoxification: A Behavioral Intervention

In response to the growing concerns about digital addiction, digital detox has emerged as a viable intervention. Digital detox involves temporarily refraining from using digital devices to reduce distractions and improve mental and physical well-being (Basu, 2019). Newport (2019), in his book *Digital Minimalism*, introduced the concept of digital decluttering, recommending a 30-day break from non-essential digital applications such as social media and online entertainment. According to studies, going through a digital detox can help people feel less anxious and have more control over their online behavior (Wilcockson et al., 2019). Although social media abstinence has been linked to a craving for digital engagement, it has not been shown to affect overall mood or anxiety levels significantly (Wilcockson et al., 2019). This suggests that while digital detox can be challenging, it offers an opportunity for individuals to reassess their digital consumption and engage in healthier habits.

Media Dependency Theory and Digital Detox

Media dependency theory explains the growing dependence on digital media to understand, escape, and interact with the world (Baran, 2010). People use media not only for information but also as a way to interpret reality and alleviate boredom. However, this constant reliance on digital devices can increase addiction, making digital detox an essential intervention.

Through digital detoxification, individuals can break their dependence on media and rediscover alternative ways of engaging with the world (Baran, 2010).

The Role of Digital Discipline

Digital discipline encompasses the proactive measures individuals can take to regulate their technology use intentionally. This includes setting time limits for app usage, practicing mindfulness during digital interactions, and being discerning about the content consumed. By cultivating digital discipline, individuals can reclaim agency over their time and attention, allowing for a more meaningful engagement with both digital and physical environments.

Benefits of Digital Detoxification

1. **Improved Mental Health:** Overuse of screens, especially social media, has been connected to low self esteem, anxiety, and depression.. Engaging in a digital detox can diminish these adverse effects, fostering a more positive mental state (AAP Publications).
2. **Enhanced Physical Well-being:** Extended use of devices is linked to problems like eye strain, headaches, and musculoskeletal discomfort. Limiting screen time can help relieve these symptoms and support improved physical health (Well.org).
3. **Increased Productivity and Focus:** Constant notifications and digital distractions can impair concentration. A digital detox allows individuals to reclaim focus, leading to heightened productivity and improved cognitive performance (Cleveland Clinic).

Strategies for Implementing a Digital Detox

1. **Set Realistic Goals:** Define clear, attainable objectives for reducing screen time to ensure consistency and effectiveness (Mindbodygreen).
2. **Establish Tech-Free Zones:** Designate specific areas or times in your daily routine where digital device use is prohibited, encouraging engagement in alternative activities (Therapist).
3. **Gradual Reduction:** Implement incremental decreases in screen time, such as reducing usage by 15 minutes each day, to facilitate a sustainable detoxification process (Newport Institute). 4. **Take Part in Activities Offline**: Substituting meaningful offline activities for screen time is a crucial component of digital detoxification. People ought to look for pastimes, outdoor pursuits, or artistic endeavors that don't include using technology (Parekh, 2017).

5. **Set Workplace Boundaries**: Digital burnout is significantly influenced by digital engagement at work. Establishing limits on communications connected to work, can greatly lower stress and enhance work-life balance (Basu, 2019).

Future Prospect

Making decisions about when to connect with, and perhaps more crucially, when to disengage from, digital platforms presents a significant challenge for individuals (Aagaard, 2020; Lyngs et al., 2020). This tension lies at the heart of the pursuit of digital well-being, a topic frequently explored in both public discussions (Ardes, 2018) and academic discourse (Hiniker et al., 2016). The practice of disconnecting from digital tools, platforms, and devices—whether temporarily or permanently—has gained substantial traction among users and, consequently, has emerged as a prominent theme in scholarly inquiry. A rapidly expanding body of literature investigates the phenomenon of 'digital disconnection' (Bozzola, 2019). However, the field remains riddled with confusion, lacking a unified conceptual framework. To address these conceptual ambiguities, we propose a working definition: digital disconnection refers to the intentional avoidance of certain features, platforms, devices, interactions, or messages at varying frequencies and durations. The purpose of this approach is to optimize the perceived value of technology use, manage perceived overuse, promote more meaningful social contacts, improve psychological well-being, increase productivity, and protect privacy. Additionally, we point out important theoretical and empirical gaps in the existing literature and make suggestions for further study to deepen our grasp of this quickly developing field (Vanden Abeele, 2021; Jiang & Balaji, 2021).

CONCLUSION

In the setting of excessive smartphone and internet use, digital detoxification presents a potent remedy for the expanding issue of digital addiction. By refraining from the constant consumption of digital content, individuals can reduce the negative psychological, social, and physical impacts of digital addiction. As technology continues to advance, fostering a balance between digital engagement and offline well-being will be critical for sustaining mental and physical health in the digital age. Digital detox is not about eliminating technology but about striking a balance between the digital world and real-life experiences. For today's youth, it is essential for maintaining physical health, mental well-being, and fostering personal growth. By periodically disconnecting from screens and reconnecting with the world around them, young individuals can cultivate a more mindful, fulfilling, and balanced lifestyle. Encouraging digital detox practices will not only improve their overall well-being but also prepare them to thrive in an increasingly digital future.

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RESONANCE OF ECOLOGICAL IMPERIALISM WITH RADICAL ECOFEMINISM

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ABSTRACT

In the novella, Dweepa Island by Norbert D'Souza, environment resonates with the human behavior as the river Sharavathi flows through hamlet Hosamanehalli. The attributes of river Sharavathi and Nagaveni, Ganapayya's wife have an integrated portrayal. The undeniable resistance of Krishnayya and Ganapayya to conquer Nagaveni and natural environment respectively, lead to destruction of latter two entities. Ganapayya whose innate bond with the river and place acts as a sensible reason for his lag to opt for legal assistance. This builds a courage in him to endure the heavy rain and flooding of river with a blatant audacity. Krishnayya is a farm hand at household of Ganapayya's father- in- law. The presence of Ganapayya serves as a true source of comfort and hope for Nagaveni has who stayed in utter dejection over Ganapayya's blindfold guts to endure the environmental change. The conquering spirit of humankind is explicitly presented through the Ganapayya and Krishnayya under an ecological imperialism. When conquering spirit dominates human mind, no more liveliness is attributed to the necessities kept under conquering arena. Ganapayya with a potential conviction endures the natural calamity. Krishnayya with a convincing circumstance executes his deep- down desire to conquer Nagaveni. Ganapayya behaves in an imperialistic notion towards the environment he lived and existed. Krishnayya understanding the dejected situation of Nagaveni who has been objected to the clutches of enduring effects of Ganapayya, exhibits his radical approach with a desire and conquers Nagaveni. Analysing the intricate aspects that propelled the deeds of Ganapayya and Krishnayya, the paper attempts to evidently prove that Ecological imperialism resonates with Radical Ecofeminism.

Keywords: *Ecological imperialism, Radical ecofeminism, Potential existence, Conquering spirit.*

Ecological imperialism and Radical ecofeminism thrive under the foundation of conquering spirit. The human nature has an innate conquering spirit. With utmost necessity led by worldly desire, conquering spirit of human kind becomes explicitly evident. The impacts of necessitated deeds are anticipated through conquering spirit. The conquering spirit exists with a potential spirit of oneself. These spirits are intermingled. On one hand potential spirit of an individual is heightened when existence becomes a forceful entity while on the other hand, a blatant audacity is achieved through the conquering spirit. The intermingled notion of conquering and potential spirits is reflected through characters Ganapayya and Krishnayya who undergo the same emotional state on parallel grounds.

"Sustainability is the maintenance of an ecological-productive-reproductive balance between humans and nature—the perpetuation of the quality of all life" (Patel and Wagh). As the characters go against the will of eco- social structure, either of the characters have been subjected to a forced activity of production. This innately activates potential self. Potential spirit is essential for living a human life. When the concept of production is enforced, the characters contribute barely. On a contrary, the characters exert the spirits to conquer the determined entities. With determined notion, dominance sprout through intermingled spirits. The potential self gets incorporated into conquering spirit. Further this gets integrated to a state of dominance. The dominance is exerted when interdependence is juxtaposed. The interconnectedness strives for human praxis. This leads to shuffle in spirits as experienced by Ganapayya and Krishnayya.

Humans, eventually must develop sustainable relations with interconnectedness. No where a thought on sustainability was emphasized by characters. This aspect signifies that intermingled notion of potential and conquering spirits focusses on extraction. The notion of extraction is prioritized while the act of giving is neglected. "Stephen G. Bunker, who linked what he called "modes of extraction" to the concept of unequal exchange" (Pedregal Villodres and Lukić, 2024). The act of giving is further endured through conquering spirit. It revolves around self- indulged thoughts of authoritative mind rather than considering the determined necessities as a subjective source. "To struggle with heaven [or nature] is fun forever! To struggle with earth is fun forever! To struggle with people is fun forever!" (Miller, 2010). The obstinate dominance is exerted by humans as the struggle exists when demandable dependence overtakes the interdependence.

"Humans should not try to control nature, but work along with it and must try to move beyond power-based relationships" (Patel and Wagh). Natural environment and a woman are determined entities where the enforcement of spirts are evident. Eventually the concept of contribution is foregone and an exhausted state is radiated from characters. Natural environment and woman are exploited through such the radiance. This radiance is the reflection of resonance exerted through the friction between ecological imperialism and radical ecofeminism. The elongated propulsion of such radiance is the prevalence of dominance and dependance. Further the potential spirit and conquering spirit endure over merged forms of dominance and dependance.

Ganapayya along with four families are the sole in habitants of the Sharavathi river basin. When legal assistance takes a back step to aid a compensative land as the Sharavathi river is forecasted to overflow at the earliest, Ganapayya calmly resides with an imperialistic notion in his native to sustain the overflooding. Ganapayya had a sole notion to sustain the natural calamity and to conquer the farmlands of his fellow residents who by then have attained the legal assistance of government and made their way off to assigned regions through displacement. "'And then? Are we to return after four months to eat cow- dung?' he roared at her, rolling up his sleeves. 'Even if the government compensates me with land and money right now, I'm not the kind who'll up and go immediately. I'm going to stay here this monsoon and reap a harvest on my land. Let whatever happens, happen'" (D' Souza 13). The blatant audacity exhibited by Ganapayya is the result of his overly greediness to possess the region.

"Another trend of thought soothed his tortured spirit: 'Anyway, Herambha's leaving his lands. Why can't I harvest them with mine? He can't uproot his rice seedlings and areca palms; he can't take them with him. And he has no one here to watch over them. Let me ask him before he leaves. He's sure to say yes. I'll tell him I'll give him a part of the harvest as his share. This seems to be a good plan. If the officials do come and bother me to leave, I can always bribe them a bit. Let's see." (D' Souza 13)

However, biotic forms namely insects and animals crept inside his residence although he managed to stay away from water of overflooding. On an ironical state, Ganapayya is engulfed by the nature which stands contrary to his thought process which focused on conquering the environment he lived. The encroachment of biotic forms over the settlement of Ganapayya signifies eruption of natural environment.

The overflooding of the river Sharavathi leads to engulfment of ecology of river basin along the settlements around the hamlet Hosamanehalli. The livelihood of Ganapayya along the basin of river Sharavathi is a long event. He had unfavorable and delayed approaches to legal aid to assist himself with the displacement to a new place. This displacement will be a new prospect for Ganapayya as it would change his livelihood on a new dimension. The entire environment might be changed from his occupation to settlement. In order to overcome the displacement, Ganapayya with his utmost potential spirit leads his survival then after with an imperialistic notion. Even though understanding the impacts of non- displacement, he also consciously neglects the idea to extend assistance for help from his father- in- law's house, during the time of overflooding. He had anticipated the effects of overflooding still the force of propulsion to endure the natural calamity proves the imperialistic nature of human kind towards nature. The dominance of Ganapayya over the expected hardship during the time of overflood is because of the conquering spirit over the environmental circumstance he has lived and got accustomed over the years.

Krishnayya as a farm hand in Ganapayya's father in law's house experienced a concealed emotional bond of appeal towards Nagaveni. Owing to circumstantial demand, Krishnayya's presence proves inevitable for assistance to Ganapayya. Krishnayya as assigned by his landlord, made his presence only to extend a moral support to Ganapayya. Instead of being a farm help to Ganapayya, Krishnayya becomes a moral supporter to Nagaveni. With no exception, Nagaveni has encountered the despondence of Ganapayya. Nagaveni who as sheltered under the determination of Ganapayya is also forced to encounter the natural calamity of river Sharavathi.

"'Nagaveni is Yajamanaru's daughter, ten years younger to me', he mused, 'I've carried her, played with her, and helped her grow…. In those days we always spent time together eating, sleeping, playing. Even as she was growing up, I was fascinated with her. I've noticed her firm breasts under her blouse, her arms filling out, her reddened cheeks, her slender swaying waist. I've wanted to be with her all the time, teasing her, making her cry, making her laugh, comforting her, just being with her. It was a longing, a craze. But her mother would always keep an eye on us, watching over us like an eagle." (D' Souza 64)

Krishnayya finds the entire situation a convincing one to stand as a moral supporter to Nagaveni. Nagaveni who has succumbed to mean state of survival, is pleased to endorse any form of comfort. Krishnayya considers this situation as a favorable notion, is found exhibiting his spirit of conquering nature. The potential spirit of Krishnayya is also a reason for Krishnayya's forceful presence in Ganapayya's household.

"But Krishnayya's selfishness prevented him from asking Nagaveni to be circumspect. He wanted her to behave as she did; to talk excitedly, to laugh helplessly in his presence, to ignore her husband while *he* was around. It gave him a certain pleasure and satisfaction." (D' Souza 65)

Krishnayya exhibits his dominance as long- lasting dormant desire which got sprung up with encountering a woman, Nagaveni in utmost desperation. It throws light on Radical ecofeminism. "Ecofeminism can be defined as a "value system, a social movement, and a practice… (which) also offers a political analysis that explores the links between androcentrism and environmental destruction" (Patel and Wagh). As the river Sharavathi is about to overflood, Nagaveni also exists in same state. When encountered by Krishnayya, Nagaveni had an urge to spurt out her suppressed self- confinement. Krishnayya persists the eruption of Nagaveni without knowing that the tightened bond of emotion expelled would engulf Krishnayya himself.

The deeds of Ganapayya and Krishnayya have culminated in an eco-social crisis. Ganapayya reasoned environment to fight against the legality of aid while Krishnayya assured being a farm help of Ganapayya in order be a dormant companion of Nagaveni. The social crisis is explicated when Ganapayya stays against the warning issued from Submersion Office regarding the flooding of river Sharavathi. Similarly, Krishnayya has disrupted the family bond of relationship between Ganapayya and Krishnayya. The nature resonates the discontent on social structure. This assures that the merged form of dominance and dependence exerts self- destruction from either side.

The conquering spirit thrives on an ability to sustain growing search on a profitable merit. The characters have a stern quench to conquer profitable merits existing in the form of environment and a human self. Under the prospect of sustaining the conquering spirit, it resulted in transformation of social life. "This power manifests itself at every stage of the commodity supply chains, which condition the unbalanced distribution of benefits and harms, both natural and social" (Pedregal Villodres and Lukić, 2024). The potentiality endures with sustaining conquering spirit. It revolves with a superior power- based structure. The superior power is exerted over profitable merit. Profitable merits are determined necessities as portrayed by characters.

The dependence and domination have a correspondent relation to each other. Ganapayya depends on environment for his perdurable settlements withholding his occupation and livelihood. When nature challenges such existence, for survival, Ganapayya takes a dominance over it with his utmost potential force. On the other hand, Krishnayya understands that Nagaveni perceives Krishnayya as her sole state of solace. This evidently evince the idea that dependence leads to an opportunity for counterpart to reflect potential dominance. In this respect, conquering spirit focusses on extraction of beneficial measures through dominance from counterpart. The necessary worth of appropriation in the concerned entity is demeaned after each attempt of subjugation. When the loss of value is encountered the potential development in conquering spirit is speculated the least.

Nagaveni, as the river Sharavathi, with her utmost potential tolerance suppressed her balanced emotional self. When emotional balance attained an overwhelmed state, her drowning in flood merges with overflooding of Sharavathi river. River Sharavathi derailed from its basin while Nagaveni intermingles with river symbolizing the overwhelmed state of herself attained through conscious suppression. Krishnayya has drowned himself in overflow of Sharavathi. The stubborn existence of Ganapayya with his family, on an ironical state challenged his survival rather than his environment. Ganapayya was distinct to retain his occupation integrated with farmland and residence. Nevertheless, natural environment proved, an unchallengeable entity.

As a dormant anticipation, it is certain that through forceful endurance to conquer the determined necessities lead to self- destruction. Ganapayya is engulfed by overflooding of river Sharavathi without any prospects for self- escapism. Krishnayya has drowned himself in overflooded river Sharavathi. It signifies that, Ganapayya and Krishnayya have conquered the destructive phase of their desired necessities leading to potential conquering spirit to utter vain. Ganapayya was distinct to retain his occupation integrated with farmland and settlement. Natural environment is an unchallengeable entity as resonated with emotions of humans. Nagaveni, like river Sharavathi, after her potential tolerance to suppress overwhelming unbalanced emotions merges with overflooding of river. The resonance is reclaimed to a lower state when each individual commits oneself to a productive potential with least expectation.

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LETTER OF UNDERTAKING

This is to state that the paper titled, **Resonance of Ecological Imperialism with Radical Ecofeminism**, is our original work along and I/ we take full responsibility for its content. I/ We have acknowledged the sources. I/ We state that this work is not submitted to any other publication for their consideration nor is published previously in the present form.

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TRAUMA AND ITS IMPACT ON COMMUNICATION: A STUDY WITH SPECIAL REFERENCE TO BLESSY'S AADUJEEVITHAM (GOAT LIFE)

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ABSTRACT
This study investigates the intricate relationship between mental wellbeing and a person's ability to communicate effectively, highlighting the importance of communication for human survival. While many individuals, particularly students, experience common issues such as stage fright or fear of communication, some struggle more profoundly due to traumatic events in their lives. By analyzing the character of Najeeb, the protagonist of Blessy's film Aadujeevitham, which is based on real-life experiences, this study draws parallels with a case study of a student facing communication difficulties rooted in trauma experienced in the classroom. The research explores how trauma can deeply affect one's ability to express themselves and how overcoming these challenges is crucial for personal and academic development. Through this dual exploration, the study sheds light on the psychological impact of trauma on communication and offers insights into supportive interventions for individuals facing similar struggles.

Keywords: *Trauma, Mental wellbeing, Communication, Aadujeevitham*

INTRODUCTION
Communication is the ability of an individual to create the exact replication of his/her ideas within the listener. It is the essence of every society for its better understanding and survival. The ability of a person to communicate effectively determines his/her personal success and career growth. At the same time, if one is unable to put forth his ideas he may be marginalized from everywhere and gradually others may not even ask for his/her personal choices at all. Even though stage fear is a common issue of every person in the world, anxiety in communicating needs to be addressed in connection to the traumatic experiences we face in our life. The malayalam movie *Aadujeevitham* (Goat life) directed by Blessy, based on the novel by Benyamin with same title, portrays the theme of mental wellbeing, trauma and its effect in one's communication.

REVIEW OF LITERATURE
The novel *Aadujeevitham* by Benyamin on which this movie is based has been a subject of various literary analysis which explored the themes of isolation, survival, and the loss of identity. Critics have admired the novel for its stark realism and its portrayal of the migrant experience.

The depiction of migrant labor in cinema has garnered significant attention from film scholars, especially within the realms of Indian and global cinema. Movies such as *Gaddhama*, *The Lunchbox*, and *City of Gold* delve into themes like displacement, exploitation, and the quest for identity, offering nuanced perspectives on migration. The study on trauma and communication is very limited and this study itself is a contribution to the same.

METHODOLOGY
The methodology for this study on the Malayalam movie *Aadu Jeevitham* is structured around qualitative content analysis, which allows for an in-depth exploration of the film's narrative, themes, and cultural significance especially the traumatic experiences faced by Najeeb and a parallel analysis of the case study of a student facing communication difficulties rooted in trauma experienced in the classroom. The Researcher has taken inputs from various magazines and journals for this dual exploration.

Najeeb's traumatic experience and its effect on his communication.
Aadujeevitham or Goatlife is the life of Najeeb who went to Saudi Arabia for his livelihood during the 90s. It was a transition from Kerala's greenery to Saudi Arabia's dessert in all dimensions. It was not only a geographic transition but also from an energetic to a numb or dry Najeeb due to the drastic changes in work life, habits and other traumatic experiences in the 'masara'(a goat pen in the desert in Saudi Arabia) where he was forced to work as a slave of an Arab to take care of his goats and camels. This change even resulted in the change of his identity as a result he became extremely panicked when he saw himself in the mirror of a public carrier that came to the masara. The intensity of the change can be understood from the movie review by Neelima Menon published in Mathrubhumi.com. "He is deprived of basic amenities and forced to sleep in a corroded truck. During the day he has to milk and tend the sheep and survive on a frugal meal and rationed water. The Arab takes out his belt and lashes at him for even a trivial act of dissent." In various senses the movie portrays the geographical change of Najeeb from his regular labour at water bodies in Kerala to a forced labour in a desert with rationed water as a traumatic experience. More than this, Arab's belt terrified him for every mistake he

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committed. Especially the mistakes like consumption of enough water for his existence and making use of the opportunity to flee from the masara.

Vignesh Madu clearly states in his online movie review that Najeeb's desert life was a traumatic phase, "He is mostly seen getting physically hurt, either by his master or the goats or the ferocious desert climate. It's also quite natural for anyone going through such a traumatic phase to have suicidal thoughts, but strangely, the film doesn't get a lot into such spaces." Due to all these experiences the talkative keralite became mute. When he landed in Saudi along with his friend Hakkim, both spoke too much about their gulf dreams, but at same time when they met again in the desert Najeeb struggled to speak. The same struggle in Najeeb's communication is evident in the desert scene especially after the death of Hakkim. The traumatic experiences in the desert life made a negative impact on Najeeb's ability to communicate effectively.

Case Study: Impact of Teacher's Behavior on a Student's Communication Skills

Ananya, a bright and cheerful six-year-old, started her academic journey in first standard at a reputed school. She exhibited an innate curiosity, excellent problem-solving skills, and a keen interest in learning. Her parents were supportive and encouraged her to express her thoughts and ideas freely at home.

Ananya's initial enthusiasm for school began to wane within a few months. Her parents noticed a marked change in her behavior—she became withdrawn, avoided talking about school, and started hesitating to express her thoughts even at home. Over time, she also began stuttering during conversations, a behavior she had never displayed before.

Concerned about these changes, Ananya's parents sought feedback from her teachers and classmates. They discovered that Ananya's first standard teacher had a habit of shouting at students who made mistakes or failed to follow instructions promptly. The teacher's terrifying demeanor created an environment of fear rather than learning. Ananya, being a sensitive child, was deeply affected by this behavior.

In one particular incident, the teacher publicly scolded Ananya for a minor mistake during a class activity. The loud reprimand and the attention it drew from her peers made her feel humiliated. This incident became a turning point, as Ananya started associating communication with the fear of being judged or reprimanded.

Impact on Ananya's Communication Skills

- **Fear of Expression:** Ananya became reluctant to speak in class, fearing that she might say something wrong and face her teacher's wrath.
- **Stuttering:** The constant anxiety led to the development of a stutter, which further hampered her confidence.
- **Social Withdrawal:** Ananya avoided interacting with her classmates, fearing they might mock her or report her mistakes to the teacher.
- **Decline in Academic Performance:** Her reluctance to ask questions or participate in discussions led to gaps in her understanding of subjects, which reflected in her declining grades.

As John Finch, clinical psychologist, explains in his article titled 'How does trauma affect communication',

Trauma survivors may use vague or guarded language, or avoid talking about the traumatic event altogether. This can come in the form of not even talking about topics that have emotional content. Feeling detached from family and friends is a common trauma symptom and can obviously make it hard to open up with others or to experience empathy. Trauma survivors can sometimes describe a wall between them and others. "Zoning out", feeling like everything is surreal or as if you are outside your body is something that can occur to trauma survivors and can make it hard to be present during communication. (https://ccp.net.au/how-does-trauma-affect-communication/)

RECOMMENDATION AND CONCLUSION

Najeeb and Ananya faced all the above mentioned communication issues stated by Mr Finch due to the circumstances that they have undergone. Irrespective of age, traumatic experiences of an individual can result in a negative impact on their ability to communicate effectively. If it is in childhood as in Ananya's case the impact would be more severe. Timely parental and teachers support and counselling can help her to regain the track. The same is applicable in regaining the mental stability of Najeeb. As he managed to escape the tragic situations of Masara and desert, he got his life back in kerala which resulted in his mental wellbeing.

Every individual including parents and teachers should have a basic knowledge in psychology and mental wellbeing. The Parents and teachers trying to control kids through shouting and terrifying nature are actually deteriorating their personality and confidence to face life. Even though the effect is lesser the same is applicable for adults as well. The terrifying experience in our workplace can make us mute and socially detached.

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UNDERSTANDING THE ROLE OF ORGANIZATIONAL MINDFULNESS AND ERROR MANAGEMENT CULTURE IN ENHANCING ORGANIZATIONAL AGILITY

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ABSTRACT

This study explores the interplay between organizational mindfulness, error management culture, and organizational agility. A quantitative survey was conducted among 115 working professionals in India. Findings indicate that organizational mindfulness significantly influences both error management culture and organizational agility. Additionally, error management culture partially mediates the relationship between organizational mindfulness and agility. These findings emphasize the importance of cultivating a mindful and error-tolerant culture to enhance adaptability in organizations.

Keywords: *Organizational Mindfulness, Error Management Culture, Organizational Agility, Mediation*

1. INTRODUCTION

The rapidly evolving business landscape demands that organizations enhance their agility to respond effectively to uncertainty. Globalization, technological advancements, and unforeseen crises (e.g., the COVID-19 pandemic) highlight the need for organizations to develop adaptive mechanisms. However, traditional management practices are often inadequate in volatile environments.

Organizational mindfulness—defined as an enhanced awareness of operational complexities—and error management culture, which fosters constructive error handling, are potential enablers of organizational agility. This study investigates how these constructs interact to influence agility, particularly within the Indian business context.

2. LITERATURE REVIEW

2.1 Organizational Mindfulness

Organizational mindfulness involves five key dimensions: preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise. Mindful organizations are better equipped to anticipate risks and respond proactively to dynamic changes.

2.2 Error Management Culture

Error management culture promotes open communication about errors, rapid problem-solving, and collective learning. It reduces fear of failure, fosters innovation, and enhances problem-solving capabilities.

2.3 Organizational Agility

Organizational agility enables firms to swiftly restructure processes in response to environmental changes. Research suggests that agility is closely linked to risk-taking, proactive decision-making, and continuous learning. While prior research has examined these constructs individually, few studies have explored their interrelationships. This study aims to bridge this gap.

3. METHODOLOGY

3.1 Research Design & Participants

A correlational quantitative design was employed. A convenience sample of 115 full-time employees from various Indian industries (IT, banking, fashion, etc.) participated. The inclusion criteria required a minimum of 1.5 years of work experience.

3.2 Measures

Organizational Mindfulness Scale (Mu & Butler, 2012) – 21 items, 7-point Likert scale

Error Management Culture Scale (van Dyck et al., 2005) – 17 items, 5-point Likert scale

Organizational Agility Scale (Lee et al., 2015) – 12 items, 7-point Likert scale

3.3 Procedure & Analysis

Surveys were distributed online. Data analysis was conducted using statistical software, employing correlation and mediation analyses to examine relationships among the variables.

4. RESULTS

Table 1.1

Correlation Matrix						
		OM		**EMC**		**OA**
OM	Pearson's r	—				
	p-value	—				
EMC	Pearson's r	0.617	***	—		
	p-value	< .001		—		
OA	Pearson's r	0.626	***	0.544	***	—
	p-value	< .001		< .001		—
Note. * p < .05, ** p < .01, *** p < .001						
Table 1.2 demonstrates correlations between organizational mindfulness, error management culture and organizational agility.						

Table 1.3

Mediation Estimates						
Effect	**Label**	**Estimate**	**SE**	**Z**	**p**	**% Mediation**
Indirect	a × b	0.112	0.0416	2.70	0.007	25.1
Direct	c	0.335	0.0638	5.25	< .001	74.9
Total	c + a × b	0.447	0.0520	8.61	< .001	100.0

4.1 Descriptive Statistics & Correlations

Organizational mindfulness ($M = 107$, $SD = 17.9$) showed a significant positive correlation with both error management culture ($r = 0.617$, $p < .001$) and organizational agility ($r = 0.626$, $p < .001$). Error management culture also correlated positively with agility ($r = 0.544$, $p < .001$).

4.2 Mediation Analysis

Mediation analysis revealed that error management culture partially mediates the relationship between organizational mindfulness and agility (25.1% mediation, $p = 0.007$), suggesting that while mindfulness directly enhances agility, a portion of this effect is explained through error management culture.

5. DISCUSSION

Findings affirm that organizational mindfulness significantly impacts both error management culture and agility. Organizations that cultivate mindfulness are better equipped to identify and manage errors, fostering a culture that supports adaptability and resilience. These results align with prior research, which highlights the importance of mindfulness in enhancing workplace adaptability.

While error management culture plays a mediating role, it does not fully account for the relationship between mindfulness and agility. Future research should explore additional mediators, such as innovation capability and proactive organizational behavior.

6. CONCLUSION

This study contributes to the growing literature on organizational agility by highlighting the interplay between mindfulness and error management culture. Findings suggest that fostering a mindful work environment and a constructive approach to errors can enhance an organization's adaptability to change.

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THE ROLE OF NON-GOVERNMENTAL ORGANIZATIONS IN PREVENTING HUMAN TRAFFICKING AND FACILITATING REHABILITATION: A CASE STUDY OF EIGHT BROTHERS SOCIAL WELFARE SOCIETY

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1. INTRODUCTION

Human trafficking refers to the illegal trade and exploitation of individuals, often for purposes such as sexual slavery, forced labor, or commercial sexual exploitation. According to the United Nations Convention against Transnational Organized Crime (UNTOC), trafficking in persons involves the recruitment, transportation, transfer, harboring, or receipt of individuals through means such as threat, coercion, abduction, fraud, deception, abuse of power or vulnerability, or giving payments to gain control over another person, primarily for the purpose of exploitation (UNODC, 2004). In India, human trafficking, particularly of women and children, remains a serious and widespread issue. States such as Andhra Pradesh, West Bengal, Maharashtra, Tamil Nadu, Haryana, Gujarat, Jammu and Kashmir, Karnataka, Bihar, Odisha, and Delhi have been identified as major source and destination areas for trafficking (National Crime Records Bureau [NCRB], 2022). Additionally, regions near international borders are especially vulnerable due to poor socio-economic conditions, porous boundaries, and lack of enforcement, which facilitate cross-border trafficking (Bales, 2007; UNODC, 2014). Like, other places in India, Assam also has the issue of trafficking. As Assam is situated in North east region of India and it connect with near Boarder areas of other country such as China, Bhutan, Nepal, and Bangladesh, so it is easy for the traffickers and middle man to continue the trade of human. In Assam it has been seen that women and girl child are trafficked to all state of India. Most of them suspected to be trafficked to big cities where they are forced into a lifetime of bonded labor or end up as prostitutes.

2. OBJECTIVE OF THE STUDY

1. To know about the different schemes performed by NGO under Ministry of Women and Child Development.
2. To understand the various factors which influence human trafficking.
3. To know about the preventive measures taken for minimizing women trafficking.
4. To identify the different strategies adopted by the NGO for rehabilitation for the victims.

3. LITERATURE REVIEW

Human trafficking remains one of the gravest human rights violations globally, involving the exploitation of individuals through force, fraud, or coercion for various purposes, including forced labor, sexual exploitation, and organ trade (UNODC, 2020). Numerous studies have underscored the multifaceted nature of trafficking, often linked to poverty, illiteracy, migration, unemployment, and gender inequality (Chuang, 2014; Kara, 2017). Non-Governmental Organizations (NGOs) have emerged as critical actors in combating human trafficking, both in terms of prevention and rehabilitation. According to Gallagher and Holmes (2008), NGOs play a pivotal role in policy advocacy, victim identification, legal assistance, and the reintegration of survivors. Their proximity to vulnerable communities and grassroots networks makes them uniquely positioned to address trafficking from a bottom-up perspective.

In India, where trafficking is both inter-state and transnational, NGOs have worked extensively with law enforcement and social welfare departments to provide holistic support to victims (Sen & Nair, 2004). For instance, anti-trafficking initiatives by NGOs often include rescue operations, provision of temporary shelters, psychological counseling, vocational training, and legal aid (Bhattacharjee, 2009). Moreover, community awareness and education campaigns led by NGOs have significantly contributed to early detection and prevention. A study by Banerjee and Das (2016) emphasized that community vigilance and school-level interventions could reduce trafficking risks among adolescents, particularly in rural and tribal areas.

The Eight Brothers Social Welfare Society, a grassroots organization based in Assam, has been acknowledged for its proactive efforts in both preventing trafficking and rehabilitating survivors. While there is limited academic literature specifically on this organization, reports and field documentation suggest their involvement in community mobilization, coordination with local police, and skills-based rehabilitation programs.

Overall, the literature highlights that while NGOs face challenges such as limited funding, political resistance, and safety threats, their role in anti-trafficking efforts remains indispensable. More case-based research is

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needed to document local practices and the effectiveness of rehabilitation models employed by organizations like the Eight Brothers Social Welfare Society.

4. METHODOLOGY FOR THE STUDY

The present study examines the role of the non-governmental organization *Eight Brothers Social Welfare Society* in addressing the issue of women trafficking and the rehabilitation of victims within the community.

4.1 Study Area:

The research was conducted in the Sonitpur district of Assam, which has been identified as a region vulnerable to trafficking, particularly in tea garden areas.

4.2 Population:

The target population for the study comprised women victims of trafficking belonging to the tea tribe communities within the district.

4.3 Sample Size:

A purposive sample of 33 women victims was selected for the study to ensure the inclusion of individuals with direct experience related to the research objectives.

4.4 Data Sources:

Both **primary** and **secondary** sources of data were utilized.

4.4.1 Primary data were collected through structured interviews, case studies, and personal interactions with the victims and members of the NGO.

4.4.2 Secondary data were gathered from published reports, government documents, research articles, and records maintained by the NGO.

5. FINDINGS OF THE STUDY

5.1 Schemes performed by NGO under Ministry of Women and Child Development

The **Ministry of Women and Child Development,** Government of India, was established with the primary objective of addressing critical gaps in state-level interventions concerning the welfare of women and children. Its mandate includes fostering inter-ministerial and inter-sectoral coordination to formulate and implement gender-equitable and child-centric legislation, policies, and programmes. A significant proportion of the Ministry's initiatives are implemented through **non-governmental organisations (NGOs),** with continued efforts to enhance the effectiveness and scope of NGO participation in programme delivery. In recent years, the Ministry has undertaken several key policy measures, including the **universalization of the Integrated Child Development Services (ICDS)** and **Kishori Shakti Yojana**, the introduction of a **nutrition programme for adolescent girls**, the **establishment of the National Commission for Protection of Child Rights**, and the enactment of the **Protection of Women from Domestic Violence Act**. These initiatives collectively reflect a comprehensive approach to advancing the rights and welfare of women and children across the country.

5.2 Different Women Empowerment Schemes

1. Beti Bachao Beti Padhao Scheme
2. One Stop Centre Scheme
3. Women Helpline Scheme
4. UJJAWALA: A Comprehensive Scheme for Prevention of trafficking and Rescue, Rehabilitation and Re-integration of Victims of Trafficking and Commercial Sexual Exploitation
5. Working Women Hostel
6. Ministry approves new projects under Ujjawala Scheme and continues existing projects
7. SWADHAR Greh (A Scheme for Women in Difficult Circumstances)
8. NARI SHAKTI PURASKAR
9. Awardees of Stree Shakti Puruskar, 2014 & Awardees of Nari Shakti Puruskar
10. Awardees of Rajya MahilaSamman&ZilaMahilaSamman
11. Mahila police Volunteers

12. Mahila E-Haat
13. Mahila Shakti Kendras (MSK)
14. NIRBHAYA

The present report is basically prepared on the UJJAWALA: A Comprehensive Scheme for Prevention of trafficking and Rescue, Rehabilitation and Re-integration of Victims of Trafficking and Commercial Sexual Exploitation. The scheme has been initiated on April 2016 with a motive conceived primarily for the purpose of preventing trafficking on the one hand and rescue and rehabilitation of victims on the other.

5.3 Objective Of The Ujjawala Scheme

- To prevent trafficking of women and children through social mobilization and involvement of local communities, awareness generation programmes, generate public discourse through workshops/seminars and any other innovative activity.
- To facilitate rescue of victims from the place of their exploitation and place them in safe custody.
- To provide rehabilitation services both immediate and long-term to the victims by providing basic amenities/needs including counselling, legal aid and guidance and vocational training.
- To facilitate reintegration of the victims into the family and society at large.
- To facilitate repatriation of cross-border victims to their country of origin.

5.4 Role of NGO

Non-Governmental Organizations (NGOs) operate either through financial support from governmental sources or through self-funding mechanisms. Their primary objective is to serve marginalized and vulnerable sections of society by empowering them to become physically, mentally, and socially capable of resisting various forms of exploitation.

In recent years, numerous NGOs have taken active roles in combating human trafficking. Their efforts include coordination with government agencies or functioning independently to address the complex challenges posed by trafficking. Given the limitations faced by law enforcement agencies—such as staffing shortages, inadequate infrastructure, and lack of specialized training in handling trafficking cases—as well as the overburdened judiciary, NGOs have emerged as critical actors in the processes of **rescue, rehabilitation, reintegration**, and **legal support** for survivors. Their interventions have significantly contributed to the effective implementation of the **Immoral Traffic (Prevention) Act, 1956.**

Despite constraints related to funding and resources, NGOs have demonstrated remarkable efficiency and commitment in combating human trafficking. Their role is increasingly viewed as complementary to that of the police, particularly in investigation and victim rescue operations. NGOs are often recognized for their **participatory, innovative, and community-based approaches**, which enhance the responsiveness and relevance of interventions in the field.

Moreover, NGOs have played a vital role in **raising public awareness** about trafficking and related social issues. Through the publication of newsletters, scholarly articles, and organizing seminars and conferences, they have fostered academic and policy dialogue. Many also undertake surveys and field research to highlight the realities of human rights violations and bring visibility to the lived experiences of survivors.

5.5 Mode of Working by NGO

Non-Governmental Organizations (NGOs) have adopted a range of strategic approaches to address the complex issue of human trafficking. Their interventions are often case-specific and tailored to meet the unique needs of each rescued individual. Upon rescue, NGOs assess the type of support required—be it medical care, psychological counselling, educational assistance, or vocational training and employment based on the survivor's skills and background.

In several instances, NGOs also work toward **family tracing and reintegration**, particularly in cases involving missing or trafficked minors. Some organizations proactively engage in surveillance and identification efforts by monitoring transportation hubs such as airports and railway stations, seeking to identify potential trafficking victims.

NGOs play a critical role across multiple dimensions of anti-trafficking work, including **prevention, protection, rescue, and reintegration**. They have been instrumental in providing actionable intelligence to law enforcement agencies, assisting in rescue operations, and facilitating legal proceedings against traffickers.

 ISSN 2394 - 7780

Despite their commitment and contributions, NGOs face significant challenges. A major impediment is the **lack of prioritization of human trafficking** as a serious crime by both government and law enforcement bodies. Moreover, **institutional corruption** among certain police officials, bureaucrats, and legal authorities often enables traffickers to evade accountability, thereby weakening the enforcement of anti-trafficking laws. This systemic apathy and corruption not only hinder justice for survivors but also discourage NGOs in their efforts to tackle this deeply rooted issue.

5.6 About Eight Brother's Social Welfare Society

Eight Brothers Social Welfare Society was shaped on 06.06.1996 as a Non- Governmental Organization and registered under Society Registration Act 1860 on 15/03/1999 with its Head Office at Tezpur, Administrative Office at Guwahati and Branch Office at Gohpur. It is established with the objective of helping hand to marginalized section of the society. The organization have been working in the field of social welfare, self employment, health and family welfare and road safety activities since 1996 with mobilization of fund from community and grant in aid of Government of Assam and different Ministries of Government of India.

I. Objectives of the Organization:

(a) Capacity Building, Skill Up gradation

(b) Economic Up-liftmen of Rural people

(c) Health and Family Welfare,

(d) Development of Youth Affairs

(e) Social Welfare Activities,

(f) Road Safety and Traffic Awareness,

(g) Women and Child Development

(h) Promotion of Cultural Heritage.

(i) Research and Publication.

(j) Women and Child Development,

II. Major Activities of the Organization in the Last 3 year:

The NGO have been implementing various project related to women and child development, minority women, health and family welfare , promotion of handicrafts etc under different Ministries and Department of Assam like Ministry of Women & Child Development, Govt. of India, Central Social Welfare Board, Ministry of Minority Textiles, Govt. of India, Ministry of Minority Textiles, Govt. of India, Ministry of Youth Affairs, Govt. of India , New Delhi, Social Welfare Department, Govt. of Assam. The main leading projects has been implementing by the organization are Ujjawala, Specialisation Adoption Agency, Family Councelling Centre, Working Women Hostel, National Creche Programme, Ambedkar Hastsilpa Vikash Yojana etc. in Sonitpur and Biswanath District particularly.

6. DATA ANALYSIS

Table –I: Age classification of the respondents

Age Group	Number of Respondents	Percentage
Below 12	2	6.06%
12-14	2	6.06%
14-18	10	30.30%
18-25	16	48.48%
Above 25	3	9.10%
Total	33	100%

Source- Field Survey

Interpretation: From the above table it is seen that the victims were mostly between 18-25years of age.

Table –II: Qualification classification of the respondents

Education	Number of Respondents	Percentage
Illiterate	18	54.54%
L.P(Class 1-5)	3	9.09 %
U.P(Class 6-8)	7	21.21 %

High School (Class 9-10)	2	6.06 %
Above Class 10	3	9.10%
Total	33	100%

Source- Field Survey

Interpretation: From the above table it is seen that the victims were mostly illiterate and school dropout.

Table –III: Classification of the people involved in Trafficking

Category of people	Number of Respondents	Percentage
Kidnap	6	18.18%
Stranger	7	21.21%
Neighbor	12	36.36%
Family	7	21.21%
Missing	1	3.04%
Total	33	100%

Source- Field Survey

Interpretation: From the above table it is seen that the person involved in trafficking falls under different category, but most of them are seen to be neighbours.

Table –IV: Classification of the reasons behind Trafficking

Factors	Number of Respondents	Percentage
Marriage	7	21.21%
Job	12	36.36%
Medical treatment	2	6.06%
Education	7	21.21%
Any other	5	15.16%
Total	33	100%

Source- Field Survey

Interpretation: The above table shows that majority of the victims fall in search of job , fake marriage proposal and education comes rest.

7. PREVENTIVE MEASURES TAKEN TO OVER THE PROBLEM

- **Prevention:** Prevention as one of the components of the scheme, Eight Brothers Society Welfare. Society has been taken the following activities from time to time as a part of prevention programme.
- **Awareness Camp:** To make people aware and alert against trafficking Eight Brothers organized awareness camps in different places of entire Sonitpur and Biswanath district specially in tea garden areas in every month.
- **Formation of Community Vigilance Group:** CVG plays an important role to prevent trafficking against women and children. So far Eight Brothers' form more than 150 nos. of CVG in entire Sonitpur District they create a network to observe suspected persons in villages. Thereby they trying to identify the local agents of this organized crime.
- **Formation of Balika Sangha:** Most of the blocks of Sonitpur district inhabited by tribal people. The poor girl child is frequently caught by miscreants who exploit them by giving false promises of job, money and marriage. Therefore, EB has formed many Balika Sanghas with the objective of monitoring any such kind of unusual incidents that take place within the village and informed the authority concern for necessary action

Sensitization Programmes: To aware some stakeholder the organization organized two workshop in every year. To make people aware of the trafficking of women and children, being carried on by some anti-social groups of people, which has emerged as a challenge to protect basic human rights.

- **Street Play:** Since it is a vital medium to connect, a desired message can be transmitted directly and easily to the common people. Keeping in view the effectiveness of this mass-media EB displayed street play on women trafficking issue in various parts of Sonitpur district.
- **Networking with local police stations and voluntary organization**: In the process of rehabilitation of victims under project "Ujjawala" and its successful implementation Eight Brothers' has been closely

working with various voluntary organizations and local police station for gathering information about the victims.

- **Leaflets, pamphlets distribution:** To disseminate information regarding women trafficking as well as about the project "Ujjawala" leaflets, pamphlets are distributed by Eight Brothers' NGO among the masses.

8. MAJOR FINDINGS , SUGGESTION AND RECOMMENDATION:

- Field observations suggest that each tea estate faces distinct socio-economic and gender-specific challenges, with women often bearing the brunt of systemic vulnerabilities. Broader issues such as poverty, poor health infrastructure, and lack of educational opportunities further compound the risk of women falling prey to trafficking. These factors collectively create conditions conducive to exploitation and trafficking within these communities.

- One significant observation is the lack of parental awareness and vigilance. Many parents send their children to distant workplaces without verifying the legitimacy or safety of the employment. In such cases, they neither retain records of the employers nor have contact information, thereby limiting their ability to assist law enforcement in the event of a disappearance.

- Another critical finding is the reluctance of community members to report missing children. Fear of police harassment, coupled with low literacy levels and limited awareness of legal rights, prevents timely reporting. The general mistrust of law enforcement agencies and lack of knowledge about legal provisions further delay intervention and rescue efforts.

- The psychosocial impact on survivors of trafficking is also severe. According to the survey, many victims face social ostracism and stigma, resulting in low self-esteem, social withdrawal, and an inability to reintegrate into society. The trauma experienced leaves a lasting impact, making it difficult for them to trust others or participate in communal life.

- However, there is a growing trend of awareness and resistance, particularly among the younger and more educated generations in these communities. Young men and women are increasingly conscious of trafficking-related issues and are beginning to raise their voices against injustice.

- Non-Governmental Organizations (NGOs) have played a pivotal role in this shift. Their efforts in conducting awareness programmes, rights-based education, and community mobilization have empowered residents to recognize exploitation and demand accountability. These interventions are gradually building community resilience and encouraging proactive measures to prevent trafficking.

13. RECOMMENDATIONS

This study aims to assist government authorities and human rights institutions in identifying and addressing the underlying causes of women trafficking in tea garden regions. Multiple root factors contribute to the vulnerability of women and girls in these areas, yet the lack of systematic data and contextual understanding has hindered effective governmental intervention. One of the key challenges in mitigating trafficking is the occasional involvement of local community members, which further complicates detection and prevention efforts.

By uncovering these socio-economic and structural drivers through empirical research, the present study provides valuable insights that can inform the formulation of targeted policies and preventive strategies. It is anticipated that the findings will support the development of comprehensive measures aimed not only at reducing trafficking but also at promoting the socio-economic welfare of women and girl children belonging to tea garden communities and other marginalized groups.

14. CONCLUSION

Over the years, women trafficking has persisted as a critical and deeply entrenched issue in society. Although it is not a new phenomenon, its manifestations continue to evolve, often affecting vulnerable populations in marginalized regions. This study attempts to explore the dynamics of women trafficking within the context of tea garden communities, drawing insights from both primary data collection and field-based personal observations.

While only a limited number of trafficking cases were identified in the selected tea garden areas, this does not imply the absence of such activities. The findings may be constrained by the limited timeframe of the study and the small sample size of respondents. Nevertheless, the study reveals that several triggering factors, such as poverty, lack of awareness, and social vulnerabilities, contribute to the risk of trafficking. Importantly, the

ISSN 2394 - 7780

research highlights a growing awareness among the local population regarding human trafficking and related social issues.

A key focus of this study is the awareness levels within tea garden communities, particularly among the younger generation, who are increasingly gaining access to formal education. This shift has contributed to improved understanding of social rights and responsibilities, equipping young men and women to recognize exploitation and challenge harmful practices. Such progress, though gradual, signals a positive change and offers hope for reducing the incidence of trafficking in these areas through education, empowerment, and community-based awareness initiatives.

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A STUDY ON MARITAL STATUS AND EMPLOYMENT OPPORTUNITIES FOR WOMEN IN THE WORKPLACE: A DE&I PERSPECTIVE

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ABSTRACT
Most organisations attempt to establish an inclusive environment for people with varied characteristics such as race, ethnicity, religion, handicap, gender, and sexual orientation. DE&I is an acronym that refers to the three values that most modern organisations want to promote to cater for the needs of the diverse population. It means that sustaining DE&I initiatives can help organisations be more adaptable to change, get competitive access to the best candidates, and serve diverse customers and markets. Concerning DE&I, organisations have asked themselves how much they are prepared to support employees. This research paper aims to analyse the impact of marital status on women's employment prospects in the workplace with a special reference to diversity, equity, and inclusion. This study will help us understand how gender and marital status, which are frequently overlooked as aspects of identity, influence women's job advancement. Using the concept of intersectionality, the study analyses the various challenges that women face depending on their marital status: single, married, divorced, or widow. The research of this paper is based on the results of the survey conducted among 200 women of different ages, either studying or working in different industries and holding various positions, to identify patterns and tendencies of the relationship between marital status and employment consequences. The study also explores the single, divorced and widowed women who may experience various forms of discrimination and prejudice at the workplace. The paper concludes by providing a set of suggestions for organisations to encourage better representation and fair treatment of women of different marital statuses. The present study is based on primary data; the researcher has collected data from respondents through a structured questionnaire. The sample size for the present study was 200 respondents, and a combination of convenience & snowball sampling methods was used for the study.

Keywords: Marital Status, Intersectionality, Diversity, Equity, Inclusion, Workplace.

INTRODUCTION
The approach to managing organisations today has evolved from the traditional management perspective to accommodate DE&I with an emphasis on minority groups. When organisations take an interest in DE&I activities, it becomes evident that they tackle discrimination, respect, and organisational effectiveness in corporations. DE&I is no longer a mandate of doing the right thing for the good of marginalised communities. However, it is a survival tool in today's globally connected business environment. Businesses that commit to DE&I activities will be able to efficiently source for and manage the best employees while also developing positive relationships with customers, investors, and a variety of other stakeholders, as well as driving innovation. The implementation of DE&I values within an organisation can improve the company's image, increase employee productivity, and subsequently enhance the company's financial condition. While managing diversity, equity and inclusion, organisations have to follow practical DE&I approaches that can support organisational objectives. The recognition of DE&I as a critical component of organisational growth supports its strategic importance as a fundamental factor influencing organisational sustainability and competitiveness.

Companies today are being judged based not only on financial returns but also on factors such as DE&I. Organisations are evaluated for their effectiveness to cater for the demographic characteristics of individuals at various career levels, in diverse positions, as well as across regions. In this regard, the focus on DE&I is appropriate for transforming consumers who make purchase decisions based on firms' true social responsibility and ethical standards. Research shows that organisations with a clear DE&I objective enjoy significant advantages: customers are four times more likely to purchase from that company, six times more likely to come to its defense even with negative criticism, five times more likely to endorse that company to other people and finally four times more likely to have confidence in that company. Therefore, it is for this reason that the pursuit of DE&I efforts not only benefits an organisation in terms of image but also ultimately in terms of customers, sales, and stock price in the modern socially-conscious business environment.

The adoption of DE&I policies and practices in organisations is a business imperative for organisations that have aimed at promoting a diverse, productive, creative and innovative organisational culture. Choosing DE&I means that businesses gain a range of values that ultimately contribute to the organisation's success and growth. Managing a diverse workforce is a good way to gather professionals with different backgrounds and experiences, and thus, it can develop creativity and improve problem-solving skills. Diversity management seeks to incorporate everyone into the processes, where all opinions are respected and taken into account, hence making it much more efficient and effective. This diversity of thought and inclusive approach drives innovation, as evidenced by studies showing that gender-diverse companies innovate faster and that culturally diverse companies introduce new products to the market more quickly. However, one cannot undermine the effectiveness of DE&I promotion as a great talent attraction and retention tool. The young generation of employees, like Gen Z, look for organisations' policies that are fair and equal as well as an organisation that will make them feel they belong there. In this way, creating a tolerant organisational culture allows for a decrease in the rate of turnover and keeps the efficient employees in the company. (Radancy, 2024) Apart from the ethical reasons, DE&I is a must-adopt organisational strategy. A diverse company is profitable, and employees in ethnically and gender-diverse companies are 39% more likely to outperform their counterparts in other companies. This has not only improved the level of satisfaction among the employees, but also their efficiency, cooperation, management skills, innovation and organisational adaptability. (Quantive, 2024) However, modern businesses cannot consider DE&I solely as an obligation but would instead view it as an opportunity to gain a competitive edge. Thus, DE&I can be perceived not just as a set of principles for managing ethnic, cultural, gender, and other differences but also as an effective tool for developing a successful strategy and encouraging growth and change in an organisation's work environment in an era of globalisation and diversity.

DE&I refers to the intentional and ongoing effort to create an environment where all individuals, regardless of their background, identity, or characteristics, feel valued, respected, and empowered to contribute their unique perspectives and talents. DE&I is not just about numbers or statistics but about creating a culture that is inclusive, equitable, and just. It involves recognising and addressing the systemic and structural barriers that prevent certain groups from fully participating and thriving and working to create a more equitable and just society. DE&I is not a one-time event or a single initiative but a continuous process that requires ongoing effort, commitment, and engagement from all stakeholders.

Intersectionality is the social justice concept that studies how multiple forms of identity – including but not limited to race, gender, class, sexuality, and ability can produce different experiences of power for an individual. Proposed by Kimberlé Crenshaw towards the end of the 1980s, intersectionality means that the discriminated person cannot be discriminated against based on one aspect of his or her persona but is discriminated against based on the interaction of these aspects. This approach sheds light on the limitations of conventional assessments that rarely capture the complexity of the problems that vulnerable groups experience. For example, while equality may be defined differently for women and men, the Black woman may struggle with discrimination in a manner the Black man or the white women would unlikely experience. Using intersectional analysis, scholars and activists could identify structural discrimination at work, which is still prevalent in modern society, and defend a program that meets the diverse needs of individuals. Finally, intersectionality becomes an important tool in the pursuit of social justice and equality across multiple areas. (Gary Goertz, 2008)

REVIEW OF LITERATURE

For the present study, the researcher reviewed various published journals, research articles, & books that were related to DE&I.

"The Importance of Diversity, Equity, and Inclusion in Orthopaedic Research" by **Tamara Alliston et al. (2020)** acts as a background for the paper as it demonstrates the relevance of DE&I practices in the orthopaedic research field. The authors argue that diverse teams work more efficiently and can introduce innovations that would ultimately improve patients' care. They note that, currently, women and racial and ethnic minorities are particularly scarce; although there has been some improvement in women, issues of racial and ethnic representation still prove to be a concern. Based on the authors' work, some of the issues affecting underrepresented minorities' progression in orthopaedics are a scarcity of role models as well as uplifts and increased attrition in residency among underrepresented minorities (URMs). Such systemic problems explain why more specific approaches are required. The article also implores academic institutions and journals to elevate DE&I, proposing the funding and implementation of successful mentorship and policies for marginalized people. Besides, by focusing on continued investigation of DE&I practices and impacts on orthopaedic results, the authors claim that the improvement of DE&I is an ethical imperative as well as the necessity to provide higher-quality health care. The idea of this approach is to make the community within the field of orthopaedics more diverse and less prejudiced in any way. Thus, the paper by Alliston et al. (2020) highlights the insufficiency of DE&I in orthopaedic studies and the necessity of its improvement. This is a positive step their request for academic institutions and journals for increased DE&I through promotions and supportive policies for the needy will help create this environment thus improving healthcare delivery systems for diverse communities.

"Is there a glass ceiling or can racial and ethnic barriers be overcome? A study on leadership positions in professional Belgian football among African coaches" by Chris Heim, Joris Corthouts & Jeroen Scheerder (2020) looks at the current state of African coaches in the leadership positions in professional football in Belgium. The research also looks at the role that racism and ethnicity play as causes of the lack of representation of these coaches at the managerial level. Carrying out qualitative and quantitative analysis, the authors investigate the experiences of African coaches, evaluating the possibility of the barriers' elimination and the presence of 'the glass ceiling'. Therefore, it is recommended to initiate specific measures and reforms to increase the representation of women and people of colour in positions of authority in the field of coaching in Belgian football.

Ghada Barsoum (2018), this research article explains how educated women in Egypt make their employment choices due to the constraints of social culture, lack of child care and weak protection by law. Based on the study, it suggests increasing gender-sustainable norms, increasing accessible childcare, improving legal frameworks, encouraging flexible working conditions, and increasing the training in skills to increase the rate of women's employment and to support gender equality in the workplace. (Barsoum, 2018)

Ellen Ernst Kossek & Patrice M. Buzzanell (2018), this paper mainly examines the challenges facing the equality of women and their leadership advancement in organisations. The research aims to understand the systematic barriers to women's promotion, to investigate the part of organisational culture and practices, to discuss the findings and to conclude the effective practices for women's leadership. Sexism, unsupportive management and the absence of role models and other policies that support working mothers contribute to the slow rate at which women are promoted. Thus, the authors suggest that organisations should adopt potential work arrangements supported by sound organisational policies which also entail encouragements to mentorship and diversity training. They stress on the organisational leadership support for gender equality and the use of metrics to track and predict gender change for women's career advancement and leadership pipeline. (Buzzanell, 2018)

The research article **'Women and Work around the World'** by **Abigail M. Folberg** (2020) offers insights into the various opportunities as well as hurdles that women face in and through work across various cultures and economies. The main research questions are as follows: What are global trends, cultural values, and institutional policies govern women's employment and career advancement? What practices foster gender equity in the workplace? According to research, as women enter the workforce around the world, they confront distinct problems such as gender bias in the workplace, income disparities, and limited promotion opportunities. The article also stresses the need to ensure that solutions to the problems are relevant in the respective countries, this is expected to consider models that have been effective in increasing women's employment across different countries. Recommendations also embrace institutions of favourable working conditions like flex time and maternal/father`s leave among others, ventures that seek to alter community perception about women's work. As a result, establishing equal opportunities for women in the workplace can help them advance in their careers and contribute to overall economic development. (Folberg, 2020)

Female conservation leaders' experiences are discussed in the article entitled **"Challenges and Support for Women Conservation Leaders"** by **Megan S. Jones and Jennifer Solomon (2019)**. The study investigates several concerns, including salary discrimination, sexual harassment, and informal exclusion, all of which are exacerbated by race and/or age differences. Research findings show that all the interviewed women described various gendered barriers at their workplace. The authors suggest the adoption of gendered organizational practices in the form of mentorship, training against bias, and women-supportive networks in a bid to improve women's leadership in the conservation of natural resources. Thus, this study shows the necessity to enhance the conservation results and ensure an environment where a range of stakeholders feel welcome. (Solomon, 2019)

The article **" Feminist Ideologies at Work: Culture, Collectivism, and Entrepreneurship among Disadvantaged Women in India"** by **Punita Bhatt & Supriya Garikipati (2024)**, the research intends to reveal the impact of feminism in forming women's entrepreneurship and the equipment that enables them. Primary conclusions indicate that although collectivist values ensure community support, they also perpetuate patriarchy that constrains women's decision-making. The authors propose the adoption of the following policies to advance women's entrepreneurship, business resources and training and change cultural attitudes. This way, the study promotes an inclusiveness that aims at effectively improving the economic status of disadvantaged women in India. (Garikipati, 2024)

LIMITATION

The results of this study must be carefully examined because of its limitations. The study could, therefore, be prone to the following limitations;

- While the survey includes 107 women from various industries and positions, the findings may not be generalisable to all women in the workforce.
- The study relies on self-reported data from participants, which may be subject to biases and inaccuracies.

OBJECTIVES:

1. To investigate the relationship between marital status and employment opportunities for women in the workplace.
2. To ascertain the specific problems that women of various marital statuses encounter and how they combine with other aspects of their identities.
3. To provide recommendations for organisations to promote more inclusive and equitable practices that recognise the diverse experiences and needs of women across marital statuses.

HYPOTHESES OF THE STUDY

1. **$H0_1$:** There is no association between women's marital status (single, married, divorced, widowed) and their rate of employment.
2. **$H0_2$:** There is no significant difference in perceived workplace discrimination levels among women of different marital statuses.
3. **$H0_3$:** There is no association between pregnancy announcement and negative changes in employment status.

RESEARCH METHODOLOGY

A strong research methodology is necessary to reduce errors in data collection and analysis. This is why the researcher chose to collect his data through structured questionnaires. The following table provides information:

Type of Data	Primary & Secondary
Sampling Method	Convenience & Snowball Sampling
Sample size	107 Respondents
Research tool	Structured Questionnaire
Research Method	Descriptive
Data Collection method	Survey
Tools to analyse data	Chi-square, One-Way Anova for Hypotheses Testing, Data Tab, Ms Excel, Descriptive Statistics, Graphical presentation.

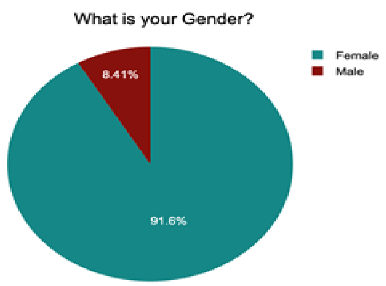
ANALYSIS, INTERPRETATION OF DATA & FINDINGS

Tables and graphical representations were used to analyse the collected data and come to the appropriate conclusions and interpretations.

DEMOGRAPHIC PROFILE OF THE RESPONDENTS: (N=107 RESPONDENTS)

CHART 1: GENDER OF RESPONDENTS

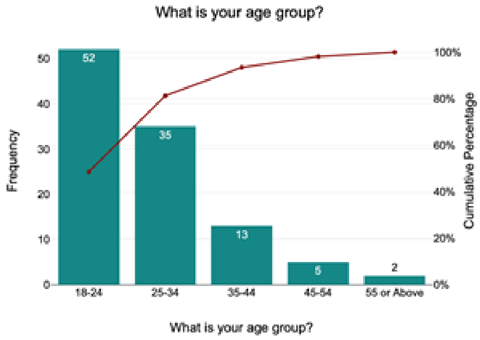
Interpretation: The data indicates that 91.6% of the respondents are female, while 8.41% are male, reflecting a higher representation of females in the sample.



Source: By Researcher

CHART 2: AGE OF THE RESPONDENTS

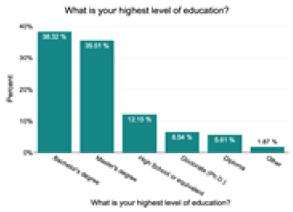
Interpretation: The bar diagram reveals a skewed age distribution, with 52 respondents in the 18-24 age group, indicating a significant bias towards younger participants in the survey, followed by 35, 13, 5 & 2 in the 25-35, 35-44, 45-54 & 55 or above age group respectively.



Source: By Researcher

CHART 3: EDUCATION LEVEL

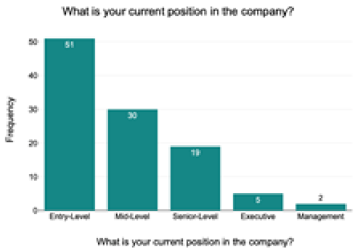
Interpretation: The bar chart indicates that the majority of respondents (38.32%) hold a Bachelor's degree, followed by Master's degrees (35.51%), High School diplomas (12.15%), Doctorates (6.54%), and Diplomas/Associates (5.61%).



Source: By Researcher

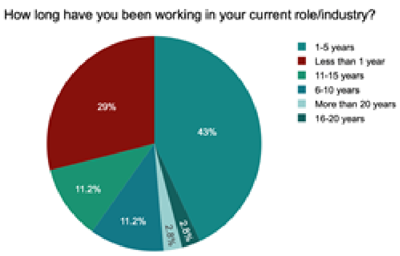
CHART 4: CURRENT POSITION IN THE COMPANY

Interpretation: The bar graph illustrates the distribution of employees across different positions within a company, revealing a steep decline in frequency from entry-level (51 employees) to management (2 employees). This suggests a hierarchical structure with a large base of junior staff, indicating potential growth or career development considerations.



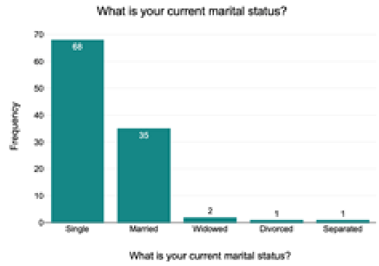
Source: By Researcher

CHART 5: TENURE IN CURRENT ROLE



Interpretation: The pie chart reveals that the largest segment of respondents (43%) have been working in their current role/industry for 1-5 years, suggesting a relatively young workforce or a dynamic industry with frequent turnover. Following this, 29% have less than 1 year of experience, indicating a significant portion of new entrants. The remaining segments, 6-10 years and 11-15 years, both represent 11.2% of respondents, while those with more than 20 years and 16-20 years of experience each account for 2.8%, highlighting a smaller proportion of long-tenured individuals.

CHART 6: MARITAL STATUS



Interpretation: The bar chart illustrates the distribution of marital statuses among the surveyed population, revealing a significant skew towards single individuals (68 respondents), followed by a notable proportion of married individuals (35 respondents). The categories of widowed, divorced, and separated each represent a very small fraction of the respondents, with 2, 1, and 1 individuals respectively, indicating a low prevalence of these marital statuses within the sample.

STATISTICAL ANALYSIS AND HYPOTHESIS TESTING RESULTS

TABLE 1: MARITAL STATUS AND EMPLOYEMENT

Relationship Tested	Degrees of Freedom (df)	Calculated χ^2 Value	Critical Value ($\alpha = 0.05$)	Decision ($\alpha = 0.05$)
Single vs Employed	4	**50.58**	**9.49**	**Reject H_0**
Single vs Unemployed	4	**18.18**	**9.49**	**Reject H_0**
Married vs Employed	4	**18.18**	**9.49**	**Reject H_0**
Unmarried vs Unemployed	4	**17.18**	**9.49**	**Reject H_0**
Divorced vs Employed	4	**1.18**	**9.49**	**Accept H_0**
Divorced vs Unemployed	4	**0.18**	**9.49**	**Accept H_0**
Widowed vs Employed	4	**1.18**	**9.49**	**Accept H_0**
Widowed vs Unemployed	4	**1.18**	**9.49**	**Accept H_0**
Separated vs Employed	4	**1.18**	**9.49**	**Accept H_0**
Separated vs Unemployed	4	**0.18**	**9.49**	**Accept H_0**

Interpretation:
Single vs Employed: The calculated chi-square value (50.58) exceeds the critical value (9.49). Therefore, we reject the null hypothesis at $\alpha = 0.05$. This suggests there is a significant association between being single and employment status.

Single vs Unemployed: The calculated chi-square value (18.18) exceeds the critical value (9.49). Therefore, we reject the null hypothesis at $\alpha = 0.05$. This indicates a significant relationship between being single and unemployment.

Married vs Employed: The calculated chi-square value (18.18) exceeds the critical value (9.49). Therefore, we reject the null hypothesis at $\alpha = 0.05$. This suggests there is a significant association between being married and employment status.

Unmarried vs Unemployed: The calculated chi-square value (17.18) exceeds the critical value (9.49). Therefore, we reject the null hypothesis at $\alpha = 0.05$. This indicates a significant relationship between being unmarried and unemployment.

Divorced, Widowed, and Separated categories: For all these categories (both employed and unemployed relationships), the calculated chi-square values (ranging from 0.18 to 1.18) are lower than the critical value (9.49). Therefore, we accept the null hypothesis at $\alpha = 0.05$. This suggests that there is no significant association between these marital statuses and employment/unemployment status.

The chi-square analysis reveals that being single or married has a significant relationship with employment status, while being divorced, widowed, or separated does not show a statistically significant association with

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employment outcomes. This suggests that certain marital statuses (specifically being single or married) may influence employment opportunities for women, while others do not appear to have a significant impact.

TABLE 2: MARITAL STATUS AND DISCRIMINATION

One-Way ANOVA Summary Table for Perceived Workplace Discrimination by Marital Status

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	101.84	4	25.46	0.46	0.76	2.87
Within Groups	1103.20	20	55.16			
Total	1205.04	24				

Interpretation:
Table 2 shows the results of a one-way ANOVA examining differences in perceived workplace discrimination among women of different marital statuses. The analysis revealed no statistically significant differences between the groups, $F(4, 20) = 0.46$, $p = 0.76$.

TABLE 3: MARITAL STATUS AND DISCRIMINATION

Relationship Tested	df	Calculated Value (χ^2)	Critical Value ($\alpha = 0.05$)	Decision
Marital Status × Negative Employment Changes Due to Pregnancy	**4**	**1.26**	**9.49**	**Fail to reject the null hypothesis**

Interpretation:
The calculated chi-square value (1.26) is less than the critical value (9.49), therefore, the researcher was fail to reject the null hypothesis. This means there is no statistically significant association between marital status and negative changes in employment status due to pregnancy in this sample.

SIGNIFICANCE OF THE STUDY
In this research, the themes of gender, marital status and workplace relations add to the body of knowledge available on the subject. Applying the intersectional analysis, the study draws attention to the distinct experiences of married, single, divorced and widowed women as well as to how these experiences are connected with other aspects of women's subjectivities. The results of this study are significant for organisations which may be interested in encouraging fair treatment of women in the workplace by acknowledging their specific assault needs. The recommendations given in the study could prove useful to organisations to enhance female policies and other endeavours that exist in organisations and society at large to eradicate discrimination based on marital status.

CONCLUSION
This study reveals the subtle relationship of marital status and employment opportunities for women, which shows that while single and married women associate greatly with employment outcomes, divorced, widowed, and separated women do not associate likewise. Notably, the research in question found that there were no meaningful differences in the perceived workplace discrimination across all marital statuses, nor any important relationship between pregnancy announcements and the negative employment changes. This result implies women share discriminatory experiences more broadly. These findings highlight how vital it is for organizations to embrace an intersectional strategy regarding diversity, equity, and inclusion initiatives because they cannot assume similar workplace experiences for women. Subtle DE&I strategies recognizing women's heterogeneity based on marital status are needed the research highlights while addressing clear as well as subtle systemic barriers. Organizations should develop support strategies that are targeted, policies that are flexible, and bias training that is thorough. This training must acknowledge the ways that marital status intersects with other identity factors as that creates unique professional challenges and opportunities. Ultimately, this study emphasises that in order to include people meaningfully in the workplace, we must move beyond one-size-fits-all approaches as well as embrace the complexity of women's lived experiences, so we can ensure DE&I initiatives are as diverse and multidimensional as the populations they seek to serve and open avenues for future longitudinal and cross-cultural research so as to understand these complex dynamics further.

AREA FOR FURTHER RESEARCH
Potential areas for further research on women's experiences in the animation industry:

- Understanding how marital status and career possibilities evolve and the factors that impact them.

- Understanding how marital status affects career chances in diverse cultural situations and societal norms.
- Evaluating the success of diversity, equity, and inclusion programs and their effects on women's employment and job satisfaction.

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HINDUSTANI CLASSICAL MUSIC AND MENTAL HEALTH: A SCIENTIFIC APPROACH

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ABSTRACT:
Hindustani Classical Music is deeply rooted in India s Vedic traditions. Its therapeutic value is immense, especially in fields with mental health, where ragas (musical scales), have proven to have a positive effect on human emotions. Ragas Yaman, Darbari Kanada, for instance, are relaxing, reduce stress and are helpful in emotional equilibrium, which resonate with the mind, comforting and calming it down. This form of music offers a non-rational and emotional healing, unlike cognitive therapies, that promote catharsis without verbal expression. Hindustani classical music can be combined with other therapeutic interventions that promote mindfulness and emotional regulation. The concept of a structured process in music therapy with the use of ragas according to the emotional state of a person is an effective method in inducing relaxation, release of emotion and reflection. It is medically validated that listening to this music can bring down the store of stress hormones, enhancing both spirits and health. For instance, Raga Yaman revolves around tranquillity and meditation, this rag can help create a sense of relaxation, decrease anxiety, and promote mental clarity. Both are designed to connect the player to the spiritual consciousness and inspiring spiritual highs as well.” The interplay of structured ragas and free improvisation enhances mental health, making it a holistic way to heal. The therapeutic value of this music extends beyond culture and offers support for emotional well-being and mindfulness.

Keywords: *Hindustani classical music, Ragas, Mental health, Music therapy, Emotional well-being, CBT: Cognitive Behavioral Therapy, MBSR: Mindfulness-Based Stress Reduction*

OBJECTIVES
1. To investigate the therapeutic impact of Hindustani classical music on mental health.
2. To do ragas analysis in its particular perspective emotional and neurological.
3. To compare effect of Hindustani classical music therapy with cognitive-behavioral and mindfulness-based interventions.Underlying mechanism and its effectiveness of a structured raga-listening therapy in emotional modulation.

SCOPE OF THE STUDY
The research paper explores the psychotherapeutic advantages of Hindustani classical music, as well as its assimilation in current therapeutic techniques. It explores individual ragas like Yaman, Darbari Kanada, music therapy techniques, and compares nonverbal healing methods with traditional therapies such as CBT and MBSR. The range spans the psychological, affective and physiological aspects of music interventions.

RESEARCH METHODOLOGY
The methods are qualitative and interdisciplinary, consisting of literature review, scientific investigation, and theoretical construction. They can be categorized into primary sources such as historical documents and written works from the classical era, as well as secondary sources: academic music therapy and mental health researches. By this, thematic and comparative analysis is conducted to observe and evaluate the application of individual ragas.

DATA ANALYSIS
The paper included references to scientific literature including Chanda & Levitin (2013), McKinney et al. & Potters 1997) and Fancourt & Finn (2019): demonstrate how Raga Yaman modulates the autonomic nervous system resulting in the reduction of stress markers (cortisol and heart rate). One piece of evidence for this phenomenon is that clinical reports as well as music texts from India suggest that certain ragas, such as Yaman and Darbari Kanada, help in emotional regulation, reducing anxiety, and enhancing cognitive functioning. The article concludes by bridging physiology and classical theory to provide an integrated account of healing factor of music.

LIMITATIONS OF THE STUDY
The present study is predominantly theoretical and literature review based without actual experimental data or clinical trials. The subjective nature of emotional responses to music, small sample diversity within the present

studies, and cultural specificity of Hindustani classical music could pose limitations on the generalizability of these findings. Conclusion More empirical work on various populations is needed for validation and expansion of the findings.

Introduction: Music is an ideal way to communicate emotions and stress states.

HINDUSTANI CLASSICAL MUSIC

Hindustani classical music is the other main tradition of Indian classical music, born in the Indian subcontinent in northeastern South Asia. In Vedic times, music was acknowledged as something more than an art form -a dedicated avenue to reach out the cosmic order, making a close relation between the transcendental sphere and the human soul. The Samaveda, one of the four Vedas, gives prominence to music as an essential aspect of rituals, as a medium through which human connects to the divine (Rao, 1999, p. 15). Music in early ages was characterized by vocal rendition of hymns and evolved over centuries, considering the influence of native culture and Persian music in medieval times. Creative developments in Indian classical music were made during the Delhi Sultanate and Mughal Empire like the introduction of several new forms, such as the qawwali and *tarana* by figures like Amir Khusrau (Khan 2014, p. 112).

The *gharana* system was further developed during the 19th and 20th centuries, but it has lost its significance in modern Indian classical music, as the task of preservation of musical tradition has devolved onto classical and academic arts colleges. Gharanas like Gwalior, Phalia and Patiala were established as crucibles of musical eminence that emphasized ragas and tala and improvisatory methods (Subramanian, 2006, p. 42). This tradition is not only a record of the diversity of India's rich heritage, but it is also an art form that generates an emotional meditative state which the power to change lives.

THERAPEUTIC POTENTIAL OF HINDUSTANI MUSIC

Classical Forecast Hindustani classical music is highly therapeutic when it comes to *aalap*, in raag guided movements, specially mind fitness. And at the very heart of this tradition is the raga system, an organized system of melodic modes that evoke particular emotions. Raga: It is "a melody type that is thought to have the power to evoke a particular emotion, or season, or time of day or night" (Rao, 1999, p. 78). Each raga has its own mood, or rasa, which has the power to affect the emotions of a listener.

The ragas skeleton is based on shruti and *swara*. Shruti are the fine-grained microtonal pitches that serve as the primary material of ICM, yielding delicate variations of pitch that differentiate one raga from another (Subramanian, 2006, 32). Hearing certain ragas like Yaman or Darbari Kanada has been demonstrated to decrease stress, decrease cortisol, induce relaxation. The slow tempi and the low-frequency tonal resonations of these ragas certainly resonate with our inner selves, promoting calmness Khan (2014, p. 64). Research indicates that even the sounds of Hindustani classical music stimulate the autonomic nervous system inducing meditative state as well as affective balance (Chakravarty, 2009, p. 45).

In contrast to the normal therapy forms known as CBT/mindfulness-based stress reduction (MBSR), Hindustani music is a non-verbal healing agent. This method is suitable for use in clinical and non-clinical settings because it enables emotional expression and catharsis without verbal communication. Furthermore, considering the specific therapeutic effects of particular ragas on ailments like anxiety, insomnia or depression, this tradition represents a culturally embedded and relevant form of mental health care (Khan, 2014, 64; Chakravarty, 2009, 45).

INTEGRATION OF HINDUSTANI CLASSICAL MUSIC WITH OTHER THERAPIES

Indian classical music has proven to be an effective adjunct to existing treatments such as CBT or MBSR. For instance, the emotional and gratitude-focused aspects of the intervention synergize with the cognitive restructuring that defines classical CBT, while the meditative components are harmonious with mindfulness training, leading to richer emotional relaxation and clarity.

But while it has potential, several obstacles prevent its popular use in a therapeutic context in the Hindustani classical tradition. These barriers include a scarcity of qualified practitioners and time needed for one to assimilate into the tradition. But further studies and such education can make it become a non-invasive behaviour for treating mental health.

HCM BASED MUSIC THERAPY PROCESS

Hindustani classical music therapy is a structured intervention consisting of the emotional, mental, and physical problems. (Ranade, 1998, p 110–115; Chakravarty, 2009, p 45–50).

The steps include:

Diagnosis: assessing the individual's state of mind. The therapist checks the mental makeup of the recipient before selecting ragas. Raga Yaman or Bhairavi may be applied to relaxation, while Raga Marwa or Darbari Kanada may address anxiety (Khan, 2014, p. 64).

Raga: The raga is selected according to the mood or season of the song. For example, the evening is a good time for listening to Raga Yaman and Hamsadhwani is good for deflecting depression (Chakravarty, 2009, 39).

Relaxation Inductions: Deep breathing or progressive muscle relaxation techniques to help a person become fully absorbed in the music. [Chakravarty, 2009, p. 47; Ranade, 1998, p. 113].

Listening and Interaction: The patient listens to the raga and often serves as a co-participant in this dialog by singing, or playing a simple instrument, enhancing attachment.

Emotional Release: As the music proceeds emotions are gradually released, resulting in catharsis, derived mode from Natyashastra (Chakravarty, 2009, p. 47).

Reflection and Evaluation: post-therapy discussions allow both, therapist and the patient to understand emotional reactions and influence the therapy sessions that follow (Ranade, 1998, p. 113).

SUSTAINED and MULTIPLE exposure: Several sessions cause emotional regulation and lessened anxiety, and regular exposure to ragas contributes to therapeutic gains (Sarkar, 2017, p. 72).

SCIENTIFIC PERSPECTIVE OF RAGA YAMAN’S IMPACT

The musical aspect of Raga Yaman's therapeutic effect can be found in its effect on the autonomic nervous system. Scientific research suggests that listening to this raga stimulates the parasympathetic nervous system, which can help in reducing stress and increasing relaxation (Chanda & Levitin, 2013, p. 119). This has a physiological action of reducing cortisol and lowering heart rate and in turn promoting a calmer space and emotional steadiness.

Research by McKinney et al. (1997) also substantiates these results, demonstrating that ragas such as Yaman have the effect of decreasing physiological signs of stress (p. 144). Additionally, the organized as well as improvisational nature of Hindustani classical music enhances emotion regulation and cognitive abilities, especially in people who suffer from mood disorder (Fancourt & Finn, 2019, p. 199).

CONCLUSION

Hindustani classical music, a system rich in complex ragas and rhythmic structure, has deep potential for emotional, psychological and physical healing. A growing body of literature supports the use of MBCT to treat psychiatric disorders like anxiety, depression and stress. More than its therapeutic potential, this practice serves as a universal balancing method to support emotional health. Using some ragas - like Yaman - in therapy will help people to gain mindfulness and an emotional cathartic as well as help them to harmonise themselves from within. Further research in this medium has potential for mental health benefit and quality of life.

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RESILIENCE AND REALIGNMENT: UNPACKING TAMIL NADU'S URBAN HOUSEHOLD SPENDING SHIFTS ON HEALTH, TOBACCO, AND LEISURE POST-PANDEMIC (2019–2021)

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ABSTRACT
This study delves into the adaptive resilience of urban households in Tamil Nadu amid unprecedented disruptions triggered by the COVID-19 pandemic. Focusing on health, tobacco, and liquor expenditures between 2019 and 2021, the research highlights how urban households in regions like Coimbatore and Tiruppur recalibrated their spending priorities across pre-pandemic, pandemic, and recovery phases. Going beyond essential versus discretionary binaries, this study explores how income constraints, demographic diversity, and socio-cultural influences interact in reshaping urban consumption behavior.

By employing secondary data from the Consumer Pyramids Household Survey (CPHS) and utilizing correlation and regression techniques, the research identifies shifting consumption trade-offs — notably the tension between rising discretionary spending and health-related priorities. The findings suggest that as pandemic threats receded, discretionary spending on tobacco and liquor resurged, often at the expense of health expenditure. This nuanced behavioral shift reflects complex realignments in household priorities shaped by occupation, education, gender, and household size.

The study introduces a contextual framework to interpret health vs. lifestyle expenditure in a post-pandemic, urban South Indian setting, contributing to broader discussions on equitable economic recovery and public health planning.

***Keywords**: Urban Consumption, Tamil Nadu, Health vs. Leisure Spending, Tobacco & Liquor, COVID-19, Socioeconomic Determinants, CPHS*

INTRODUCTION
Tamil Nadu, a vibrant southern Indian state, reflects a fusion of tradition and modernization across its socio-economic landscape. As one of India's most urbanized states, cities like Coimbatore and Tiruppur have become hubs for industrial activity and migration, representing changing household compositions and expenditure dynamics. The COVID-19 pandemic, an extraordinary global event, fundamentally disrupted household economies, sparking a reordering of consumption priorities.

This study explores how Tamil Nadu's urban households responded to these shocks, with particular attention to shifts in health-related and discretionary spending on tobacco and liquor. While previous literature often focused on broader national trends or rural-urban divides, this research zeroes in on how urban households adapted across three critical points: the pre-pandemic year (2019), the height of the pandemic (2020), and the early post-pandemic recovery phase (2021). This timeline allows an exploration of both immediate crisis responses and more sustained behavioral adaptations.

REVIEW OF LITERATURE

Household Consumption Behavior
Studies examining household consumption patterns often highlight the interplay between income, education, and household size in determining expenditure priorities. Deaton and Muellbauer (1980) work on consumption theory underscores the significance of income elasticity in shaping spending patterns across different socio-economic groups. Their findings provide a foundational framework for analyzing how Tamil Nadu's diverse demographic profiles influence household expenditures.

Urban-Rural Expenditure Dynamics
Urbanization and its impact on consumption have been extensively explored in the Indian context. Bhalla and Hazell (2003) investigated the rural-urban divide in India, emphasizing how urban households tend to allocate a higher proportion of their income to discretionary spending, such as recreation and dining out, compared to rural households that focus on essential needs like food and health. This dichotomy is relevant for Tamil Nadu, given its mix of urban centers like Chennai and Coimbatore and its agriculturally dependent rural regions.

Impact of the COVID-19 Pandemic

The COVID-19 pandemic brought significant changes to household expenditure priorities globally. Narayan et al. (2021) documented how pandemic-induced income shocks led to increased spending on food and health while curtailing non-essential expenditures. In Tamil Nadu, similar patterns were observed, with mobility restrictions and economic uncertainties altering traditional spending behaviors (Rajasekaran, 2022).

Cultural Influences on Expenditure

Cultural values play a pivotal role in shaping household spending, particularly in states like Tamil Nadu, where traditions strongly influence food and health practices. Gupta (2019) examined the role of festivals and religious practices in driving seasonal spikes in food expenditure, emphasizing how these cultural elements persist despite modern influences.

Gender and Household Consumption

The role of gender in influencing household expenditure has gained attention in recent years. Studies by Chattopadhyay and Duflo (2004) suggest that women-led households tend to prioritize health and education spending over leisure activities. This finding is particularly relevant for Tamil Nadu, where demographic diversity includes significant variations in household composition and gender dynamics.

Health Expenditure Trends

Mishra and Ray (2011) explored health expenditures in India, highlighting the coexistence of traditional remedies and modern healthcare services. Their study indicates that socio-economic factors such as education and income influence preferences for healthcare, a duality observed in Tamil Nadu’s urban and rural households.

Income and Consumption Patterns

The relationship between income levels and expenditure is a critical area of study. Krueger and Perri (2006) highlighted how income disparities affect consumption inequality, a dynamic that is particularly pronounced in states like Tamil Nadu, where economic growth coexists with significant socio-economic disparities.

Post-Pandemic Recovery and Expenditure

Studies on post-pandemic economic recovery, such as by Srivastava and Jha (2022), emphasize the shift back to discretionary spending as income levels stabilize. For Tamil Nadu, understanding these recovery trajectories is essential for assessing the long-term impact of the pandemic on household behavior

Research Gaps Identified:

In Tamil Nadu, there is limited research comparing rural and urban household consumption patterns, particularly post-pandemic. Most studies focus on urban centers like Chennai, neglecting the rural-urban divide in expenditures on food, health, and leisure. Another gap is the under-exploration of household composition, especially how age and gender dynamics influence spending decisions. Further research is needed to understand how different demographic factors shape expenditure choices. Additionally, the impact of economic shocks like the pandemic on discretionary spending (e.g., recreation, vacations) remains largely unexplored, especially in relation to varying income groups across the state..

OBJECTIVES OF THE STUDY:

1. To examine year-wise shifts in urban household spending on health, tobacco, and liquor from 2019 to 2021.
2. To evaluate the role of socio-economic variables (income, gender, age, occupation, education, household size) in influencing these expenditures.
3. To understand the correlation and causality between health expenditure and discretionary consumption of tobacco and liquor.

METHODOLOGY

This research takes a quantitative approach to investigate consumption expenditure patterns related to health, tobacco, and liquor across Tamil Nadu. Secondary data from the Consumer Pyramid Household Survey (CPHS) by CMIE spanning March 2019, March 2020, and March 2021 is used to analyze shifts in consumption behaviors during the pre-pandemic, pandemic, and post-pandemic periods. The study captures the dynamic economic and cultural characteristics of Tamil Nadu's urban regions.

The dependent variables include household expenditure on health, tobacco, and liquor, while independent variables such as age, gender, occupation, education, and household size are explored for their impact on consumption patterns. Descriptive statistics will offer an overview of consumption behaviors, and Chi-square tests will analyze the relationships between socio-demographic characteristics and expenditure. Regression

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analysis will quantify the effect of these factors on consumption expenditures, with SPSS software supporting data analysis.

The study's rationale for focusing on these specific expenditures is rooted in their socio-economic significance. Health expenditure reflects economic well-being, while tobacco and liquor spending reveals discretionary consumption patterns shaped by cultural, income, and education factors. Tamil Nadu's economic diversity, particularly in Coimbatore and Tiruppur, offers an insightful backdrop for analyzing these patterns across various socio-demographic groups

Rationale for Period, Area, and Expenditures Chosen

1. Temporal Focus: Capturing the pre-, during-, and post-pandemic phases allows for a comprehensive understanding of behavioral transitions.

- Geographic Scope: Coimbatore and Tiruppur are ideal for studying consumption under economic stress due to their industrial and urban dynamics.
- Category Selection: Health reflects necessity-driven spending, while tobacco and liquor represent discretionary, culturally-influenced behavior.

LIMITATIONS OF THE STUDY

1. **Data Limitations:**
   - The secondary data from CPHS and CMIE may not always reflect the most current trends, particularly if the datasets are not updated regularly. Furthermore, there could be gaps or inconsistencies in the data that may affect the results.
2. **Geographic Limitations:**
   - The study is limited to the urban areas of **Coimbatore** and **Tiruppur** in Tamil Nadu, which may not fully represent rural consumption behaviors or other regional patterns in the state or across India.
3. **Self-reporting Bias:**
   - Since the data is secondary, the accuracy of information such as expenditure figures is dependent on how well respondents reported their consumption, potentially introducing biases or inaccuracies.
4. **Generalizability:**
   - While the study provides valuable insights into consumption behaviors in these cities, the findings may not be directly applicable to other states or rural areas, given the socio-economic and cultural differences that may exist.

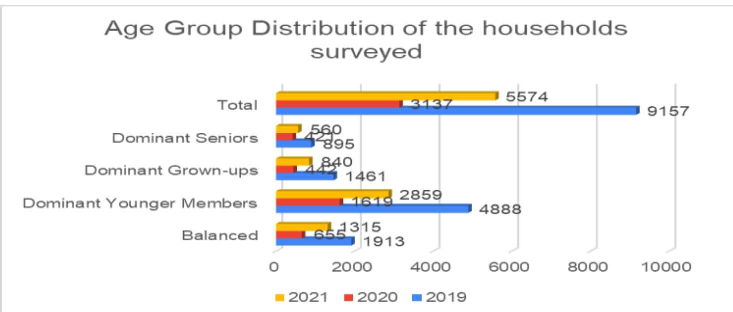
This methodology provides a clear path for analyzing consumption expenditure patterns in Tamil Nadu with a focus on socio-demographic factors.

RESULTS AND DISCUSSION

Demography

Demographic profile of Tamil Nadu households from March 2019, March 2020 to March 2021, focusing on age groups, gender distribution, occupations, education, household sizes, and region types. It highlights trends like urbanization, dominance of nuclear families, and prevalence of younger age groups, offering insights into socio-economic shifts. Statistical analysis reveals significant variations across categories, providing a foundation for understanding challenges in education, workforce development, and urban planning. These findings aim to guide sustainable and inclusive policy-making.

Figure 1 : Age Groups



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

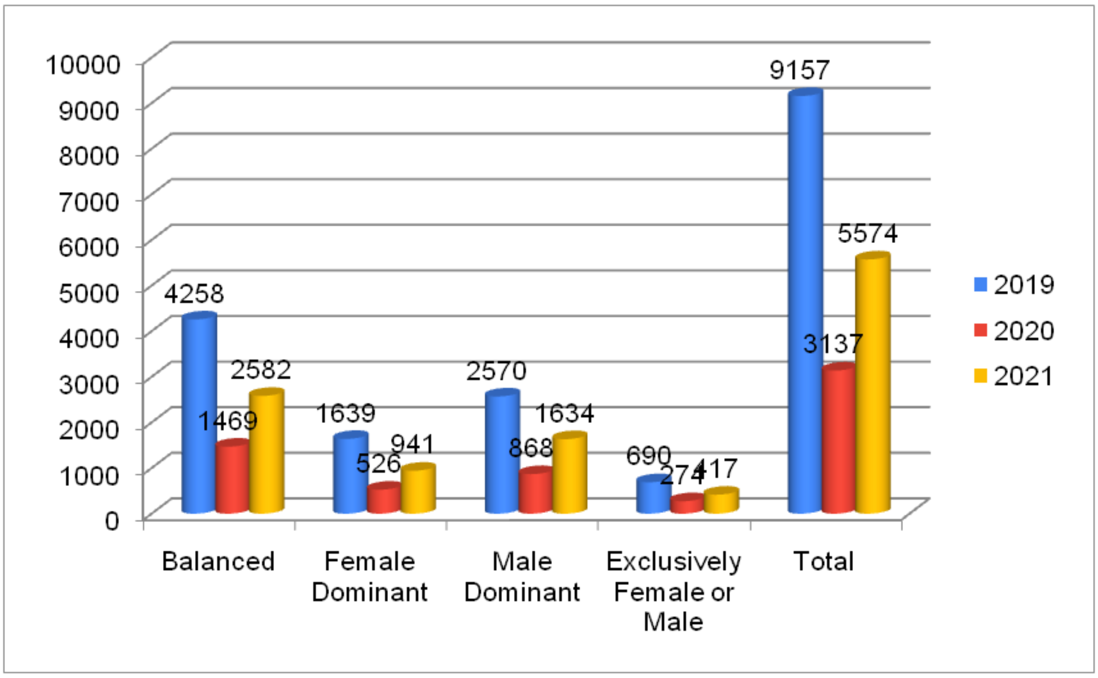
The age composition of households in Tamil Nadu between 2019 and 2021 shows a consistent trend where the "Dominant Younger Members" group forms the largest segment, comprising over half of the population (53.4% in 2019, 51.6% in 2020, and 51.3% in 2021). This indicates a prevalence of households with younger individuals, likely reflecting a younger workforce and family structures oriented around younger dependents. Conversely, "Dominant Seniors" consistently have the smallest representation, ranging from 9.8% in 2019 to 10% in 2021, signifying a smaller proportion of elderly-dominated households.

Chi-square tests confirmed significant differences in age group distributions each year, driven by observed overrepresentation of the "Dominant Younger Members" group and underrepresentation of other groups, particularly seniors. The high proportion of younger individuals aligns with Tamil Nadu's role as an economic hub, attracting working-age populations to urban areas. Balanced age households and those with grown-ups form a stable middle ground, suggesting diverse age structures within households.

These trends have implications for social policy and economic planning. The dominance of younger populations may increase demand for education, employment, and childcare services. Meanwhile, the relatively low senior representation highlights the need to prioritize targeted elder care and healthcare infrastructure for aging populations. Long-term planning must address shifts in this balance as Tamil Nadu continues to develop economically, potentially impacting dependency ratios and demographic structures

Gender Groups

Figure 2 : Gender Group Distribution of the households surveyed



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

The gender dynamics within Tamil Nadu households reveal that "Balanced" gender households constitute the majority, comprising approximately 46% across all three years (46.5% in 2019, 46.8% in 2020, and 46.3% in 2021). This category includes households where no single gender dominates, reflecting a tendency toward equilibrium in gender representation within households. "Exclusively Female or Male" households represent the smallest segment, averaging around 7-8% across years, indicating minimal extreme gender imbalances in household composition.

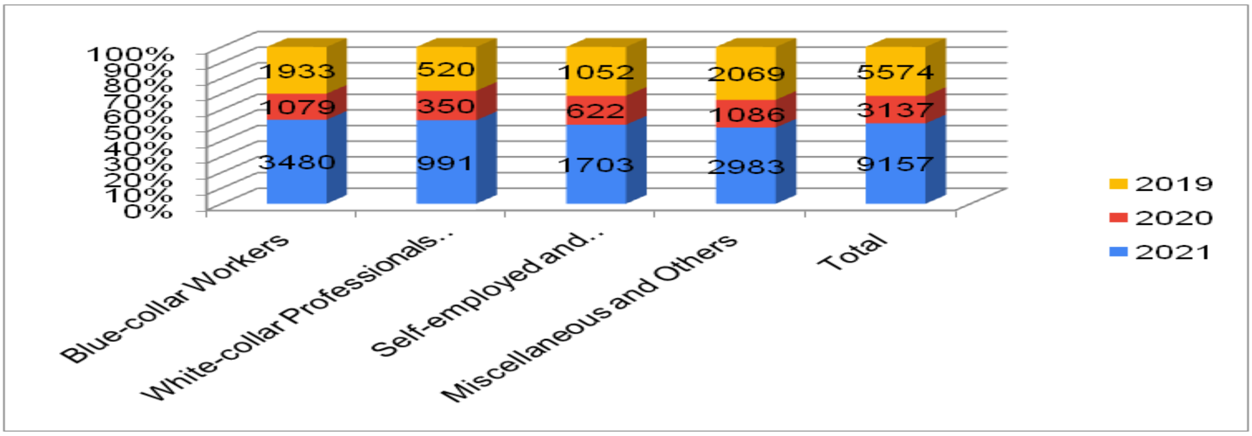
Chi-square tests show significant differences among gender group proportions, driven by consistent overrepresentation of the Balanced group and underrepresentation of Exclusively Female or Male households. The residual analysis supports these findings, emphasizing that Balanced households exceed expected values by wide margins, while Exclusively Female or Male households fall significantly short.

The "Female Dominant" and "Male Dominant" groups show intermediate representation, with slight year-to-year variations but remaining lower than the Balanced group. This reflects a relatively equitable gender structure in household decision-making and roles, potentially influenced by Tamil Nadu's progressive social policies and cultural dynamics.

These findings underline the importance of sustaining gender equity initiatives in social and economic planning. Policies that promote gender-balanced workforce participation and equal opportunities in education and governance can further enhance these trends. Conversely, the small proportion of Exclusively Female or Male households warrants targeted support to ensure inclusivity, particularly for female-headed households that may face socio-economic vulnerabilities.

3. Occupation Groups

Occupation Group Distribution of the households surveyed



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

Tamil Nadu's households exhibit diverse occupational compositions, with blue-collar workers consistently forming the largest group, comprising 38% in 2019, 34.4% in 2020, and 34.7% in 2021. This reflects the state's industrial and manufacturing backbone, which employs a significant portion of the population. The "Miscellaneous and Others" group follows closely, growing to 37.1% by 2021, highlighting the role of informal and non-traditional occupations in Tamil Nadu's economy.

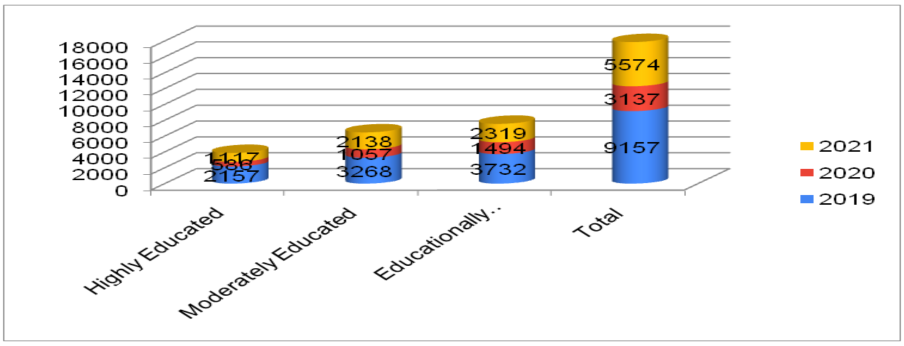
Conversely, "White-collar Professionals and Management" consistently make up the smallest segment, with proportions as low as 9.3% in 2021. This indicates limited household representation in high-skill, management-level roles, potentially reflecting disparities in educational access or regional economic structures. The "Self-employed and Entrepreneurs" group maintains moderate representation (18.6% in 2019, 19.8% in 2020, and 18.9% in 2021), underscoring Tamil Nadu's entrepreneurial spirit, particularly in small and medium-sized enterprises.

Chi-square tests confirm significant occupational differences, with blue-collar workers and Miscellaneous occupations exceeding expected values, while white-collar professionals fall significantly short. These findings suggest opportunities to expand skill development and education to balance occupational representation and increase mobility into higher-paying, white-collar roles.

Policies supporting vocational training, entrepreneurship, and formalizing informal sectors can improve economic equity. Additionally, investments in industrial upskilling and white-collar job creation, particularly in IT and services, could diversify employment opportunities and boost household income levels.

4. Education Groups

Education Group Distribution of the households surveyed



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

Education levels within Tamil Nadu households reveal an increasing predominance of "Educationally Homogeneous" households, which form the largest segment in all three years (40.8% in 2019, 47.6% in 2020, and 41.6% in 2021). These households likely consist of members with similar educational backgrounds, reflecting societal trends where household members tend to have comparable access to education.

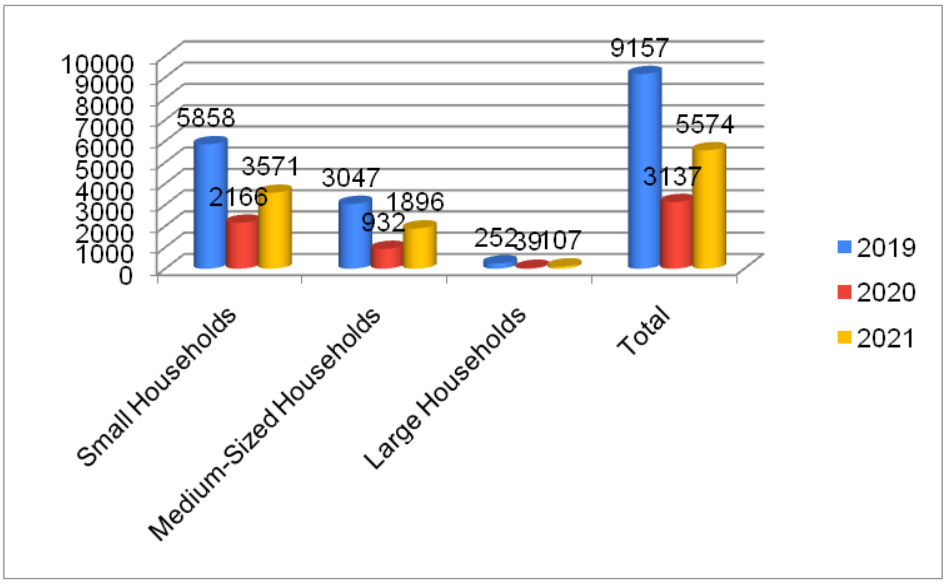
"Highly Educated" households consistently represent the smallest segment, declining to 18.7% in 2020 and recovering slightly to 20% in 2021. This suggests that while higher education is accessible to a minority, it remains unevenly distributed, possibly due to financial, regional, or infrastructural barriers. "Moderately Educated" households form the middle category, maintaining steady representation, which underscores gradual progress in educational attainment across the state.

Chi-square tests confirm significant differences in education group proportions each year. Observed versus expected values highlight overrepresentation of Educationally Homogeneous households and underrepresentation of Highly Educated households. These findings align with Tamil Nadu's focus on improving literacy and basic education, though challenges remain in higher education accessibility.

To bridge these gaps, targeted interventions are needed, such as scholarships, rural education programs, and skill-based training to enable upward mobility. Emphasizing equitable access to quality education can help balance representation among education groups and equip households with the skills necessary to thrive in an evolving economy.

5. Household Size

Household Size Group Distribution of the households surveyed



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

Household size analysis indicates a consistent dominance of "Small Households" across the study period, comprising 64% in 2019, increasing to 69% in 2020, and stabilizing at 64.1% in 2021. This reflects a shift toward nuclear family structures, possibly driven by urbanization, economic factors, and changing societal norms. "Medium-Sized Households" make up the second-largest category, while "Large Households" remain marginal, averaging around 2-3%.

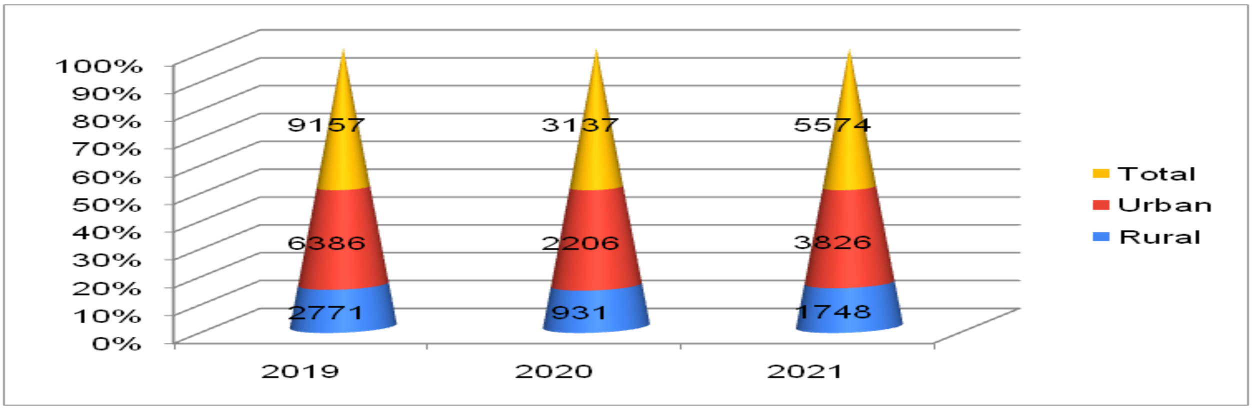
Chi-square tests confirm significant differences, with Small Households exceeding expected values by a wide margin, while Large Households fall significantly short. These residual trends emphasize a strong movement away from traditional joint families toward smaller, more manageable household units.

This trend has implications for housing, urban planning, and resource allocation. Smaller households may require more housing units, emphasizing the need for affordable housing policies and infrastructure development. Conversely, the decline of large households may impact traditional support systems, increasing the need for community-based care and services.

Policymakers should focus on catering to these shifts by promoting urban infrastructure, expanding affordable housing, and supporting nuclear families with childcare and eldercare services. Simultaneously, fostering community networks can compensate for the declining prevalence of larger, multi-generational households.

 ISSN 2394 - 7780

6. Region Type



Source: Analysis based on data collected from CPHS- March 2019, 2020,2021

The region type analysis highlights Tamil Nadu's ongoing urbanization, with urban households consistently forming the majority (69.7% in 2019, 70.3% in 2020, and 68.6% in 2021). Rural households, on the other hand, account for approximately 30%, with slight year-to-year variations.

Chi-square tests reveal significant differences between observed and expected values, showing consistent overrepresentation of urban households and underrepresentation of rural households. This reflects Tamil Nadu's economic and developmental focus on urban centers, driving migration and urban growth.

Urbanization trends suggest increasing pressure on urban infrastructure, including housing, transportation, and utilities, while rural areas may face depopulation and associated challenges such as aging populations and resource allocation. This urban-rural divide calls for balanced development strategies to ensure equitable growth.

Policies promoting rural development, such as improving healthcare, education, and connectivity, can retain rural populations and foster regional equity. Simultaneously, sustainable urban planning is essential to accommodate the growing urban population while mitigating issues such as congestion and environmental degradation.

- *Age Groups*: "Dominant Younger Members" households were the largest group (>50%) throughout the study period, indicating a young workforce and dependency structure.
- *Gender Composition*: Balanced gender households (46%) dominated, reflecting demographic stability. Female-headed households remained underrepresented but critical.
- *Occupational Profile*: Blue-collar households led across years (34-38%), followed by miscellaneous workers, reflecting Tamil Nadu's industrial economy.
- *Education*: "Educationally Homogeneous" households remained dominant (~40-47%), but "Highly Educated" households were consistently the smallest group (~20%).
- *Household Size*: Nuclear families dominated (>64%), with a decline in large households, reflecting urban living trends.
- *Region Type*: Urban households accounted for ~70%, validating urban-centric analysis.

Correlation Analysis

The correlation analysis between health expenditure and aggregated tobacco and liquor expenditure will examine the relationship between household spending on health and consumption of tobacco and alcohol. Several prior studies showed that tobacco and alcohol consumption are possibly associated with increased expenses in health care since these products causally induce varying severe chronic and non-chronic health conditions (Rani et al., 2019). Some of the research has suggested that higher spending on tobacco and liquor leads to higher health expenditures due to medical treatment for related illnesses (Singh & Ranjan, 2020). Other studies indicated that there were competing priorities and, hence, households shortchanging health spending in favor of discretionary item spending for tobacco and alcohol (Dutta et al., 2021). This analysis seeks to evaluate whether increased expenditure on tobacco and liquor leads to higher costs of health. Or, alternatively, is the effect more complicated, whereby households, in fact, put discretionary expenditure on the scale over and above health care?

Table No 1 Correlation Analysis – Health vs. Liquor and Tobacco Spending: Tamil Nadu (2019–2021)

Year	**Region**	**Correlation Coefficient (r)**	**P-Value**	**Hypothesis Result & Interpretation**
2019	Tamil Nadu	0.035	0.001	Rejected null hypothesis: Weak positive correlation. Slight increase in health expenditure associated with liquor and tobacco expenditure.
2020	Tamil Nadu	0.107	0	Rejected null hypothesis: Weak positive correlation. Slight increases in both expenditure categories are related.
2021	Tamil Nadu	-0.134	0	Rejected null hypothesis: Weak negative correlation. An increase in liquor and tobacco expenditure is weakly associated with a decrease in health expenditure.

Source: Author's Analysis based on data collected from CPHS- March 2019, 2020,2021

Table No 1 above, shows the correlational analysis between health and discretionary spending patterns over three years while highlighting the region-specific analysis.

Means of correlation between health expenditure and liquor & tobacco expenditure showed weak positive correlation in 2019 ($r = 0.035$, $p = 0.001$). Thus, the null hypothesis was rejected, which gave credence to the inverse influence of added spending in liquor and tobacco on health expenditure. This likely reflects upon the burden of expenditure due to health-related problems precipitating from consumption of tobacco and alcohol products (Rani et al., 2019).

Even in 2020, a weak positive relationship was suggested with $r = 0.107$ and $p = 0$; thus, the null hypothesis was rejected. The implication here is that there has been an increase in liquor and tobacco spending associated with increasing health expenditures as a result of the broader health impact of the pandemic. Costly health expenditures might be attributable to the pandemic's impact on physical and mental health (Singh & Ranjan, 2020).

In 2021, there was a negative coefficient of correlation ($r = -0.134$, $p = 0$), developed between liquor and tobacco spending and health related expenditure, which meant higher liquor and tobacco spending, hence lower health expenditure. This indicated that there has been a major change in priorities after the pandemic in which households might have cut down their medical expenses in favor of other discretionary expenditures like liquor and tobacco since the immediate health crisis disappeared (Dutta et al., 2021).

To conclude, across Tamil Nadu, the correlation between health and liquor & tobacco expenditures evolved from weakly positive (2019-2020) to weakly negative in 2021, reflecting changing priorities influenced by the pandemic.

Regression Analysis

The regression is a potent tool, which is used to establish the relationship between a dependent and an independent variable and helps to quantify the effect of socio-economic factors on consumption patterns. The study has made use of regression models to analyze how income, age, occupation, education, and household size affect health and liquor & tobacco expenditure. Previous studies also highlighted the role of socio-economic factors in shaping household consumption (Dutta et al., 2021; Rani et al., 2019).

Table No 2 Socio-Economic Predictors of Health and Discretionary Spending in Tamil Nadu: 2019–2021

Year	**Dependent Variable**	**Model Fit (F-Value)**	**P-Value**	**Adjusted R2**	**Significant Predictors**
2019	Health	32.597	0	0.024	Adjusted Total Income, Age Group, Occupation, Education, Gender, Region
2019	Liquor & Tobacco	45.18	0	0.033	Adjusted Total Income, Age Group, Occupation, Region, Size
2020	Health	58.325	0	0.113	Adjusted Total Income, Age Group,

 ISSN 2394 - 7780

					Occupation, Education, Gender, Size
2020	Liquor & Tobacco	63.812	0	0.123	Adjusted Total Income, Age Group, Occupation, Size
2021	Health	72.739	0	0.083	Adjusted Total Income, Age Group, Occupation, Education, Gender, Size
2021	Liquor & Tobacco	140.278	0	0.149	Adjusted Total Income, Age Group, Occupation, Education, Region, Size

Source: Author's Analysis based on data collected from CPHS- March 2019, 2020,2021

The Table No 2 above, shows the focus on health, liquor, and tobacco expenditures, emphasizing the role of socio-economic factors over the years.

Year-wise and Region-wise Interpretation of Model Results

Regression analysis of spending on health, liquor, and tobacco in Tamil Nadu from 2019 to 2021 unveils household consumption behavior during the pre-pandemic, pandemic, and post-pandemic period influenced by socio-economic factors.

The health expenditure model in 2019 (F = 32.597, p = 0, Adjusted R^2 = 0.024) has statistical significance, but the low adjusted R^2 indicates that only a minor portion (2.4%) of the variation associated with health spending is captured by predictors such as Adjusted Total Income, age group, occupation, and education. The small explanatory power suggests that other and undocumented variables influence health expenditures comparable to liquor and tobacco expenditure since the F-statistic was so fair (F = 45.18, p = 0, Adjusted R^2 = 0.033), which has shown that income, family size, and regional factors significantly affect consumption behavior at ranges just slightly better than other models, hence wholly weak.

By 2020, the pandemic largely dictated changes in expenditure behavior. Now the health expenditure model (F = 58.325, p = 0, Adjusted R^2 = 0.113) has increased its explanatory capability, with income and household size coming forth as the vital determinants. Health generally became prioritized for many families due to increased awareness of health risks coupled with the problems posed by the pandemic. The liquor and tobacco expenditure model (F = 63.812, p = 0, Adjusted R^2 = 0.123) points out economic interruptions strongly influenced household purchasing preferences whereby even discretionary items such as liquor and tobacco got planned less over the hand of priority ordering.

2021 patterns indicate the post-COVID recovery. The health expenditure model (F = 72.739, p = 0, Adjusted R^2 = 0.083) suggested an improved explanation (8.3%), pointing out health as dominant but growing less important with households recovering economically. For liquor and tobacco expenditure (F = 140.278, p = 0, Adjusted R^2 = 0.149), the highest level of explanation (14.9%) speaks of discretionary spending rebounding, with restrictions at their highest especially after income easing back to the heights preceding the pandemic.

Year-on-year trends show the interplay of income, household size, and socio-demographic factors in consumption behavior canvassed through the three years.

KEY INSIGHTS AND CONTRIBUTIONS

1. **Novel Urban-Centric Lens**: The study departs from state-level generalizations, focusing instead on industrial urban centers.
2. **Health vs. Discretionary Trade-off**: It identifies a critical behavioral reversal in 2021, with health deprioritized.
3. **Income and Household Size as Anchors**: These two variables remained robust predictors across categories and time.
4. **Cultural Continuities**: Despite crisis, discretionary spending rebounded, hinting at deep-rooted cultural patterns.
5. **Policy Utility**: The findings inform targeted urban health policies and anti-tobacco interventions.

SUMMARY

The health expenditure pattern in Tamil Nadu has exhibited a unison influence of Adjusted Total Income, age-groups, and household size across regions and over time, especially in the context of the pre- and post-pandemic period. These variables have continued to be major predictors. The findings show that income remains the most prevalent determinant of health spending, with older age groups and the larger household usually spending more on health. This conforms to existing literature on health expenditure, which opines that larger households and aged people expend more on healthcare needs, courtesy of heightened needs (Pender, 2021).

After the pandemic, there really was a noticeable improvement in the model fit, so socio-economic dynamics, in Tamil Nadu, were very pronounced, along with a clearer indication of health expenditure and socio-economic factors. This suggests the pandemic may have further entrenched existing socio-economic inequalities with households possibly spending more on health due to the heightened awareness of healthcare needs.

CONCLUSION

This study has explored the evolving consumption patterns in Tamil Nadu, focusing on household expenditure across food, health, and leisure categories, with a particular emphasis on the post-pandemic period. The analysis revealed that socio-economic determinants such as income, education, occupation, gender, and household size significantly influence household spending behaviors, with variations between rural and urban regions. The economic disruptions caused by the COVID-19 pandemic reshaped spending priorities, with essential expenditures on food and health becoming more pronounced, while discretionary spending on leisure activities like recreation and vacations saw a notable decline.

Furthermore, the interplay between urbanization and traditional cultural values played a pivotal role in shaping consumption patterns, especially in urban areas where economic pressures intersected with modern lifestyles. Despite these challenges, Tamil Nadu's households displayed resilience, adapting their expenditure strategies to cope with the economic constraints imposed by the pandemic.

The findings of this study offer valuable insights into the socio-economic factors driving household consumption in Tamil Nadu and highlight the importance of considering regional and demographic differences when designing targeted economic policies. As the state moves towards post-pandemic recovery, understanding these shifts will be essential for creating interventions that support sustainable growth, enhance welfare, and address the evolving needs of both urban and rural households.

By contributing to the broader understanding of household behavior in Tamil Nadu, this research provides a foundation for future studies on regional consumption patterns in India and can inform policy decisions aimed at fostering inclusive and equitable economic development.

This research highlights how urban households in Tamil Nadu navigated complex consumption choices during and after a global crisis. While income and household size consistently shaped spending, the post-pandemic period saw a resurgence in discretionary expenditure, often at the cost of health-related spending. These findings underscore the need for policies that not only support economic recovery but also promote public health and equitable access to care.

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GREEN MARKETING IN THE DIGITAL AGE - THE INFLUENCE OF SOCIAL MEDIA

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ABSTRACT
This research, conducted in Coimbatore City, explores how social media influences the growing trend of green marketing and its effect on consumer behavior towards environmentally friendly products. As consumers become increasingly aware of environmental issues, their purchasing decisions are shifting toward sustainable options. This study investigates the role of social media in shaping these behaviors, focusing on six key motivational drivers: word-of-mouth, engagement, entertainment, trendiness, trust, and reliability. A survey of 231 participants, including both consumers and marketers, sheds light on how these factors contribute to consumers' environmental concerns and their willingness to pay a premium for eco-conscious products. The findings reveal that social media has a powerful impact on consumer attitudes, fostering a positive outlook toward green products and boosting their readiness to spend more on sustainable goods. Additionally, the research highlights the role of demographic variables—such as age, income, and education—in influencing how consumers interact with green marketing on social media. Ultimately, this study provides valuable insights into how businesses can harness social media to promote eco-friendly products and encourages policymakers to consider the digital age's impact on sustainability efforts in Coimbatore and beyond.

Keywords: *Green Marketing, Social Media, Consumer Behavior, Eco-friendly Products, Sustainability, Digital Marketing.*

INTRODUCTION
The advent of the internet and the globalization of digital platforms has ushered in the social media revolution, fundamentally transforming how businesses communicate with consumers. Platforms like Facebook, WhatsApp, Instagram, Twitter, and LinkedIn have replaced traditional forms of media, providing companies with vast opportunities to interact directly with their audience. In particular, social media has proven to be a powerful tool for green marketing, allowing businesses to reach environmentally conscious consumers and promote sustainable practices. As environmental awareness grows, businesses must now navigate the complexities of online marketing, where consumers are increasingly engaged in discussions about sustainability and the impact of their purchasing decisions.

Social media platforms are integral to this shift, offering businesses an interactive space to provide real-time information, foster customer relationships, and promote sustainability. These platforms enable two-way communication, word-of-mouth marketing, and the spread of environmental messages, helping shape consumer attitudes toward eco-friendly products. Companies are leveraging social media to not only advertise but also to build trust, create brand loyalty, and educate their followers on sustainability. With global brands like Louis Vuitton and Ralph Lauren using Facebook, Instagram, TikTok, and YouTube to engage with customers, social media is eliminating the barriers of time and space, enabling real-time interaction and enhancing the impact of green marketing strategies.

In Coimbatore, this study examines the specific influence of social media on consumer behavior in the context of green marketing. As consumers increasingly seek eco-friendly alternatives, social media platforms provide businesses with the tools to promote green products and services effectively. Facebook, Instagram, and YouTube, in particular, offer companies the ability to advertise, share promotions, and create awareness around sustainability initiatives. These platforms also allow consumers to influence each other’s behaviors, thereby amplifying the impact of green marketing. This research investigates how these digital tools shape consumer attitudes toward sustainability and their willingness to pay a premium for eco-friendly products in Coimbatore, offering valuable insights for businesses and policymakers alike.

LITERATURE REVIEW
The integration of social media with green marketing strategies has gained significant attention in the digital age. The rise of social media platforms such as Facebook, Instagram, Twitter, and YouTube has fundamentally altered how businesses promote sustainable products and engage with eco-conscious consumers. Social media not only provides businesses with a platform for brand visibility but also allows for direct consumer engagement, making it a powerful tool for green marketing initiatives. According to Smith and Green (2021), businesses that effectively leverage social media can build stronger relationships with environmentally-conscious consumers by engaging them in meaningful conversations about sustainability.

This engagement creates opportunities for businesses to educate consumers about the environmental benefits of their products, thereby influencing purchase decisions.

Research by Chaudhuri et al. (2020) explores the role of social media in shaping consumer attitudes toward green consumption. They argue that social media is a vital tool in increasing environmental awareness and promoting sustainable behaviors. Social media platforms enable businesses to engage with consumers in real-time, providing updates on product sustainability, certifications, and environmental impacts. As consumers increasingly turn to digital platforms for information and recommendations, companies that actively communicate their eco-friendly practices via social media gain a competitive edge. In a study focused on the Indian context, Srinivasan et al. (2022) found that social media campaigns highlighting eco-friendly product features significantly improved consumer attitudes toward green products. The findings suggested that Indian consumers, particularly millennials, are more likely to purchase green products when they are exposed to sustainability-related content on platforms like Facebook and Instagram.

The relationship between consumer engagement on social media and their willingness to pay a premium for green products has also been examined in recent studies. Patel and Sharma (2020) found that consumers who engage with green marketing content on social media platforms show a higher level of environmental concern, which positively influences their willingness to pay higher prices for sustainable products. The study revealed that the ability of social media to create awareness about the environmental impact of consumer choices played a key role in shaping purchase behavior. Additionally, Joshi and Gupta (2021) examined the impact of social media marketing on consumer purchasing decisions in India and found that consumers' willingness to pay more for eco-friendly products increased when businesses provided clear, credible information through these platforms. This highlights the importance of transparent communication in fostering consumer trust and encouraging green purchasing behavior.

Social media also plays a critical role in building brand loyalty among consumers who are committed to sustainable consumption. Kumar and Chamoli (2019) emphasize that businesses can use social media to foster long-term relationships with environmentally conscious consumers by promoting consistent green messaging. In their study, they found that brands that actively engage with their audience through sustainability-related posts and discussions on social media are perceived as more authentic, which in turn strengthens brand loyalty. This aligns with Liu et al. (2018), who argue that brand trust, built through consistent communication of sustainable practices via social media, influences consumer decisions to prefer one brand over another in the green product market.

Kohli and Kapoor (2021) further highlight that the growing trend of eco-consciousness on social media is driven by the need for consumers to align their purchasing behaviors with their environmental values. Their research suggests that social media platforms, through the dissemination of user-generated content such as reviews, testimonials, and recommendations, contribute to shaping consumer perceptions of the environmental impact of various products. These platforms, therefore, act as both information hubs and engagement tools that allow businesses to shape consumer preferences toward green products.

In the Indian context, Reddy et al. (2023) examined how social media campaigns influence green consumption behavior among Indian consumers. Their findings reveal that social media has a significant impact on raising environmental awareness, especially when it comes to younger, urban consumers. The study highlighted that in cities like Coimbatore, where environmental issues are increasingly gaining prominence, consumers are more likely to engage with businesses that promote their eco-friendly initiatives on digital platforms. Furthermore, Patel et al. (2022) examined the specific role of social media influencers in promoting green products and found that influencers who authentically promote sustainable lifestyles can significantly sway their followers' purchasing decisions.

Finally, Zhang and Li (2020) explore the concept of "greenwashing" on social media, a phenomenon where businesses falsely advertise their products as environmentally friendly to attract consumers. The study suggests that while social media can be a powerful tool for promoting green marketing, consumers are becoming more adept at identifying misleading claims. Therefore, businesses must ensure that their green marketing campaigns are transparent and based on credible, verifiable information to build trust and avoid backlash from informed consumers. This finding is especially relevant in the Indian market, where consumer skepticism regarding green claims is rising, and businesses must carefully manage their digital communication strategies to maintain consumer confidence.

In conclusion, the literature reveals that social media plays a pivotal role in shaping consumer behavior toward green products.

By effectively utilizing social media platforms, businesses can foster environmental awareness, influence consumer attitudes, and increase their willingness to pay a premium for eco-friendly products. However, businesses must be mindful of transparency and authenticity in their green marketing strategies to avoid the risks of greenwashing. In the context of Coimbatore, where environmental concerns are becoming more pronounced, leveraging social media for green marketing can provide businesses with significant opportunities to engage with consumers and promote sustainable consumption.

OBJECTIVES

- To investigate the role of social media marketing in influencing green consumption behavior among consumers in Coimbatore city.
- To assess the impact of social media marketing on shaping consumers' attitudes towards eco-friendly products and their willingness to purchase sustainable goods in Coimbatore.

METHODOLOGY

A total of 231 respondents, including both marketers and consumers, were surveyed to examine the role and impact of social media marketing on green consumption behavior in Coimbatore city. The data was collected using a structured questionnaire, and a convenience sampling method was employed to select participants. To analyze the collected data, mean analysis and t-tests were utilized to derive meaningful insights and determine the relationship between social media marketing and green consumption behavior among consumers in Coimbatore.

FINDINGS

The survey results reveal the following demographic profile of the respondents in Coimbatore: Gender Distribution: 36.8% of respondents are male, while 63.2% are female. Age Distribution: 30.7% of respondents are below 34 years of age, 40.3% fall within the 34-42 years age group, and 29.0% are above 42 years. Respondent Type: 53.2% of the respondents are marketers, and 46.8% are consumers, reflecting a balanced representation of both perspectives in the study. These findings provide a comprehensive demographic overview that helps in understanding the impact of social media marketing on green consumption behavior in the context of Coimbatore city.

Table 1 General Details

Variable	Respondent	Percentage
Gender		
Male	146	63.2
Female	85	36.8
Total	**231**	**100**
Age (years)		
Below 34	71	30.7
34-42	93	40.3
Above 42	67	29.0
Total	**231**	**100**
Occupation		
Marketers	123	53.2
Consumers	108	46.8
Total	**231**	**100**

Table 2 Role of social media marketing on green consumption behavior

S. No.	"Statements"	"Mean Value"	"t value"	"Sig."
1.	Social media marketing is increasing consumer's interest towards green products	3.20	3.093	0.001
2.	Consumers are preferring public transport and recyclable packing	3.17	2.646	0.004
3.	Social media is motivating consumers to change their attitude and purchase intention for green cosmetics	3.21	3.320	0.001
4.	Social media is making consumers to support companies that produce green goods	3.19	2.944	0.002
5.	Social media is changing consumers' perceptions of the	3.10	1.575	0.058

	usefulness of green products			
6.	Social media is providing green product knowledge	3.15	2.322	0.011
7.	Consumer desire to buy green goods following consumer groups inside the social media is increased	3.11	1.719	0.043
8.	Environmental education on social media is increasing focus on public environmental concerns	3.28	4.395	0.000
9.	Consumers are consuming green products even they are expensive	3.13	2.016	0.022
10.	Consumers prefer green consumption to reduce environmental pressure	3.18	2.840	0.002

Table 2 reveals that social media marketing significantly influences green consumption behavior in Coimbatore. Respondents indicated that social media is increasing environmental awareness (mean: 3.28) and motivating changes in attitudes and purchase intentions for green cosmetics (mean: 3.21). It also encourages support for eco-friendly brands (mean: 3.19), promotes green consumption to reduce environmental pressure (mean: 3.18), and drives preferences for public transport and recyclable packaging (mean: 3.17). Social media is seen as a key source of green product knowledge (mean: 3.15), and consumers are willing to pay a premium for green products (mean: 3.13). Engagement with consumer groups on social media has increased interest in green goods (mean: 3.11), while perceptions of the usefulness of these products have shifted (mean: 3.10). T-test results show all findings to be statistically significant, except for the perception change (0.058).

CONCLUSION

This study examined the strategic challenges businesses face in appealing to the growing "green consumer" market in Coimbatore. The findings highlight that digital media, especially social media, plays a significant role in engaging consumers and promoting sustainable practices. The more consumers in Coimbatore interact with social media, the more likely they are to adopt eco-friendly behaviors. Social media has emerged as a vital tool for green marketers to connect with their audience and encourage green consumption. In conclusion, leveraging digital platforms to target environmentally conscious consumers can lead to a healthier, more sustainable future. For green product manufacturers, the study emphasizes the importance of utilizing social media to promote eco-friendly products and increase green consumption. This will not only benefit individual consumers and society at large but also contribute to environmental sustainability.

The study explored the role of social media marketing on green consumption behavior and found that social media is significantly influencing consumers in Coimbatore. Key findings include that social media is enhancing environmental awareness, motivating consumers to change their attitudes and purchase intentions for green cosmetics, increasing interest in green products, and encouraging support for companies producing eco-friendly goods. Furthermore, consumers are increasingly inclined towards green consumption as a way to reduce environmental pressure. The study concludes that social media marketing has a significant impact on green consumption behavior in Coimbatore.

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A STUDY ON TRANSFORMING RICE HUSK INTO A VALUABLE ASSET: A MULTIFACETED APPROACH TO AWARENESS RAISING AND SUSTAINABLE UTILIZATION

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ABSTRACT
This research paper explores the potential of transforming rice husk, an often discarded agricultural byproduct, into a valuable asset through sustainable utilization strategies. Rice husk, which constitutes a significant portion of global rice production waste, presents environmental challenges due to its improper disposal and lack of awareness regarding its economic and ecological potential. The study adopts a multifaceted approach, focusing on awareness-raising, technological innovation, and the promotion of sustainable practices for rice husk management. Key areas of investigation include the conversion of rice husk into biofuels, and its use in construction materials, as well as its role in soil enhancement and waste management. The paper evaluates the technological advancements in processing rice husk, the economic benefits of its utilization, and the barriers to widespread adoption. Additionally, it assesses the impact of raising awareness among farmers, industries, and communities about the benefits and practical applications of rice husk. By offering a comprehensive framework for sustainable rice husk utilization, this study aims to contribute to environmental conservation, economic growth, and the circular economy, while highlighting the importance of fostering innovation and education in promoting this underutilized resource.

INTRODUCTION
Waste disposal is a critical environmental concern. Rice husks are a by-product of rice processing and are often considered agricultural waste.

The aim of this project is not only to reduce agricultural waste but also to promote awareness amongst farmers as a revenue generation tool.

This study concludes by creating awareness amongst the farmers by providing an opportunity of earning more revenue by selling the rice husk to furniture manufacturing industry.

AIM
To create the awareness among farmers for using rice husk in furniture manufacturing industry and mobilizing revenue from the same.

OBJECTIVE
To promote environmental friendly practices amongst farmers, Furniture manufacturer and Society for alternative use of rice husk in furniture manufacture.

To mobilize more revenue to Farmers by sale of rice husk to furniture manufacturer industry.

HYPOTHESIS
H1: There is no significant awareness amongst farmers, furniture manufacturers and society w.r.t. the disposal of rice husk waste.

H2: There is significant awareness amongst farmers, furniture manufacturers and society w.r.t. the disposal of rice husk waste.

H3: There is no significant scope of revenue generation to farmers through sale of rice husk waste.

H4: There is significant scope of revenue generation to farmers through sale of rice husk waste. **H5**: There is no significant relationship between awareness and increasing revenue generation from the sale of rice husk waste.

H6: There is significant relationship between awareness and increasing revenue generation from the sale of rice husk waste.

RESEARCH METHODOLOGY
➢ **Population**
- Farmers Producing Rice Husk Waste

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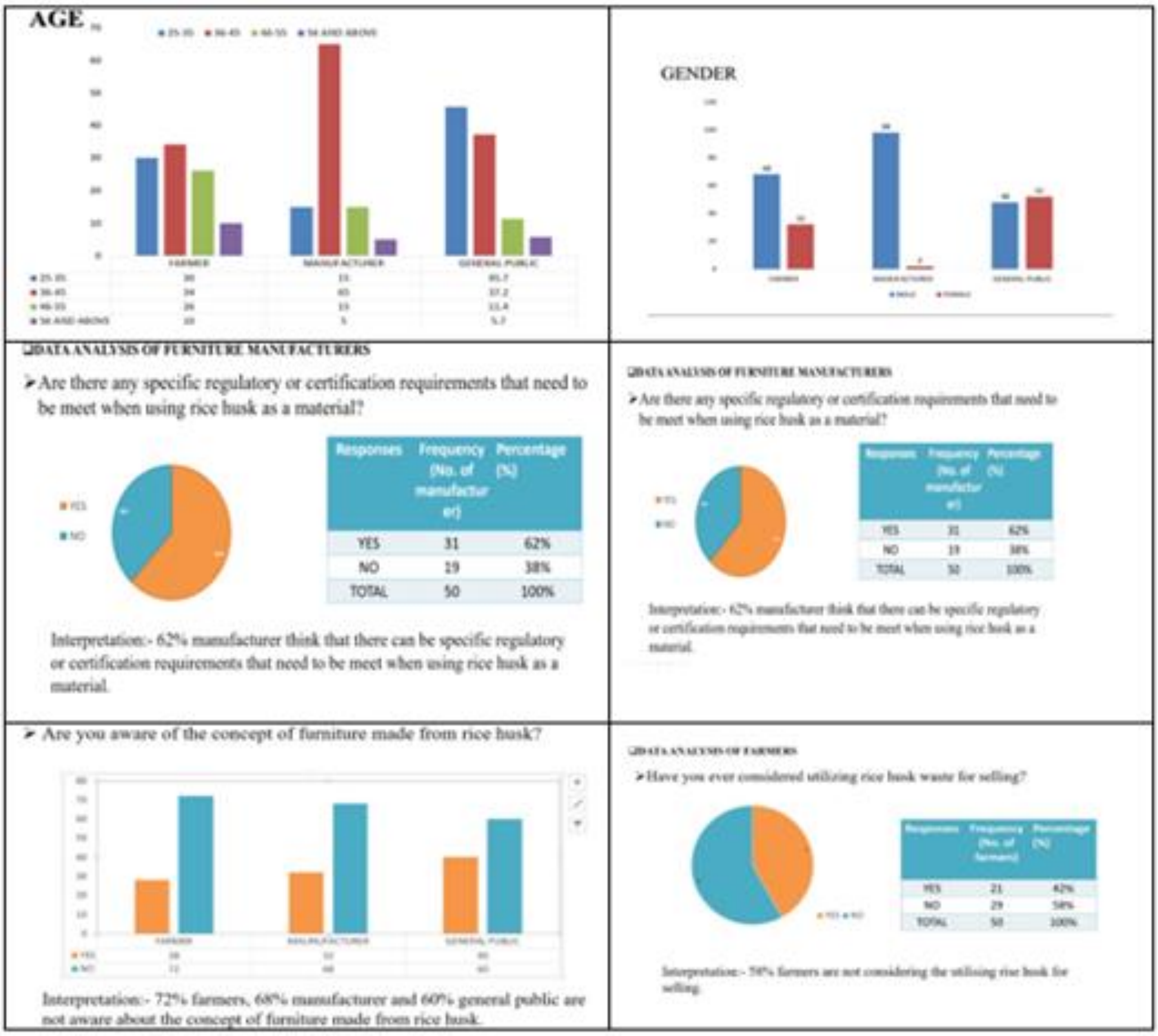
- Furniture Manufacture from Rice Husk Waste
- General Public

Sample size
- 50 Farmers
- 50 Furniture Manufacturer
- 50 General Public

Data Analysis and Interpretation



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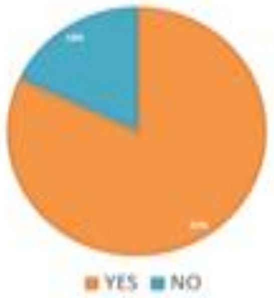
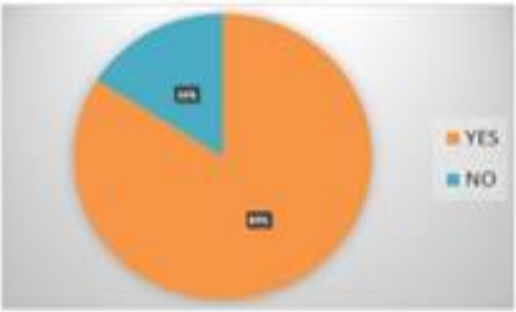
➢ Do you think using rice husk waste for furniture could provide additional income opportunity for farmers?



Responses	Frequency (No. of farmers)	Percentage (%)
YES	41	82%
NO	09	18%
TOTAL	50	100%

Interpretation:- 82% farmers are think that using rice husk waste for furniture could provide additional income opportunity for them.

➢ Do you believe that promoting rice husk furniture can contribute to more sustainable agricultural sector?



Responses	Frequency (No. of farmers)	Percentage (%)
YES	42	84%
NO	08	16%
TOTAL	50	100%

Interpretation:- 84% farmers are believed that the promoting rice husk furniture can contribute to more sustainable agricultural sector.

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➢ Do you think using rice husk waste for furniture could provide additional income opportunity for farmers?

Responses	Frequency (No. of farmers)	Percentage (%)
YES	41	82%
NO	09	18%
TOTAL	50	100%

Interpretation:- 82% farmers are think that using rice husk waste for furniture could provide additional income opportunity for them.

➢ Are you familiar with any local initiative or organization that promote the use of rice husk for furniture?

Responses	Frequency (No. of farmers)	Percentage (%)
YES	13	26%
NO	37	74%
TOTAL	50	100%

Interpretation:- 74% farmers are not familiar with any local initiative or organisation that promotes the use of rice husk for furniture.

➢ Would you be interested in collaborating with the other furniture manufacturers to collectively promote rice husk furniture?

Responses	Frequency (No. of manufacturer)	Percentage (%)
YES	36	72%
NO	14	28%
TOTAL	50	100%

Interpretation:- 72% manufacture are interested to collaborate with the others furniture manufacturers to collectively promoting rice husk furniture.

➢ Are there any specific regulatory or certification requirements that need to be meet when using rice husk as a material?

Responses	Frequency (No. of manufacturer)	Percentage (%)
YES	31	62%
NO	19	38%
TOTAL	50	100%

Interpretation:- 62% manufacturer think that there can be specific regulatory or certification requirements that need to be meet when using rice husk as a material.

➢ Would you be interested in exploring the potential of rice husk furniture in your product line?

Responses	Frequency (No. of manufacturer)	Percentage (%)
YES	33	66%
NO	17	34%
TOTAL	50	100%

Interpretation:- 66% manufacturer are interested in exploring the potential of rice husk furniture in their product line.

➢ Are you aware of the environmental benefits of rice husk furniture?

Responses	Frequency (No. of general public)	Percentage (%)
YES	34	68%
NO	16	32%
TOTAL	50	100%

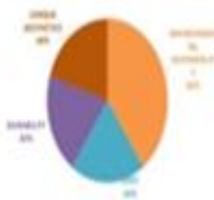
Interpretation:- 68% people are aware about the environmental benefit of rice husk furniture.

➢ Would you consider purchasing rice husk furniture for your home?

Responses	Frequency (No. of general public)	Percentage (%)
YES	38	76%
NO	12	24%
TOTAL	50	100%

Interpretation:- 76% people are considering the purchasing rice husk furniture for their home.

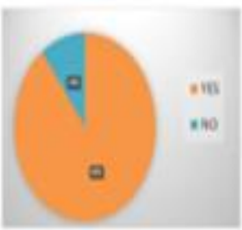
➢ What factor would influence your decision to buy a rice husk furniture?



Responses	Frequency (No. of general public)	Percentage (%)
Environmental Sustainability	20	40%
Cost	10	20%
Durability	10	20%
Unique Aesthetics	10	20%
TOTAL	50	100 %

Interpretation:- Environmental sustainability is one of the most important factors that influence the decision of the general public to buy a rice husk furniture.

➢ Would you be interested in learning more about the process of making rice husk furniture?



Responses	Frequency (No. of general public)	Percentage (%)
YES	38	76%
NO	12	24%
TOTAL	50	100%

Interpretation:- 76% people are interested in learning more about the process of making rice husk furniture.

➢ Do you think promoting rice husk furniture can help reduce deforestation in the region?

Responses	Frequency (No. of general public)	Percentage (%)
YES	43	86%
NO	07	14%
TOTAL	50	100%

Interpretation:- 86% people are think that promoting rice husk furniture can help to reduce the deforestation in region.

 ISSN 2394 - 7780

TESTING OF HYPOTHESES

Farmers:

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Are you aware of the concept of furniture made from rice husk ?	No	.0	37	.74	.50	.001
	Yes	1.0	13	.26		
	Total		50	1.00		
Do you think using rice husk waste for furniture could provide additional income opportunities for framers ?	Yes	1.0	41	.82	.50	.000
	No	.0	9	.18		
	Total		50	1.00		
Are you familiar with any local initiatives or organization that promote the use of rice husk for furniture ?	Yes	1.0	13	.26	.50	.001
	No	.0	37	.74		
	Total		50	1.00		
Have you ever considered utilizing rice husk waste for furniture?	No	.0	30	.60	.50	.203
	Yes	1.0	20	.40		
	Total		50	1.00		
Would you be interested in a learning more about the process of rice husk furniture	Yes	1.0	39	.78	.50	.000
	No	.0	11	.22		
	Total		50	1.00		
Do you believe that promoting rice husk furniture can be contribute more sustainable agricultural sector	Yes	1.0	42	.84	.50	.000
	No	.0	8	.16		
	Total		50	1.00		
Would you be open to collaborating with the furniture manufacture	Yes	1.0	34	.68	.50	.015
	No	.0	16	.32		
	Total		50	1.00		

Society :

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Have you heard about furniture made from rice husk	Yes	1.0	29	.58	.50	.322
	No	.0	21	.42		
	Total		50	1.00		
Are you aware of the environmental benefits of rice husk furniture	Yes	.0	16	.32	.50	.015
	No	1.0	34	.68		
	Total		50	1.00		
Would you consider purchasing rice husk furniture for your home	Yes	1.0	37	.74	.50	.001
	No	.0	13	.26		
	Total		50	1.00		
Are you familiar with any local store or manufacture that offer	Yes	1.0	10	.20	.50	.000
	No	.0	40	.80		
	Total		50	1.00		
Would you be interested in learning more about the process of ma	No	.0	12	.24	.50	.000
	Yes	1.0	38	.76		
	Total		50	1.00		
Do you think promoting rice husk furniture can help reduced for	Yes	1.0	43	.86	.50	.000
	No	.0	7	.14		
	Total		50	1.00		
Are you willing to pay a premium for sustainable furniture like rice husk furniture	Yes	1.0	36	.72	.50	.003
	No	.0	14	.28		
	Total		50	1.00		
Could you recommend rice husk furniture to others	Yes	1.0	40	.80	.50	.000
	No	.0	10	.20		
	Total		50	1.00		

ISSN 2394 - 7780

Manufacturers:

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Are there any specific regulatory or certification requirements that need to be meet when using rice husk as a material?	Yes	.0	31	.62	.50	.119
	No	1.0	19	.38		
	Total		50	1.00		
Are there any technical challenges or consideration that need to addressed when working with rice husk?	Yes	1.0	38	.76	.50	.000
	No	.0	12	.24		
	Total		50	1.00		
Would you be interested in collaborating with the others manufacture to collectively promote rice husk furniture?	Yes	.0	16	.32	.50	.015
	No	1.0	34	.68		
	Total		50	1.00		
Are you familiar with the furniture made from rice husk as a sustainable alternative ?	No	.0	16	.32	.50	.015
	Yes	1.0	34	.68		
	Total		50	1.00		
Have you considered in corporating rice husk as a material in your furniture manufacturing process?	Yes	1.0	15	.30	.50	.007
	No	.0	35	.70		
	Total		50	1.00		
Would you be interested in exploring the potential of rice husk furniture in your product line?	Yes	1.0	33	.66	.50	.033
	No	.0	17	.34		
	Total		50	1.00		

TESTING OF HYPOTHESES

	HYPOTHESES	Accepted / Rejected
H_1	There is no significant awareness amongst farmers furniture manufacturers and society w.r.t. the disposal of rice husk waste.	Accepted
H_2	There is significant awareness amongst farmers furniture manufacturers and society w.r.t. the disposal of rice husk waste.	Rejected
H_3	There is no significant scope of revenue generation to farmers through sale of rice husk waste.	Rejected
H_4	There is significant scope of revenue generation to farmers through sale of rice husk waste.	Accepted
H_5	There is no significant relationship between awareness and increasing revenue generation from the sale of rice husk waste.	Rejected
H_6	There is significant relationship between awareness and increasing revenue generation from the sale of rice husk waste.	Accepted

Survey results indicate:

- 72% of farmers, 68% of manufacturers, and 60% of the general public are unaware of rice husk furniture.
- 82% of farmers believe utilizing rice husk in furniture could provide additional income.
- 66% of manufacturers are interested in exploring rice husk furniture in their product line.
- 68% of the general public values the environmental benefits of rice husk furniture.
- 84% of respondents believe rice husk furniture can contribute to sustainability and reduce deforestation.

Findings and Conclusions

The study reveals a lack of awareness about the benefits of rice husk furniture, despite significant interest in sustainable alternatives.

 ISSN 2394 - 7780

Key findings include:

- Farmers can generate revenue by selling rice husk to furniture manufacturers.
- Rice husk furniture is cost-effective, eco-friendly, and durable.
- Increased awareness through social media campaigns and educational initiatives can enhance adoption.
- The use of rice husk in furniture manufacturing reduces CO2 emissions and supports sustainability goals.

Limitations of the Study

- Limited sample size.
- Geographic focus restricted to Panvel, Khalapur, and Uran.
- Need for further research on the economic feasibility of large-scale adoption.

SUGGESTIONS

- Being a well-educated person it is our responsibility to stop the environmental damages done by our actions unknowingly or knowingly.
- Awareness can be conducted through informative campaigns through social media, posters and pamphlets to educate the people about the benefits of rice husk furniture and the importance of proper waste disposal.
- By opting for sustainable furniture, we can reduce deforestation, minimize waste and conserve natural resources and indirectly it’s a way to make a positive impact and contribute towards a greener future for our planet.

Contribution of the Study

- Economic benefits for farmers through additional income streams.
- Employment generation in sustainable industries.
- Reduction in environmental pollution through waste utilization.
- Promotion of sustainable practices in the furniture industry.

RECOMMENDATIONS

- Conduct awareness campaigns using social media, posters, and community engagement programs.
- Encourage collaboration between farmers and manufacturers to create a supply chain for rice husk furniture.
- Develop regulatory frameworks and certification processes to standardize rice husk furniture production.
- Promote the affordability and sustainability of rice husk furniture to consumers.

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A STUDY ON CONSUMER BUYING BEHAVIOUR TOWARDS ONLINE SHOPPING

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ABSTRACT

The rapid growth of e-commerce has transformed the way consumers shop, making online shopping a prevalent phenomenon. This research investigates the factors influencing consumer buying behavior in the context of online shopping. It explores the motivations, preferences, and challenges faced by consumers when engaging in online transactions. By examining the psychological, social, and technological aspects that shape online shopping behavior, this study aims to provide insights into the dynamics of the digital marketplace and contribute to a better understanding of consumer decision-making in the online environment.

INTRODUCTION

The rise of the internet and the proliferation of e-commerce platforms have revolutionized the retail landscape, offering consumers unprecedented convenience and access to a vast array of products and services. Online shopping has become an integral part of modern life, with millions of consumers worldwide embracing the digital marketplace. This research delves into the intricacies of consumer buying behavior in the realm of online shopping, seeking to unravel the factors that drive consumers to engage in online transactions. By examining the motivations, attitudes, and challenges associated with online shopping, this study aims to shed light on the evolving dynamics of consumer behavior in the digital age.

REVIEW OF LITERATURE

(Adamczyk G., 2021)

In the article entitled "Compulsive and compensative buying among online shoppers: An empirical study", Online shopping addiction and its compensating counterpart are explored in the present research. Empirical data collected from a sample of consumers aged 15 and above, stratified by their usage or non-use of the e-commerce sector, provided for an estimate of this form of purchasing. Second, the findings provide light on the ways in which characteristics including online shopping frequency, online shopping expenditures relative to offline shopping, attitudes about online shopping, and socioeconomic status all play a role in this kind of purchasing.

(Georgie N.A., 2021)

In this article entitled "The influence of selected factors on online shopping behaviour: a study with respect to Kottayam district", investigated the extent to which customer preferences have a role in determining a business's fortunes. Online shopping, which uses the internet as a sales channel, has a similar dilemma due to the diversity of opinions held by online shoppers.

(Aldousari, A. A., 2016)

In the paper entitled "Determinants of consumers' attitudes toward online shopping", This study looked at the effects of the Technology Acceptance Model and the Theory of Reasoned Actions on customers' attitudes about internet shopping. Previous studies have focused mostly on the online shopping habits of wealthy countries, while ignoring those of developing countries.

(Shanthi, R., & Desti, K., 2015)

In their paper entitled "Consumers' perception on online shopping", One hundred students from Madras University and Madras Christian College were surveyed using a Structure questionnaire to learn about their thoughts on internet shopping and the kinds of products they like to purchase from these websites. This is what the research found. E-commerce businesses may better serve their clientele by using customised advertising strategies that bring in new consumers and encourage immediate purchases.

 ISSN 2394 - 7780

RESEARCH METHODOLOGY

Research Objectives

- To examine how socio-economic factors affect Consumer attitude towards online shopping.
- To find how the pattern of Online buying influences consumer's attitudes towards online shopping.
- To study the present status of online shopping in Indian consumers.
- To study potential for development of online shopping in India.

Okay, here's one hypothesis for each research objective:

1. **Objective:** To identify the key factors influencing consumer buying behavior in online shopping.
   - **Hypothesis (H1):** Perceived usefulness of online shopping positively influences consumers' intention to shop online.
2. **Objective:** To examine the impact of perceived risk, trust, and security on online purchase decisions.
   - **Hypothesis (H2):** Higher perceived financial risk negatively influences online purchase decisions.
3. **Objective:** To investigate the role of website design, user experience, and product information in shaping online shopping behavior.
   - **Hypothesis (H3):** Higher website usability positively influences online purchase decisions.
4. **Objective:** To analyze the influence of social media and online reviews on consumer purchase intentions.
   - **Hypothesis (H4):** Positive online reviews positively influence online purchase intentions.
5. **Objective:** To explore the differences in online shopping behavior across different demographic segments (e.g., age, gender, income).
   - **Hypothesis (H5):** Younger consumers are more likely to engage in online shopping compared to older consumers.

RESEARCH METHODS

Area of the study

- This study was carried out in Mumbai & Navi Mumbai.

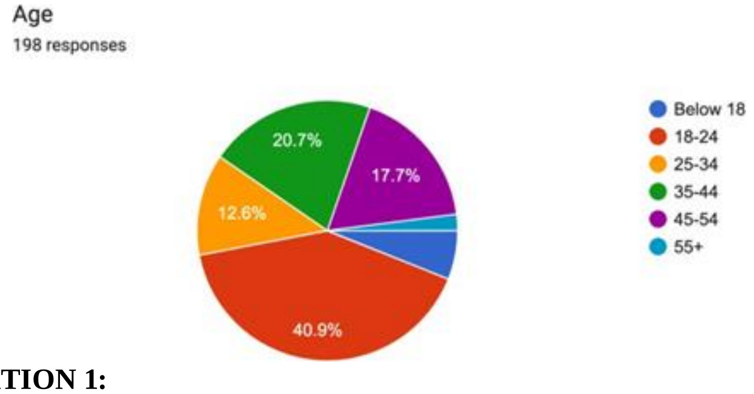
Sample Unit and Sample Size

- This study uses a sample of approximately 198 Mumbai & Navi Mumbai city residents as its sample unit.

Sampling Technique

In this study, the researchers used the Convenience sampling method. DATA ANALYSIS AND INTERPRETATION

1. Age of the respondents:



DATA INTERPRETATION 1:

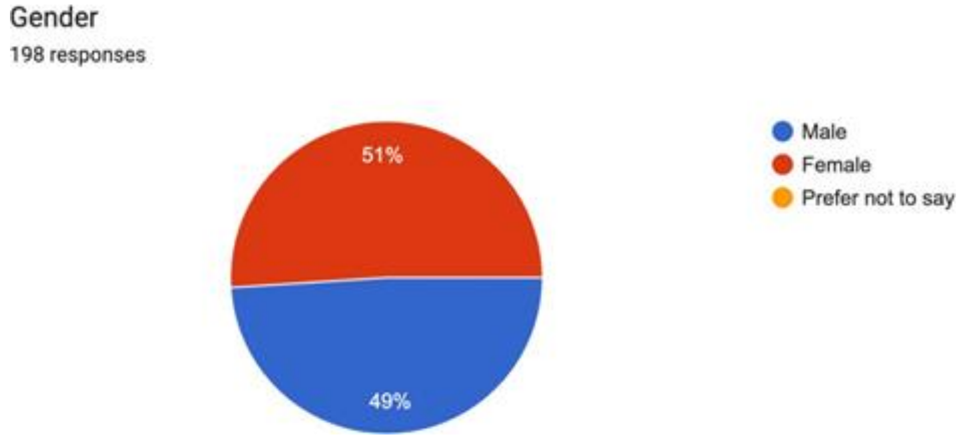
The above graph shows the wide range of age groups from which the data has been obtained.

- Age group 18-24: 40.9% (Maximum)
- Age group 35-44: 20.7%

- Age group 45-54: 17.7%
- Age group 25-34: 12.6%
- Age group Below 18 & 55+: Rest (Minimum)

The following data helps us understand that the age group 18-24 shows maximum interest in online shopping, followed by other age groups. These age ranges help us understand the consumer behaviour of various audience ranging from millennials to older age groups and their behaviour towards online shopping.

2. Gender of the respondent:



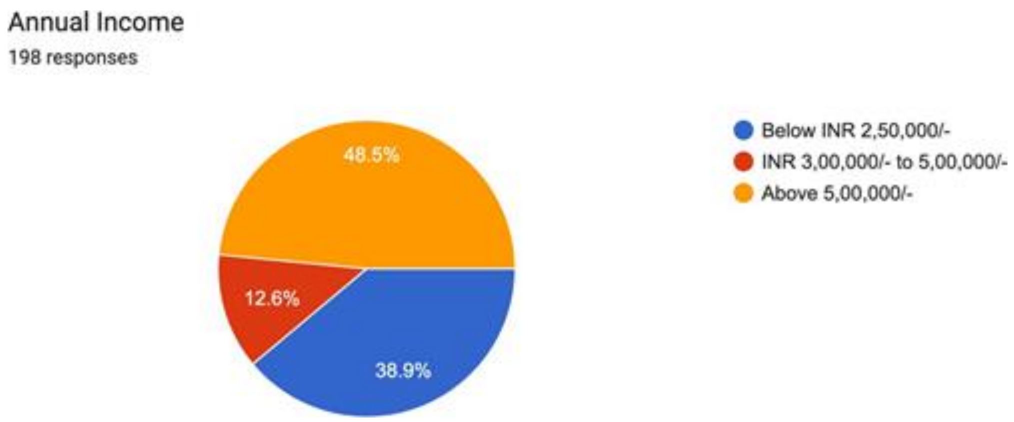
DATA INTERPRETATION 2:

The above graph shows the participation of men and women in the survey from which the data has been obtained.

- Male– 49%
- Female- 51%

The following data helps us understand the percentage of participation from each gender i.e., Male and Female. Female participation in the survey was of majority of 51% and Male participation in the survey was of total 49%

3. Annual Income of the respondent:



DATA INTERPRETATION 3:

The above graph shows the bifurcation of annual income earned by various respondents who participated in the survey.

- Below INR 2,50,000/-: 38.9%
- INR 3,00,00/- to 5,00,000/-: 12.6%
- Above 5,00,000/-: 48.5%

The above data helps us understand the earning capacity of the mass included in the survey which would have a direct relationship in understanding the spending capacity of each individual contributing to the consumer behaviour towards online shopping.

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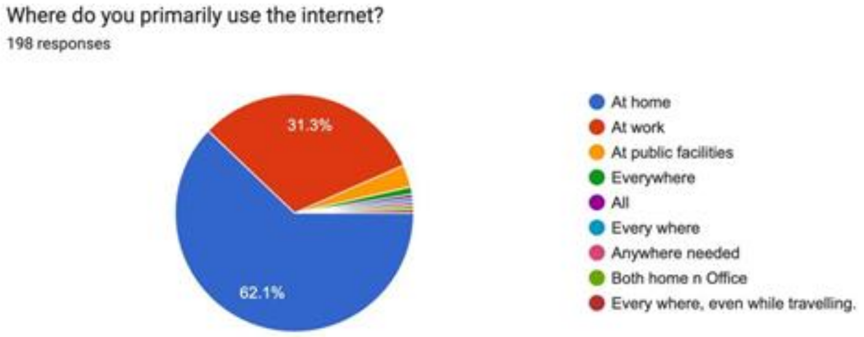
4. Location of primary usage of internet of the respondents:



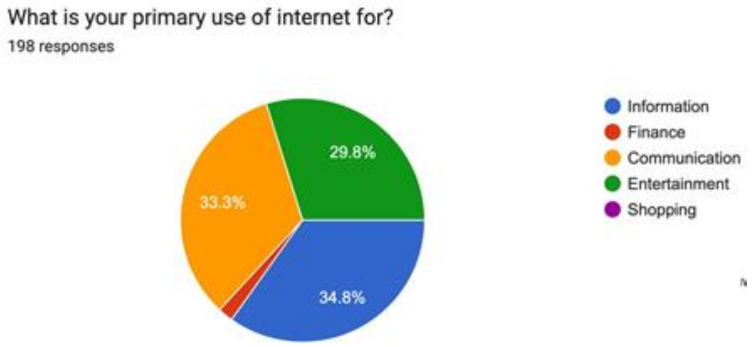
DATA INTERPRETATION 4:

The above graph shows us the primary usage of internet by our respondents in their day-to-day life.

- At Home: 62.1% (Maximum)
- At Work: 31.3%
- Rest at public facilities and other areas.

This data helps us understand how in the modern times the users can conveniently access the internet from their homes and as well as work. This plays a major role in understanding the consumer behaviour towards online shopping.

5. Primary use of the internet for of the respondent:



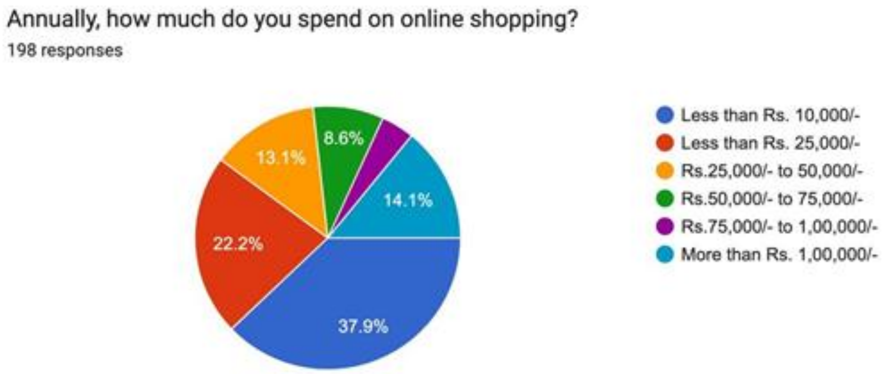
DATA INTERPRETATION 5:

The above graph shows us what the respondents primarily use the internet for, as we can see:

- Information: 34.8%
- Communication: 33.3%
- Entertainment: 29.8%
- Finance: 2.1%

This data helps us understand that how and what for the respondents use the internet for which explains to us the behavioral pattern of the consumer.

6. Annual spending of the respondent on online shopping:



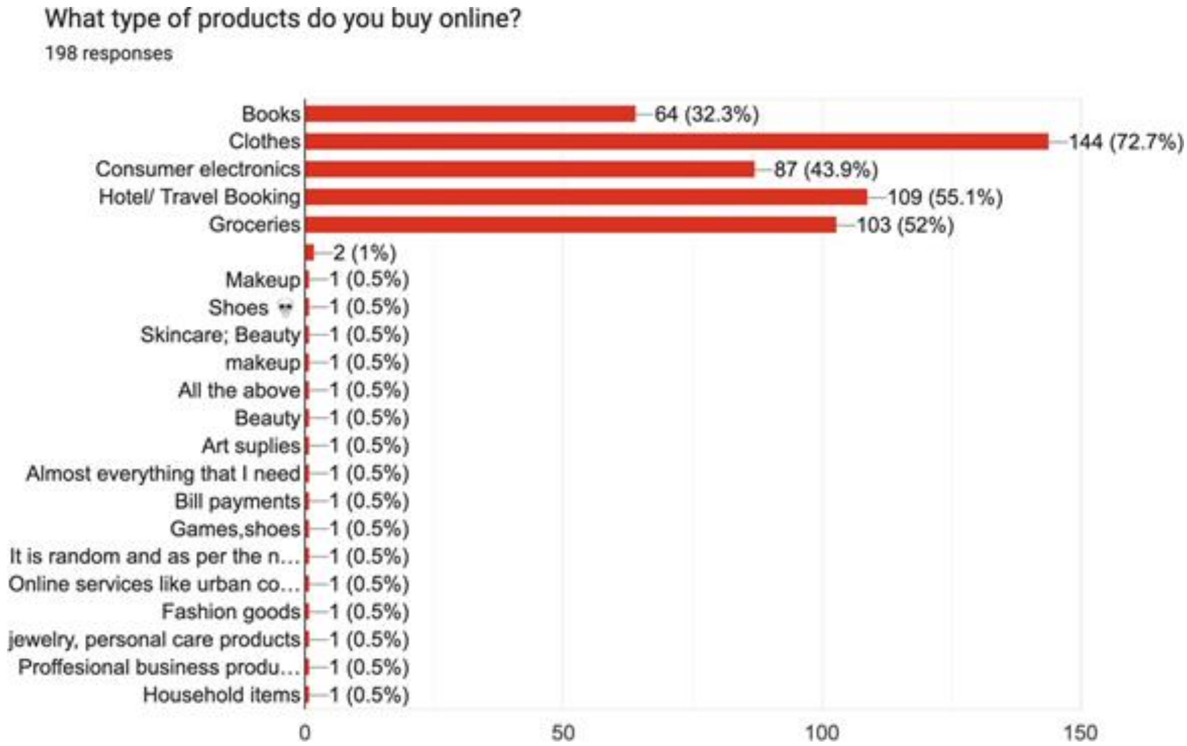
DATA INTERPRETATION 6:

The above graph shows us the annual spendings done on online shopping by individuals done who participated in the survey, as we can see:

- Less than Rs. 10,00/-: 37.9% (Maximum)
- Less than Rs. 25,000/-: 22.2%
- Rs.25,000/- to Rs.50,000/-: 13.1%
- Rs.50,000/- to Rs.75,000/-: 8.6%
- Rs.75,000/- to Rs.1,00,000/-: 4.1%
- More than Rs.1,00,000/-: 14.1%

This data tells us how much spending is done annually, 37.9% (maximum) no. of respondents spends less than, Rs.10,000/- on online shopping, 22.2% respondents spend less than Rs. 25,000/- on online shopping, 13.1% of the respondents spend between Rs.25,000/- to Rs.50,000/- on online shopping, 8.6% of the respondents spend between Rs.50,000/- to Rs.75,000/- on online shopping, 4.1% of the respondents spend between Rs.75,000/- to Rs.1,00,000/- on online shopping and 14.1% of the respondents spend more than Rs.1,00,000/-

7. Types of products purchased online by the respondents:



DATA INTERPRETATION 7:

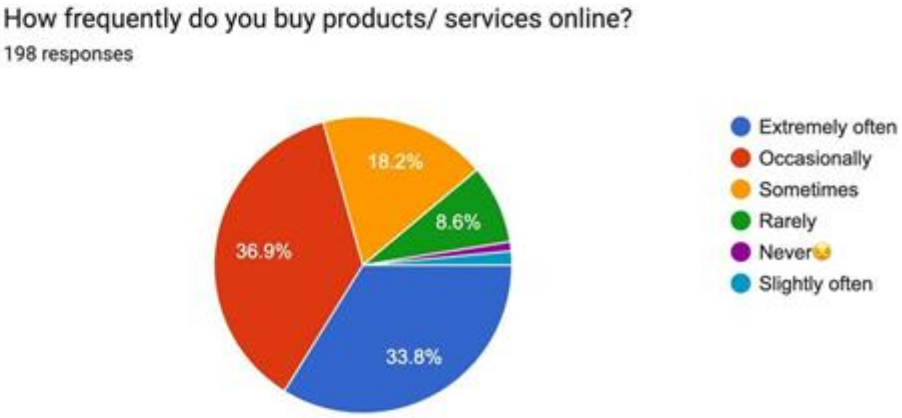
The above data shows us the different kinds of products that are purchased online by various respondents through online shopping, majorly being:

- Books – 32.3%
- Clothes - 72.7%
- Consumer electronics – 43.9%
- Hotel/ Travel Booking – 55.1%
- Groceries – 52%

The data collected through the survey helps us understand the different kinds of products purchased online by different customers through Online shopping, majorly being Clothes, Travel Booking, Groceries, Clothes and Books.

ISSN 2394 - 7780

8. The frequency of purchase of products/services through online shopping.



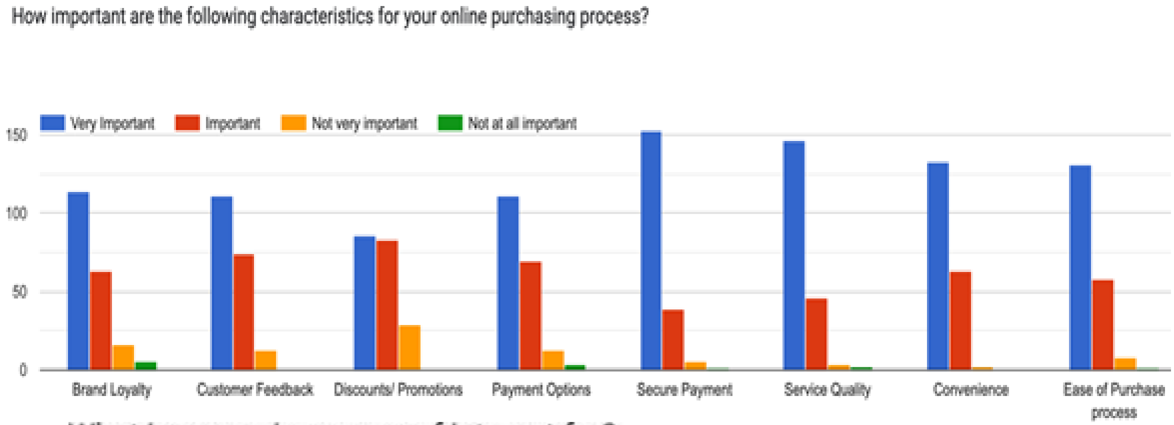
DATA INTERPRETATION 8:

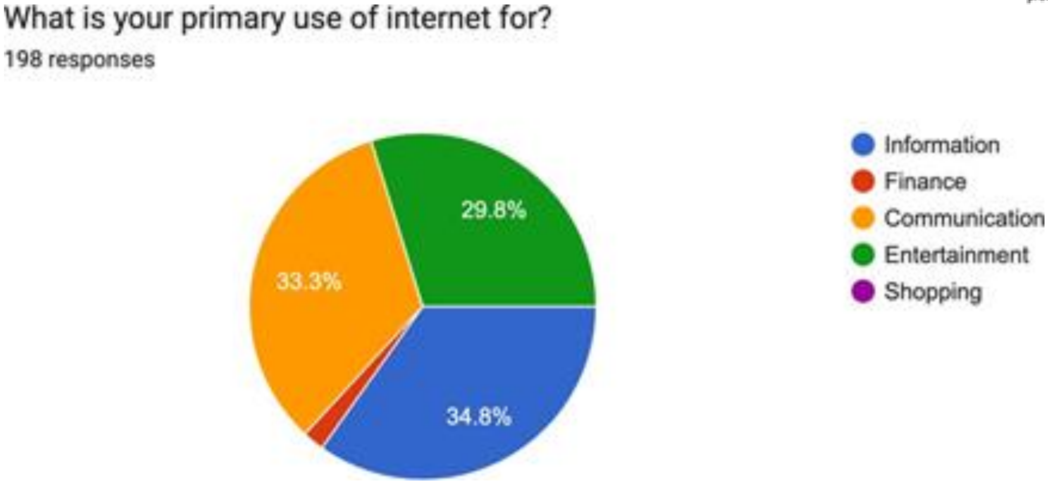
The graph above shows us the frequency of purchase of goods and services through online shopping which helps us deeply understand the consumer behaviour towards online shopping.

- Extremely Often: 33.8%
- Occasionally: 36.9%
- Sometimes: 18.2%
- Rarely: 8.6%
- Others

The above data explains that majority of the survey respondents occasionally purchase goods and services through online shopping – 36.9% and some respondents extremely often make purchases through online shopping – 33.8%.

9. Important factors that played role in the purchasing process through online shopping:





ISSN 2394 - 7780

DATA INTERPRETATION 9:
The above chart shows the opinions of various respondents and the importance of different actors that play a role in the purchase making process for a consumer. Several factors were noted down based on which the opinion of the respondent was collected. The factors are as listed below:

- Brand Loyalty
- Customer feedback
- Discount/promotion
- Payment options
- Secure payment
- Service Quality
- Convenience
- Ease of purchase process

This data helps us understand the behaviour of the consumer and how different factors play a role in the decision-making process before purchasing the products. Through the survey we understand that, Secure payment, Convenience and Service quality are some of the most important factors that play a role followed by brand loyalty, customer feedback, ease of purchase process and payment options.

10. Preferred mode of payment for online purchase of the respondents:

DATA INTERPRETATION 10:
The above graph shows us the data acquired through the survey forms which showcases the preferred mode of payment of the respondents while online shopping.

- Credit Card: 32.8%
- Debit Card: 34.3%
- E-wallet: 43.4%
- Cash on delivery: 52% (Maximum)

The above data explains that most of the respondents/ consumers who engage in online shopping yet choose cash on delivery as their preferred mode of payment (52%) followed by E-wallet (43.4%), Debit card (34.3%), & Credit card (32.8%)

FINDINGS

5.1 The findings of this study are as follow:

Here's a suggested interpretation of findings based on the provided data, related to each hypothesis:

H1: Perceived usefulness of online shopping positively influences consumers' intention to shop online.
- Finding (Supporting): The data states, "Some of the reasons cited for adoption of online shopping include time saving, easy comparison of alternative products, fairer prices of online goods, expert or user review of

products and access to a market without borders." These reasons directly relate to the perceived usefulness of online shopping. The fact that respondents cite these benefits as reasons for adoption strongly supports the hypothesis. The mention of "convenience" further reinforces this.

H2: Higher perceived financial risk negatively influences online purchase decisions.

- Finding (Potentially Mixed/Needs More Data): While the data mentions that "most of the respondents think that online shopping is cheaper than offline shopping," this doesn't directly address perceived financial risk. The focus is on price advantage, not the risk of financial loss due to fraud, etc. The fact that many use Cash on Delivery (COD) might suggest some concern about online payment security, which could be related to perceived financial risk. However, more direct questions about security concerns and fraud would be needed to definitively assess this hypothesis. The data is insufficient to conclude on this.

H3: Higher website usability positively influences online purchase decisions.

- Finding (Indirectly Supportive/Needs More Data): The data doesn't explicitly discuss website usability. The convenience and ease of comparing products suggest that the online platforms are usable, but it's an indirect inference. To properly evaluate this hypothesis, you'd need data specifically about website navigation, search functionality, clarity of product information, etc. The current data provides weak, indirect support.

H4: Positive online reviews positively influence online purchase intentions.

- Finding (Supportive): The data states, "Some of the reasons cited for adoption of online shopping include...expert or user review of products." This directly supports the hypothesis. The fact that reviews are a cited reason for adoption demonstrates their influence on purchase intentions.

H5: Younger consumers are more likely to engage in online shopping compared to older consumers.

- Finding (No Direct Evidence/Needs More Data): The data doesn't provide any information about the age of the respondents. Therefore, it's impossible to draw any conclusions about this hypothesis based on the provided information. Data on the age demographics of online shoppers is necessary. The statement about increased internet users and willingness to buy online could suggest younger generations are driving this growth, but it's speculation.

CONCLUSION

The findings suggest that perceived usefulness, positive online reviews, and potentially price advantages are key drivers of online shopping adoption. While convenience and product quality are also cited as benefits, the data indirectly supports the influence of website usability and offers limited insight into perceived financial risk and demographic differences in online shopping behavior. The preference for cash on delivery may indicate some underlying concerns about online security, which warrants further investigation.

RECOMMENDATIONS

- **E-commerce businesses:** Should focus on highlighting the usefulness and convenience of their platforms, ensuring positive customer reviews are readily available, and potentially offering competitive pricing. Addressing potential security concerns through transparent communication and secure payment options may also increase consumer confidence. Further research into website usability and user experience is recommended to optimize online platforms.

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A STUDY ON THE ROLE OF RISK PERCEPTION AND FINANCIAL LITERACY IN RETAIL INVESTORS' MUTUAL FUND INVESTMENT DECISIONS

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ABSTRACT
Mutual funds have become a preferred investment vehicle for retail investors, offering diversification and professional fund management. Financial literacy and risk perception are key factors influencing mutual fund investment decisions. This study examines their impact on investment behavior among retail investors in Mumbai and Navi Mumbai, analyzing the association between risk perception and financial literacy, how they affect portfolio diversity, and how they both influence investing choices.

A descriptive quantitative research design was employed and data were collected through structured questionnaires from 164 retail investors using convenience sampling. To test the internal consistency of the data researcher used. Statistical analyses, including independent t-tests, correlation tests, and multiple regression, were conducted to test the hypotheses. The results indicate that individuals with higher financial literacy exhibit significantly lower risk perception. It was found that, financial literacy and portfolio diversification have a weak but statistically significant relationship, and mutual fund investing decisions are influenced by both financial literacy as well as risk perception.

Findings suggest that risk perception plays a more dominant role in investment behavior than financial literacy, although financial literacy enhances investment knowledge. Investors with higher risk perception tend to adopt conservative investment strategies, emphasizing the need for financial education initiatives that address behavioral biases alongside technical knowledge. By contributing to the growing body of research on investor psychology and financial decision-making, this study provides insight to policymakers and financial educators on how to create focused interventions that enhance investor confidence and decision-making accuracy.

Keywords: *Financial Literacy, Risk Perception, Mutual Fund, Portfolio Diversification, Investment Decision.*

INTRODUCTION
As a handy approach to diversify portfolios and take advantage of professional fund management, mutual funds have become one of the most popular and accessible investing choices for retail investors over the years. The mutual fund sector in India has grown substantially; as of December 2024, assets under management (AUM) were up by 31.81% year over year to ₹66.93 lakh crore. Similarly, there were 22.50 crore mutual fund accounts, or folios, resulting in an annual increase of 36.46%. This quick growth demonstrates how more retail investors are entering the market. Still, many investors still find it difficult to make wise choices in spite of this growing trend, which emphasizes the need of grasping the main variables influencing investment behavior.

Risk perception and financial literacy constitute two of the most important factors among the numerous variables that influence investment decisions. A competent investor is more likely to analyze potential risks, critically evaluate investment opportunities, and make calculated choices that support their financial objectives. In contrast, risk perception reflects an investor's subjective assessment of uncertainties in the market and their willingness to accept potential fluctuations in returns. This perception directly impacts investment preferences, influencing whether an investor opts for low-risk debt funds, high-risk equity funds, or a moderate-risk balanced portfolio.

Understanding the interaction between financial literacy and risk perception is vital for analyzing the decision-making patterns of retail investors in Mumbai and Navi Mumbai, which have a diverse and dynamic investor base. Higher financial literacy levels can empower individuals to make informed choices, while risk perception determines their comfort level with different investment vehicles. By examining these factors, financial educators, policymakers, and investment firms can develop targeted strategies to enhance investor awareness, promote prudent financial planning, and ultimately drive sustainable growth in the mutual fund industry.

REVIEW OF LITERATURE

Risk Perception in Mutual Fund Investments:
Risk perception plays a critical role in how investors approach mutual funds. Deb and Singh (2018) found that factors like fear, lack of confidence, and knowledge gaps significantly influence how individuals perceive

investment risks. Walia and Kiran (2016) highlighted the importance of understanding the risk-return trade-off and suggested that mutual fund providers must innovate to address varying risk appetites. Chandrakala and Suresh (2016) further found a substantial correlation between risk tolerance and investment choices, with women investors in Bengaluru exhibiting a higher degree of risk tolerance, which results in greater variety in investment choices.

Financial Literacy and Investment Decisions:
Financial literacy has been shown to be a major determinant of investment behavior. According to Mahdzan, Zainudin, and Yoong (2020), people who were more financially literate had a larger tendency to invest in mutual funds. Investors' risk attitudes and investing preferences are shaped by financial literacy, which also aids in the assessment of financial products.Verma et al. (2023) further emphasized that financial literacy was strongly linked with a better understanding of risk and investment products, which led to more favorable investment decisions, especially among younger investors. Alexander et al. (1997) Pension investors demonstrate a comparable understanding of mutual fund costs, risks, and returns to those investing through other distribution channels.

Demographic and Socioeconomic Factors Influencing Investment:
Demographic and socioeconomic factors, have been found to influence mutual fund investments. Deb and Singh (2017) noted that these factors significantly affect risk perception, with individuals from higher socio-economic backgrounds exhibiting a more positive view of mutual fund investments. Anil et al. (2024) pointed out that education and income levels shape investor awareness and decision-making.

Factors Influencing Mutual Fund Selection:
The factors that influence investors' selection of mutual funds include fund credibility, tax benefits, and various fund attributes such as entry and exit loads, lock-in periods, and professional management. Chawla (2014) found that these attributes, alongside the financial health and risk perceptions of investors, shaped their investment choices.

RESEARCH GAP AND CONTRIBUTION
While financial literacy and risk perception influence investment decisions, their specific impact on retail investors in Mumbai and Navi Mumbai remains underexplored. Given the region’s diverse investor base, understanding how these factors shape mutual fund choices is essential. This study addresses that gap by examining their combined role in investment behavior.

RESEARCH OBJECTIVES
- To investigate how risk perception and financial literacy influences mutual fund investment decisions of retail investors in Mumbai and Navi Mumbai.
- To investigate the connection between retail investors' perceptions of risk and financial literacy in Mumbai and Navi Mumbai.
- To determine how financial literacy impacts the investing strategy and portfolio diversification of retail investors in Mumbai and Navi Mumbai.
- To analyze whether higher financial literacy leads to lower risk perception in mutual fund investment decisions among retail investors in Mumbai and Navi Mumbai.

HYPOTHESIS

Hypothesis 1:

Null Hypothesis (H0): There is no significant difference in risk perception between individuals with high and low financial literacy.

Alternative Hypothesis (H1): Individuals with higher financial literacy have significantly lower risk perception compared to those with lower financial literacy.

Hypothesis 2:

Null Hypothesis (H0): There is no significant association between financial literacy and portfolio diversification.

Alternative Hypothesis (H1): There is a significant association between financial literacy and portfolio diversification.

Hypothesis 3:

Null Hypothesis (H0): Financial literacy and risk perception do not have a significant combined effect on mutual fund investment decisions.

Alternative Hypothesis (H1): Financial literacy and risk perception have a significant combined effect on mutual fund investment decisions..

RESEARCH METHODOLOGY

Research Design:
The researcher adopted a quantitative, descriptive, and analytical approach to examine the impact of financial literacy and risk perception on retail investors' investment decisions in mutual funds.

Sample Selection:
The researcher surveyed 164 retail investors from Mumbai and Navi Mumbai, selected through convenience sampling. Participants represented diverse backgrounds in terms of age, income levels, and education, ensuring a broad perspective on investment behavior.

Data Sources:
For a thorough analysis, this researcher used both primary and secondary data. A systematic questionnaire encompassing demographics, financial literacy, risk perception, and investing preferences has been utilized to collect primary data via a Google Form. Adapted from established literature, the reliability of the questionnaire was ensured using Cronbach's alpha. To complement this, secondary data was sourced from peer-reviewed journals, industry reports, and financial market sources, including the Association of Mutual Funds in India (AMFI) website and its monthly reports.

Data Collection & Analysis
Data was collected through online surveys, enabling broad participation while ensuring efficiency in reaching the target audience. To evaluate the impact of risk perception and financial literacy on mutual fund investment decisions, a variety of statistical techniques were used, such as multiple regression analysis, Pearson correlation, and t-tests. These analytical tools provided a quantitative foundation for evaluating the strength and significance of relationships between the studied variables.

RESULTS AND DISCUSSION

This chapter presents the findings of the statistical analyses conducted to assess the relationship between financial literacy, risk perception, and investment decisions. It covers demographic analysis, reliability assessment using Cronbach's Alpha, and hypothesis testing through t-tests, correlation analysis, and multiple regression.

1. Demographic Profile of Respondents

Table 1: Summary of Respondents' Demographic Characteristics

Demographic Variables	Levels	Counts	% of Totals	Cumulative %
Age	Below 25	114	69.51	69.51
	26-35	29	17.68	87.20
	36-45	15	9.15	96.34
	46-55	5	3.05	99.39
	Above 55	1	0.61	100.00
	Total	164	100.00	
Gender	Male	77	46.95	46.95
	Female	87	53.05	100.00
	Total	164	100.00	

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Education Level	High School	18	10.98	10.98
	Graduate	92	56.10	67.07
	Post Graduate	42	25.61	92.68
	Professional Degree	12	7.32	100.00
	Total	164	100.00	
Occupation	Salaried	45	27.44	27.44
	Business Owner	12	7.32	34.76
	Student	101	61.59	96.34
	Others	6	3.66	100.00
	Total	164	100.00	
Annual Income	Less than ₹3,00,000	111	67.68	67.68
	₹3,00,000 – ₹6,00,000	25	15.24	82.93
	₹6,00,000 – ₹10,00,000	15	9.15	92.07
	Above ₹10,00,000	13	7.93	100.00
	Total	164	100.00	
Location	Mumbai	70	42.68	42.68
	Navi Mumbai	94	57.32	100.00
	Total	164	100.00	

Source: Primary data based on survey(2025)

A total of 164 respondents participated in the study. The majority of respondents (69.51%) were below the age of 25, 17.68% were between 26-35 years, and 12.81% were above 35 years. The gender distribution showed that 53.05% of respondents were female, while 46.95% were male. In terms of education level, 56.10% were graduates, 25.61% held postgraduate degrees, and 10.98% had only a high school education. Regarding occupation, a significant portion (61.59%) of respondents were students, while 27.44% were salaried employees. The majority (67.68%) had an annual income of less than ₹3,00,000. Geographically, 57.32% of respondents were from Navi Mumbai, while 42.68% were from Mumbai.

2. RELIABILITY ANALYSIS

Table 2: Cronbach's Alpha Reliability Test Results

Component	No. of Items	Cronbach's Alpha	Reliability Level
Financial Literacy	5	0.9001	Excellent
Risk Perception	4	0.7605	Acceptable
Investment Decisions	5	0.8006	Good

****Source:*** Author's calculation based on survey data (2025)

Cronbach's Alpha was computed to evaluate the internal consistency of the survey constructs. The results revealed that financial literacy achieved a Cronbach's Alpha value of 0.9001, indicating excellent reliability. Risk perception scored 0.7605, while investment behavior and decisions recorded a value of 0.8006, both reflecting acceptable reliability. Since Cronbach's Alpha values exceeding 0.7 are deemed reliable, these results confirm the internal consistency and suitability of measuring scales employed in this study.

3. HYPOTHESIS TESTING

3.1 Hypothesis 1:

H_0: There is no significant difference in risk perception between individuals with high and low financial literacy.

H_1: Individuals with higher financial literacy have significantly lower risk perception compared to those with lower financial literacy.

Table 3: t-Test and Variance Equality Test for Risk Perception and Financial Literacy

Test	Test Statistics	p-value	Conclusion
Levene's Test (Equality of Variance)	F = 0.0103	0.9194	Variances are equal ($p > 0.05$)
Two Sample t-test (One tailed)	t = -5.19	0.000000317	Reject H_0 ($p < 0.05$)

****Source:*** Author's calculation based on survey data (2025)

A hypothesis was tested to determine if individuals with higher financial literacy exhibit significantly lower risk perception compared to those with lower financial literacy. Levene's test confirmed homogeneity of variances (p = 0.9194), and a two-sample t-test assuming equal variance was conducted. The results showed a t-statistic of -5.19 and a p-value of 0.000000317, which is highly significant. Since the p-value is less than 0.05, the null hypothesis was rejected, confirming that individuals with higher financial literacy have significantly lower risk perception. These findings highlight the role of financial education in influencing how individuals perceive financial risks.

3.2 Hypothesis 2:

H_0: There is no significant association between financial literacy and portfolio diversification.

H_1: There is a significant association between financial literacy and portfolio diversification.

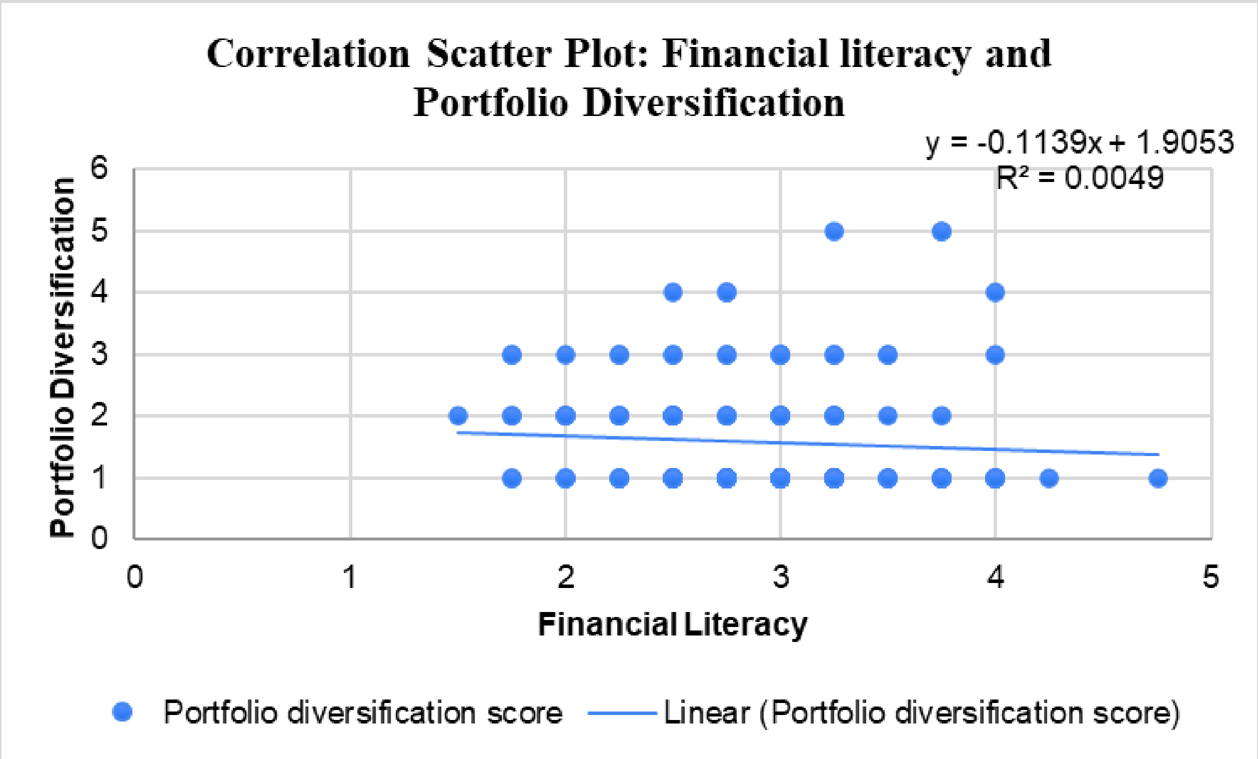

Figure 1: Correlation between Financial Literacy and Portfolio Diversification

****Source:*** Author's calculation based on survey data (2025)

The scatter plot illustrates the relationship between financial literacy and portfolio diversification scores among retail investors. The trend line shows a slightly negative slope, suggesting a weak inverse relationship between these two variables. However, the data points are widely scattered, indicating weak correlation.

Table 4: Correlation Analysis between Financial Literacy and Portfolio Diversification

Correlation Test	Correlation Coefficient (r)	p-value	R2 value	Conclusion
Pearson Correlation	-0.07007	~0 (1.03231E-75)	0.0049	Weak negative correlation

***Source:** Author's calculation based on survey data (2025)

A correlation analysis was conducted to examine the association between financial literacy and portfolio diversification. The correlation coefficient (r) was found to be -0.07007, indicating a very weak negative relationship. The p-value was effectively 0 (1.03231E-75), indicating a statistically significant result, but the R^2 value of 0.0049 suggests that financial literacy explains only 0.49% of diversification behavior. Although the relationship is statistically significant, the practical impact is negligible. This implies that financial literacy alone does not strongly predict portfolio diversification, and other factors such as income levels and investment goals may play a more significant role.

3.3 Hypothesis 3:

H_0: Financial literacy and risk perception do not have a significant combined effect on mutual fund investment decisions.

H_1: Financial literacy and risk perception have a significant combined effect on mutual fund investment decisions.

Table 5: Multiple Regression Analysis for Financial Literacy, Risk Perception, and Investment Decisions

Predictor	Coefficient (β)	Standard Error	t-statistics	p-value	95% Confidence Interval	Conclusion
Intercept	2.8943	0.3236	8.9444	<0.0001	[2.2553, 3.5334]	Significant positive baseline investment decision level.
Financial Literacy	0.0078	0.0514	0.1528	0.8788	[-0.0936, 0.1093]	No significant impact on investment decisions.
Risk Perception	-0.1995	0.0745	-2.6790	0.0082	[-0.3466, -0.0524]	Significant negative effect on investment decisions.

***Source:** Author's calculation based on survey data (2025)

A multiple regression analysis was performed to determine the combined effect of financial literacy and risk perception on mutual fund investment decisions. The regression model was significant, with an F-statistic of 5.27 and a p-value of 0.0061. However, financial literacy was found to be statistically insignificant ($p = 0.8788$), while risk perception had a significant negative effect ($\beta = -0.1995$, $p = 0.0082$).

These results suggest that while financial literacy contributes to knowledge, it does not directly drive investment decisions. Instead, risk perception plays a more dominant role, influencing conservative investment behaviors.

4. RESEARCH FINDINGS

Table 6: Summary of Hypothesis Testing Results

Hypothesis	Test Applied	Test Statistics	p-value	Conclusion
H_1: Individuals with higher financial literacy have significantly lower risk perception compared to those with lower financial literacy.	Independent t-test	t = -5.19	0.000000317	Reject Null Hypothesis
H_2: There is a significant association between financial literacy and portfolio	Correlation Test	r = -0.07007	1.03231E-75	Reject Null Hypothesis

diversification.				
H_3: Financial literacy and risk perception have a significant combined effect on mutual fund investment decisions.	Multiple Regression	F = 5.27	0.0061	Reject Null Hypothesis

Source: Author's calculation based on survey data (2025)

The reliability analysis confirmed that the measurement scales used in this study exhibit strong internal consistency. Hypothesis testing offered valuable insights into the interplay between financial literacy, risk perception, and investment decisions. The significant negative correlation between financial literacy and risk perception suggests that increased financial knowledge can help mitigate perceived risks, potentially fostering more confident investment decisions. However, the minimal influence of financial literacy on portfolio diversification indicates that investors may rely on additional factors beyond financial knowledge when making diversification choices. Furthermore, multiple regression analysis revealed that while financial literacy plays a crucial role, risk perception emerges as a more dominant factor in shaping mutual fund investment behavior. This underscores the need to address psychological biases related to risk perception in financial education initiatives.

The study provides meaningful insights into the impact of financial literacy and risk perception on investment decisions. While financial literacy enhances overall awareness, risk perception exerts a stronger influence on investor behavior. These findings highlight the importance of targeted financial education programs that not only enhance knowledge but also address psychological biases associated with risk assessment to improve investment decision-making. Future research could explore additional determinants of investment behavior, such as cognitive biases, past investment experiences, and macroeconomic influences, to develop a more comprehensive understanding of retail investors' decision-making processes.

5. LIMITATIONS OF THE STUDY

Although this study offers insightful information, it has certain limitations. The findings may not be as broadly applicable to investors in other areas with distinct economic and cultural circumstances due to the research's geographic limitation to Mumbai and Navi Mumbai. Furthermore, the use of convenience sampling raises the possibility of bias because the sample might not accurately reflect the variety of retail investors. The study mostly concentrates on risk perception and financial literacy, ignoring other important elements that can also have a big impact on investing decisions, like behavioral biases, demographic impacts, and sociocultural variables. Furthermore, time and financial limitations have limited the scope of data collection and analysis, making it more difficult to thoroughly examine more intricate investor behaviors.

CONCLUSION

This study explored the interplay between financial literacy and risk perception in shaping retail investors' mutual fund investment decisions. The results indicate that while financial literacy enhances investment knowledge, it does not serve as the sole driver of investment behavior. Instead, risk perception emerged as a more influential factor, with investors who perceive higher risks displaying a tendency toward conservative investment choices. The study also established that individuals with greater financial literacy generally exhibit lower risk perception, suggesting that a deeper understanding of financial concepts enables investors to assess and navigate risks more effectively, fostering informed decision-making.

Additionally, the research examined how financial literacy affects portfolio diversification and investment strategies. The findings revealed a weak yet statistically significant relationship, implying that although financial literacy plays a role, factors such as income levels, personal risk tolerance, and investment goals exert a stronger influence on diversification decisions. These insights underscore the need for financial education programs that not only improve technical knowledge but also address behavioral and psychological biases that impact investment choices. By implementing such targeted interventions, financial institutions and policymakers can support investors in making well-rounded, strategic decisions. Despite this study offering insightful information about investor behavior, subsequent research ought to investigate deeper at the role that psychological biases play in changing market dynamics, and demographic differences to develop a more holistic understanding of retail investment patterns.

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AI IN FINANCIAL FORECASTING: ACCURACY, ETHICS, AND ACCOUNTABILITY

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ABSTRACT
The integration of Artificial Intelligence (AI) into financial forecasting has revolutionized the accuracy and efficiency of predictive models used by businesses, investors, and policymakers. This study investigates the impact of AI on financial forecasting, focusing on three critical dimensions: accuracy, ethics, and accountability. Relying exclusively on secondary data from academic literature, industry reports, regulatory documents, and global case studies, the paper compares the performance of AI-based models—such as neural networks, LSTM, and ensemble methods—with traditional forecasting approaches like ARIMA and linear regression. The findings highlight that while AI significantly enhances forecasting accuracy, it also raises pressing ethical concerns, including algorithmic bias, lack of transparency, and data privacy risks. Furthermore, the study explores accountability challenges in AI-driven financial systems, particularly in assigning responsibility for errors and ensuring regulatory compliance. The paper concludes by recommending robust governance frameworks, the adoption of explainable AI (XAI), and ethical guidelines to ensure the responsible use of AI in financial decision-making. These insights are crucial for financial institutions, regulators, and stakeholders navigating the evolving landscape of intelligent financial technologies.

Keywords: *Keywords for this study include artificial intelligence in finance, financial forecasting, predictive analytics, forecast accuracy, ethical concerns in AI, algorithmic accountability, explainable AI (XAI), machine learning applications, data-driven decision making, FinTech, financial reporting, regulatory compliance, AI ethics, risk management, and secondary data analysis.*

1. INTRODUCTION

The integration of Artificial Intelligence (AI) into financial forecasting marks a transformative shift in how organizations process information, predict market movements, and make strategic decisions. As financial environments become increasingly complex and data-rich, AI provides tools that surpass the capabilities of traditional models. By leveraging machine learning, neural networks, and big data analytics, AI enables faster, more accurate, and adaptive forecasting. However, despite its potential to enhance decision-making, the deployment of AI in financial contexts raises significant concerns related to ethics, transparency, and accountability. This paper seeks to explore the dual nature of AI's promise and its challenges in financial forecasting, using a structured analysis based on secondary data sources.

The **context and relevance** of this study stem from the ongoing digital transformation in the financial sector, where AI is now being used to automate financial predictions, assess creditworthiness, detect fraud, and inform investment decisions. Institutions across banking, insurance, and investment domains are increasingly relying on AI-driven models to gain a competitive edge. These models can process vast volumes of real-time and historical data to detect hidden patterns, simulate future scenarios, and respond to market dynamics. In 2025, AI is no longer a futuristic concept but a present reality reshaping how financial forecasts are generated and utilized. However, the rapid pace of AI adoption has outstripped the development of ethical guidelines and regulatory frameworks, making this a crucial topic for both researchers and practitioners.

1.1 Context & Relevance

The integration of Artificial Intelligence (AI) into financial forecasting marks a transformative shift in how organizations process information, predict market movements, and make strategic decisions. As financial environments become increasingly complex and data-intensive, AI provides tools that significantly enhance the capabilities of traditional models. Using techniques like machine learning and neural networks, AI enables faster, more accurate, and adaptive financial predictions. Financial institutions, investment firms, and policymakers are increasingly adopting these tools to improve decision-making and manage risk. However, while AI offers immense advantages, it also introduces challenges related to transparency, ethics, and governance. In the current digital era, where decisions are highly data-driven, the relevance of studying AI's impact on financial forecasting—particularly its accuracy, ethical implications, and accountability mechanisms—has become more critical than ever.

1.2 Problem Statement

Despite the growing reliance on AI in financial forecasting, there is a significant gap in understanding how to balance technological efficiency with ethical responsibility and regulatory compliance. Traditional financial models such as ARIMA or regression provide transparency and interpretability, allowing users to understand the logic behind predictions. In contrast, AI models, especially deep learning-based systems, are often "black boxes" that deliver highly accurate results without clear explanations of how those results are derived. This lack of explainability poses ethical and operational risks, particularly in high-stakes financial decisions like credit scoring, investment recommendations, or risk assessment. Furthermore, issues such as data bias, misuse of customer information, and unclear lines of responsibility raise concerns about the accountability of AI systems. These challenges highlight the urgent need for a critical examination of AI's role in financial forecasting, not just from a technological perspective but also from ethical and governance standpoints.

1.3 Objectives of the Study

The primary objective of this study is to explore the intersection of AI, financial forecasting accuracy, and ethical accountability. Specifically, it aims to:

- Evaluate the forecasting accuracy of AI-based models using secondary data in comparison to traditional models.
- Identify and analyze ethical concerns associated with the use of AI in financial forecasting, such as bias, data privacy, and lack of transparency.
- Investigate how accountability is maintained in organizations using AI for financial decision-making, especially when outcomes are automated or semi-automated.
- Recommend frameworks and practices that ensure responsible, ethical, and transparent use of AI in the finance sector.

1.4 Research Questions

To achieve these objectives, the study addresses the following research questions:

1. How does the forecasting accuracy of AI models compare with traditional statistical forecasting methods in financial applications?
2. What are the main ethical issues involved in the use of AI for financial forecasting?
3. How can accountability be defined and enforced when AI-driven models influence financial decisions?
4. What governance and ethical frameworks are currently in place—or need to be developed—to support responsible AI use in the finance industry?

1.5 Methodology Overview

This research is based entirely on secondary data, utilizing a qualitative and comparative analysis approach. Sources include peer-reviewed academic journals, industry white papers, financial sector case studies, regulatory publications, and global surveys from credible organizations such as Deloitte, PwC, the World Economic Forum, and IMF. The study reviews existing literature on the performance of AI and traditional forecasting models, explores ethical frameworks proposed in academic and industry circles, and examines real-world case examples of AI use in finance. By relying on secondary data, this methodology ensures a broad and up-to-date understanding of AI's practical application, ethical risks, and the accountability mechanisms being adopted by leading financial institutions and regulatory bodies.

2. LITERATURE REVIEW

The integration of Artificial Intelligence (AI) into financial forecasting represents a significant advancement in the way organizations analyze data, predict market trends, and make strategic financial decisions. With financial markets becoming increasingly complex and data-rich, AI technologies such as machine learning, neural networks, and big data analytics offer powerful tools to enhance the accuracy and speed of financial predictions. These technologies enable institutions to process vast amounts of real-time and historical data, uncover hidden patterns, and generate adaptive forecasts that traditional statistical models may struggle to achieve. The growing reliance on AI in financial services underscores its relevance as a transformative force shaping the future of finance.

Despite the promising benefits of AI, its adoption in financial forecasting also raises critical challenges. Traditional forecasting models like regression analysis and time-series approaches are valued for their transparency and interpretability, allowing users to understand the rationale behind predictions. In contrast, many AI models operate as "black boxes," producing highly accurate results without providing clear explanations of their decision-making processes. This opacity raises ethical concerns, including potential biases embedded in algorithms, risks to data privacy, and the broader issue of accountability when AI-driven decisions impact financial outcomes. These challenges highlight the need for a comprehensive understanding of how to balance AI's predictive power with ethical considerations and regulatory compliance.

2.1 AI Models in Financial Forecasting

Recent literature highlights the growing adoption of Artificial Intelligence (AI) techniques such as machine learning, deep learning, and ensemble methods in financial forecasting. Studies indicate that AI models like Long Short-Term Memory (LSTM) networks, Random Forests, and XGBoost algorithms offer improved predictive accuracy over traditional statistical approaches such as ARIMA and linear regression. These advanced models can handle non-linear relationships, large volumes of data, and real-time processing, enabling more nuanced financial forecasts. Multiple empirical analyses show that AI-powered forecasting better captures market volatility and complex patterns in stock prices, currency fluctuations, and credit risk assessments, which traditional methods may miss.

2.2 Accuracy Comparisons: AI vs Traditional Models

A significant body of research compares the accuracy of AI-based forecasting with conventional models. Meta-analyses and systematic reviews generally find that AI approaches outperform traditional methods in various financial domains, particularly when large datasets and diverse variables are involved. However, the degree of accuracy improvement varies depending on the data quality, model selection, and application context. While AI models excel at pattern recognition, they are also sensitive to overfitting and require careful tuning. Some studies caution that despite better accuracy, AI models may lack robustness under changing market conditions, underscoring the importance of continuous evaluation and model updating.

2.3 Ethical Considerations in AI Financial Forecasting

Ethics in AI-driven financial forecasting is a critical area increasingly discussed in the literature. Key ethical concerns include algorithmic bias, lack of transparency, and data privacy. Bias can arise from unrepresentative training data or flawed model design, potentially leading to unfair credit decisions or investment advice. The "black box" nature of many AI systems limits explain ability, reducing stakeholders' trust and complicating regulatory oversight. Privacy issues emerge as models rely on sensitive customer and transaction data, raising questions about consent and data security. Scholars argue for embedding ethical principles into AI development and deployment, emphasizing fairness, accountability, and transparency as core values.

2.4 Accountability and Governance in AI Systems

The challenge of accountability in AI systems used for financial forecasting is widely acknowledged in both academic and regulatory literature. Determining responsibility when AI models make erroneous or biased predictions is complex due to the interplay between data providers, algorithm developers, financial institutions, and end-users. Emerging governance frameworks stress the need for transparent AI audit trails, human oversight ("human-in-the-loop"), and regulatory compliance to mitigate risks. Regulatory bodies worldwide, including the European Union with its AI Act and financial regulators like SEBI in India, are moving toward establishing clear guidelines to ensure that AI deployment in finance adheres to ethical and legal standards.

2.5 Summary of Gaps and Challenges

While existing literature extensively documents the technical superiority of AI in financial forecasting and outlines emerging ethical and governance challenges, gaps remain in comprehensive, unified frameworks that balance accuracy with ethical responsibility. Many studies focus on either performance metrics or ethical implications separately, with limited integrated research addressing how organizations can operationalize accountability alongside AI adoption. Furthermore, the rapid evolution of AI technologies demands ongoing research to adapt governance models and ethical guidelines. This study builds on these insights by synthesizing current knowledge and proposing holistic recommendations for the responsible use of AI in financial forecasting.

3. METHODOLOGY

This study adopts a qualitative research approach based entirely on the analysis of secondary data. By reviewing existing academic literature, industry reports, regulatory documents, and case studies, the research aims to gain a comprehensive understanding of the use of AI in financial forecasting. This method allows for an in-depth exploration of AI's accuracy, ethical considerations, and accountability without the need for primary data collection, providing a broad and well-rounded perspective based on credible and diverse sources.

3.1 Research Design

This study adopts a qualitative research design focused entirely on the analysis of secondary data, allowing for an in-depth exploration of the subject without the need for primary data collection. The qualitative approach facilitates a comprehensive synthesis of existing research, enabling the identification of patterns, trends, and gaps related to the use of AI in financial forecasting. By relying on descriptive and comparative analysis, the study examines how AI models perform relative to traditional forecasting techniques, as well as the ethical and accountability challenges that arise from their implementation. This research design is particularly suited to emerging and rapidly evolving fields like AI in finance, where up-to-date, aggregated knowledge is critical for understanding both technological advancements and their broader implications. Moreover, a secondary data-based research design ensures resource efficiency while maintaining methodological rigor by using verified, credible, and peer-reviewed sources. This approach helps to build a cohesive narrative that links technical accuracy, ethical concerns, and governance mechanisms, providing a multidimensional understanding of AI's role in financial forecasting.

3.2 Data Sources

The study leverages a diverse array of secondary data sources to ensure a well-rounded and authoritative foundation. Academic journals form the backbone of the literature review, with extensive research drawn from high-impact publications in finance, data science, and AI ethics accessed through databases such as Scopus, Web of Science, and Google Scholar. These sources provide peer-reviewed empirical studies, theoretical discussions, and meta-analyses that compare AI forecasting models with traditional methods and discuss their limitations and potentials. In addition, the study incorporates industry white papers and technical reports from prominent consulting firms such as Deloitte, PwC, and McKinsey, which offer practical insights into the deployment of AI in financial institutions, covering case studies, best practices, and emerging challenges. Regulatory documents and guidelines from institutions such as the European Union, with its AI Act and GDPR, and financial regulators like the Securities and Exchange Board of India (SEBI), provide crucial context on the evolving legal landscape that shapes AI accountability and ethical standards. Furthermore, real-world case studies published by financial organizations and international bodies such as the World Economic Forum and the International Monetary Fund are included to illustrate concrete examples of AI's impact and governance in various markets and sectors. By integrating these varied secondary sources, the study gains depth and breadth, capturing both academic rigor and industry relevance.

3.3 Data Analysis Approach

The analysis of secondary data follows a structured qualitative approach centered on thematic synthesis and comparative evaluation. First, the study involves a systematic review of the collected literature, categorizing findings into thematic areas relevant to the research objectives—specifically, forecasting accuracy, ethical implications, and accountability mechanisms in AI-driven financial forecasting. For accuracy assessment, the study compiles and compares reported performance metrics such as Root Mean Square Error (RMSE), Mean Absolute Percentage Error (MAPE), and other relevant statistical measures from different AI models and traditional techniques. This quantitative comparison, drawn from the secondary literature, helps to objectively evaluate AI's effectiveness in forecasting financial variables. In examining ethical considerations, the study qualitatively reviews discussions on algorithmic bias, transparency issues, and data privacy concerns, highlighting case examples where these issues have materialized and the approaches suggested to mitigate them. The accountability theme involves analyzing governance frameworks, regulatory policies, and corporate oversight mechanisms detailed in the literature, emphasizing how responsibility is assigned and enforced when AI systems influence financial decisions. Throughout the analysis, attention is given to identifying gaps and inconsistencies in the current research and practice, providing a nuanced view of the benefits and risks associated with AI. By synthesizing insights across these dimensions, the study presents a coherent understanding of the complex interplay between AI's technical performance and the ethical and regulatory environments in which it operates.

4. FINDINGS AND ANALYSIS

This section presents a comprehensive synthesis of insights derived from the secondary data sources. It examines the performance of AI in financial forecasting, explores the ethical challenges involved, evaluates accountability mechanisms, and offers comparative insights through summarized data. The analysis provides a balanced view of AI's capabilities and the responsibilities that accompany its use in the financial sector.

4.1 Accuracy of AI in Forecasting

The reviewed literature consistently shows that AI models improve the accuracy of financial forecasts compared to traditional methods. Techniques such as machine learning and deep learning are particularly effective in capturing complex patterns and adapting to changing market conditions, resulting in more precise and timely predictions.

4.2 Ethical Considerations
Ethical issues surrounding AI in financial forecasting are prominent, including concerns about transparency, bias, and privacy. The literature highlights the risk that biased data or opaque algorithms can lead to unfair or erroneous financial decisions, underscoring the need for ethical guidelines and greater model explainability.

4.3 Accountability Mechanisms
Accountability remains a significant challenge in AI applications, as responsibility for AI-driven decisions is often unclear. The analysis explores existing governance frameworks, regulatory efforts, and corporate practices aimed at ensuring that AI systems operate within acceptable ethical and legal boundaries.

5. DISCUSSION
This section interprets the key findings from the analysis, discussing their broader implications for the finance sector. It addresses the opportunities and challenges presented by AI in financial forecasting, considers risks linked to its overuse, and explores the ongoing tension between ethical considerations and operational efficiency.

5.1 Interpretation of Key Findings
The findings reveal that while AI substantially enhances forecasting accuracy and offers new analytical capabilities, it simultaneously introduces ethical complexities and accountability challenges. This dual nature underscores the necessity of balanced implementation strategies that maximize benefits while mitigating risks.

5.2 Implications for Finance Professionals
For finance professionals, the increasing adoption of AI demands new skill sets, including data literacy and ethical awareness. Professionals must adapt to working alongside AI systems, ensuring oversight and understanding AI outputs to maintain trust and reliability in financial decision-making.

5.3 Risks of Over-Reliance on AI
Over-dependence on AI can lead to complacency, where human judgment is sidelined, and potential model errors go unchecked. Such risks highlight the importance of maintaining human-in-the-loop processes and robust validation frameworks to prevent systemic failures and ethical lapses.

5.4 Ethics vs Efficiency Debate
The tension between achieving operational efficiency through AI automation and adhering to ethical standards is a central debate. While AI drives faster and often more accurate decisions, ethical concerns—such as bias and transparency—demand that efficiency should not come at the cost of fairness and accountability.

6. RECOMMENDATIONS (DRAWN FROM SECONDARY STUDIES)
This section offers practical recommendations based on the synthesis of existing literature and industry reports. These suggestions aim to guide financial institutions, policymakers, and researchers toward responsible and effective integration of AI in financial forecasting, balancing accuracy with ethical and accountability considerations.

6.1 For Financial Institutions
Financial institutions are encouraged to adopt explainable AI (XAI) techniques that enhance transparency and enable stakeholders to understand how AI models generate forecasts. Incorporating human oversight alongside automated systems ensures that ethical standards are maintained, and potential biases are identified and mitigated. Additionally, institutions should establish internal AI ethics committees to monitor compliance and foster a culture of responsible AI use.

6.2 For Policymakers
Policymakers should focus on developing comprehensive governance frameworks that clearly define accountability and responsibility for AI-driven financial decisions. Regulatory guidelines must mandate transparency, fairness, and regular audits of AI models to protect consumers and maintain market integrity. Collaboration with industry experts and international bodies can help create standards that are both effective and adaptable to evolving technologies.

6.3 For Researchers
Researchers are advised to prioritize the development of AI models that are not only accurate but also interpretable and fair. Further studies should investigate integrated frameworks combining technical performance with ethical and accountability metrics. Open-source platforms and datasets can promote transparency and reproducibility, facilitating collaborative progress in the field.

7. CONCLUSION

The exploration of Artificial Intelligence (AI) in financial forecasting reveals a profound shift in how financial data is analyzed, interpreted, and utilized for decision-making. This study, grounded in a thorough review of secondary data sources, confirms that AI-based forecasting models consistently demonstrate superior accuracy compared to traditional statistical techniques. Advanced methods such as deep learning, ensemble algorithms, and neural networks have the capacity to process vast and complex datasets, uncover intricate patterns, and adapt dynamically to evolving market conditions. This enhanced predictive capability offers financial institutions the potential to improve investment strategies, manage risk more effectively, and respond to market volatility with greater agility.

However, the benefits of AI are accompanied by substantial challenges that demand equal attention. The study underscores that the opacity of many AI models, often referred to as "black box" algorithms, poses significant barriers to transparency and interpretability. Without clear explanations of how decisions are made, stakeholders—including regulators, financial professionals, and customers—may find it difficult to trust AI-driven forecasts. Ethical concerns such as algorithmic bias, which can arise from skewed training data or flawed model design, threaten to perpetuate unfair outcomes and systemic inequities in financial services. Moreover, the extensive use of personal and transactional data raises critical privacy issues that must be carefully managed to prevent misuse or breaches.

Accountability in AI-driven financial forecasting emerges as a complex and pressing issue. The diffusion of responsibility across data scientists, model developers, financial institutions, and regulatory bodies creates ambiguity about who is liable when AI systems err or cause harm. Current governance frameworks and regulatory efforts are nascent and often fragmented, highlighting the urgent need for comprehensive policies that establish clear lines of accountability, mandate rigorous audits, and require explainability in AI systems. Financial institutions must take proactive steps to embed ethical principles into AI deployment, ensuring human oversight and continuous monitoring to mitigate risks.

The study's findings suggest that a collaborative approach involving financial organizations, policymakers, and the research community is essential for fostering a responsible AI ecosystem in finance. Financial institutions are encouraged to adopt explainable AI technologies that enhance transparency and trust, alongside instituting dedicated ethics committees to oversee AI applications. Policymakers should develop adaptive regulatory frameworks that address the unique challenges posed by AI, emphasizing fairness, privacy, and accountability. Researchers, meanwhile, have a critical role to play in advancing AI models that balance predictive accuracy with interpretability and ethical compliance, promoting open standards and sharing best practices.

In conclusion, the integration of AI in financial forecasting holds great promise for transforming the financial landscape through improved accuracy and efficiency. Yet, realizing this potential requires a deliberate and measured approach that addresses the ethical dilemmas and governance challenges inherent in AI systems. By aligning technological innovation with strong ethical standards and robust accountability mechanisms, the financial sector can leverage AI to create more resilient, fair, and transparent markets. Continued interdisciplinary research and stakeholder engagement will be vital to ensuring that AI-driven financial forecasting evolves in a manner that serves the best interests of all participants and upholds public trust.

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THE STRATEGIC ROLE OF AI IN ENHANCING MARKETING EFFECTIVENESS

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ABSTRACT
The strategic use of Artificial Intelligence (AI) in marketing has emerged as an indispensable tool for organizations in Coimbatore that wish to improve the effectiveness of marketing and negotiate the dynamics of the contemporary marketplace. This thesis delves into the ever-evolving interconnection between AI technologies and marketing strategies, with a view to discovering how AI can be strategically harnessed to streamline marketing efforts and provide a competitive advantage. Through a critical analysis of all the available literature and actual-case studies, the research looks into major applications of AI in marketing, such as segmentation of customers, directed marketing, creation of personalized content, and predictive analytics. It also explores the working principles of AI algorithms, which provide for the processing of large volumes of data and extraction of actionable insights that guide and direct strategic decision-making. Through the use of qualitative and quantitative research approaches, this thesis assesses how firms in Coimbatore have effectively integrated AI-driven marketing strategies and determines the determinants of successful adoption of AI. The research also responds to the issue of the challenge's organizations encounter in adopting AI technology into their marketing function, highlighting the determinants of successful integration. Furthermore, it delves into the ethical context of AI in marketing, such as data privacy issues, transparency, and algorithmic discrimination, calling for responsible practice in marketing that would emphasize consumer well-being and ethical considerations. In conclusion, this research provides rich insights into the strategic importance of AI to improve marketing efficiency, providing an outline for Coimbatore businesses to use AI to enhance marketing performance and sustainable development in a more digitalized environment.

Keywords: *Artificial Intelligence, Marketing Effectiveness, Personalization, Predictive Analytics, Ethical Considerations.*

INTRODUCTION
In today's fast-evolving digital landscape, Artificial Intelligence (AI) has emerged as a transformative force, revolutionizing the way businesses engage with consumers and optimize marketing strategies. With the exponential growth of data being created globally, AI technologies now provide marketers with the tools needed to analyze massive datasets, uncover hidden patterns, and predict customer behavior, thus enhancing marketing effectiveness. By bridging the gap between data science and practical implementation, AI enables companies to make data-driven decisions that significantly improve customer engagement, brand loyalty, and overall marketing ROI.

As businesses in Coimbatore and around the world grapple with the complexities of an increasingly digital marketplace, leveraging AI has become essential for gaining a competitive edge. In 2025, over 40 zettabytes of data will be created worldwide, much of it unstructured. This vast amount of data can be overwhelming, but AI technologies, such as machine learning and natural language processing, offer new ways to process and extract valuable insights that were once inconceivable. Marketers now have the ability to understand their audiences with precision and create personalized marketing campaigns that resonate deeply with individual consumers.

This study aims to explore the strategic role of AI in enhancing marketing effectiveness, specifically focusing on how organizations in Coimbatore can harness AI-driven solutions to optimize their marketing strategies. With the rise of machine learning, predictive analytics, and customer segmentation technologies, AI has become an indispensable tool for identifying target audiences, predicting purchasing behaviors, and delivering tailored content. By examining the real-world applications of AI in marketing, this research will offer valuable insights into how businesses in Coimbatore are adopting and integrating AI technologies to boost their marketing effectiveness and stay ahead in a competitive market.

The growing importance of AI in marketing calls for a deeper understanding of its applications, opportunities, and challenges. This research delves into the various facets of AI-powered marketing, from content personalization and predictive analytics to customer journey optimization and campaign automation. Additionally, this study will explore the ethical dimensions of AI in marketing, including privacy concerns, transparency issues, and the risks of algorithmic bias, to ensure responsible and effective implementation of AI technologies.

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Definition of Artificial Intelligence

Artificial Intelligence is a branch of computer science aimed at simulating human intelligence through machines. It involves high-speed computation using sophisticated algorithms to handle and process large volumes of data. The core technologies driving AI today are machine learning and deep learning.

Machine Learning: A subset of AI, machine learning enables machines to automatically learn from data and improve their performance without being explicitly programmed. For instance, Google’s machine learning algorithms help deliver direct answers to search queries, constantly improving by learning from user interactions.

Deep Learning: A more advanced subset of machine learning, deep learning uses vast neural networks to imitate human cognitive functions. AI systems powered by deep learning, like Google’s “People Also Ask” feature, continuously learn from vast data sets, reducing the need for manual inputs.

Recent Innovations and Real-World Applications The application of AI in marketing has brought about significant advancements and innovations. Notable examples include:

Google Duplex: A voice-enabled AI that can make appointments and reservations, replicating human-like interactions with remarkable precision. This demonstrates how AI can transform customer service and engagement strategies.

Amazon Alexa and Marriott Partnership: Through AI-driven voice assistants, Amazon has partnered with Marriott to enhance hotel guest experiences, enabling users to access services such as room service and housekeeping via voice commands.

IBM Project Debater: An AI-powered system capable of engaging in in-depth, logical discussions on complex topics, showcasing AI's potential in not only enhancing customer experiences but also in complex decision-making scenarios.

Tesla: Leveraging AI to analyze data from its fleet of vehicles, Tesla has been able to make real-time improvements in car performance and safety through cloud-enabled solutions, illustrating AI's ability to drive continuous optimization.

In marketing, AI-based innovations such as personalized marketing, predictive analytics, and content automation are transforming the way businesses produce and disseminate content. The capacity to continually evolve and customize marketing in response to real-time data is transforming AI into a key resource for businesses seeking to excel in a highly competitive market. This study will analyze the strategic use of AI in driving marketing effectiveness in the Coimbatore market, including how companies are leveraging these technologies to fuel expansion, enhance customer journeys, and stay ahead in a digitally altered environment. With case studies and real-world examples, this thesis aims to offer actionable recommendations for organizations which wish to use AI as a major driver of marketing success in the digital era.

REVIEW OF LITERATURE

The integration of Artificial Intelligence (AI) in marketing has become an essential component for enhancing marketing effectiveness. With the rapid growth of data, increased use of machine learning (ML), and advancements in AI, businesses now have tools that allow them to understand consumer behavior, predict trends, personalize content, and optimize marketing strategies. As we approach 2025, the strategic application of AI is driving transformative changes in marketing practices across industries.

AI and Marketing Strategy Formulation AI has proven to be indispensable in formulating marketing strategies. According to Huang and Rust (2022), AI facilitates a collaborative environment between human intelligence (HI) and artificial intelligence (AI), leading to better marketing outcomes. They propose a framework for how AI and HI can work together, where AI assists with data-heavy tasks like customer segmentation and predictive analytics, while humans provide creative and strategic direction. This collaboration results in more efficient and effective marketing strategies.

The Role of AI in Personalized Marketing Personalization is one of AI’s most prominent applications in marketing. AI-driven algorithms allow for real-time customer profiling and targeted advertising, significantly improving engagement and conversions. Wu and Monfort (2023) emphasize the power of AI in crafting personalized customer journeys, resulting in stronger brand loyalty and increased sales. They assert that the ability to tailor marketing content to individual preferences enhances customer experiences and solidifies long-term business relationships.

AI-Powered Predictive Analytics Predictive analytics powered by AI is increasingly utilized to forecast customer behavior and market trends. As businesses look for ways to improve their marketing ROI, AI's predictive capabilities are a game changer. Davenport (2025) notes that AI-based predictive models help organizations anticipate consumer actions, making marketing campaigns more proactive rather than reactive. By utilizing AI to predict customer behavior, businesses can design more effective campaigns and allocate marketing resources more efficiently.

Optimizing Content Creation with AI The optimization of content is another key area where AI is making a substantial impact. AI tools such as natural language processing (NLP) and sentiment analysis are enabling businesses to automatically generate and fine-tune content that resonates with their target audiences. Shaik (2023) argues that AI can analyze consumer sentiment across digital platforms, enabling brands to create content that aligns with customer emotions and needs. This ability to optimize content enhances the effectiveness of marketing campaigns, as it improves engagement rates and customer satisfaction.

AI in Multi-Channel Marketing In the era of omnichannel marketing, AI is crucial in creating cohesive and consistent customer experiences across multiple platforms. AI enables businesses to track consumer interactions across social media, websites, mobile apps, and email, offering valuable insights for crafting integrated marketing strategies. Feng et al. (2025) state that AI’s ability to monitor cross-channel data enables real-time decision-making, helping marketers ensure that messaging remains consistent and relevant across all platforms. The result is enhanced customer engagement and a more unified brand presence.

Ethical Implications of AI in Marketing Despite the advantages, the use of AI in marketing raises several ethical concerns, particularly regarding privacy, data security, and algorithmic bias. Mustak et al. (2025) discuss the importance of establishing ethical guidelines for AI use in marketing to avoid consumer exploitation and protect privacy. As AI systems often rely on vast amounts of consumer data, businesses must ensure transparency and adhere to data protection laws to maintain consumer trust. Ethical considerations will become even more important as AI-driven technologies evolve.

The Impact of AI on Marketing Performance AI’s role in enhancing marketing performance has been well-documented in academic literature. Wu and Monfort (2023) conducted empirical research and found a significant positive correlation between the implementation of AI-driven marketing strategies and improved business performance. Their findings suggest that the adoption of AI in marketing contributes to higher conversion rates, increased customer satisfaction, and more efficient resource allocation. AI’s role in performance measurement and optimization makes it a vital tool for marketing teams seeking continuous improvement.

The strategic role of AI in enhancing marketing effectiveness is becoming increasingly evident as businesses strive for a competitive edge. By leveraging AI technologies, companies are optimizing customer experiences, improving targeting, and increasing marketing ROI. As AI continues to evolve, its integration into marketing strategies will only deepen, providing businesses with more advanced tools for decision-making. However, ethical concerns around privacy and transparency must be addressed to ensure responsible and sustainable AI use. In the context of Coimbatore, businesses adopting AI in marketing strategies have the opportunity to drive innovation and achieve long-term success in an increasingly digital marketplace.

STATEMENT OF THE RESEARCH PROBLEM

The primary aim of this study is to explore the strategic role of Artificial Intelligence (AI) in enhancing marketing effectiveness, specifically within the context of Coimbatore. This research seeks to examine how AI can be leveraged as a critical tool by marketers to optimize their marketing strategies, improve customer targeting, and enhance overall marketing performance. The study focuses on understanding how AI-driven technologies, such as machine learning, predictive analytics, and automation, can be integrated into marketing practices to drive competitive advantage and deliver measurable results in the rapidly evolving digital landscape. Additionally, the research will identify the challenges and opportunities that marketers face when adopting AI in their strategies, with a particular emphasis on its impact on local businesses in Coimbatore.

IDENTIFICATION OF RESEARCH GAP

Although AI is extensive in adoption in many industries around the world, there is a lack of research on its contribution to marketing effectiveness specifically in the case of Coimbatore, India. Even with the increasing interest in using AI-based marketing strategies, nothing is much known about how companies in Coimbatore utilize AI technologies like machine learning and predictive analytics to maximize their marketing performance. Also, less is known about the cultural and behavioral patterns of Indian consumers and how AI affects their decision-making. Beyond this, ethical concerns like data privacy, algorithmic bias, and consumer trust are

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infrequently discussed within the context of Indian marketing and AI. Filling these gaps is important in creating region-specific AI strategies to maximize marketing efficiency while upholding ethical standards, thereby delivering valuable insights for companies in Coimbatore.

SCOPE OF THE STUDY

This study focuses on the strategic role of Artificial Intelligence (AI) in enhancing marketing effectiveness, specifically within the context of Coimbatore, India. The research aims to explore how AI can transform marketing practices, examining the ways in which AI-driven tools and technologies contribute to more effective marketing strategies. Key areas of investigation include:

- The impact of AI on optimizing marketing efforts and decision-making processes.
- How AI enhances customer segmentation, targeting, and personalization in the marketing landscape of Coimbatore.
- The role of AI in improving customer engagement, experience, and satisfaction.
- The challenges and opportunities associated with adopting AI in marketing strategies for local businesses.
- Ethical considerations and implications of AI applications in marketing.

By focusing on these aspects, the study aims to provide valuable insights into how AI can be strategically integrated into marketing practices to drive growth and competitive advantage for businesses in Coimbatore.

OBJECTIVES

- To explore the benefits of Artificial Intelligence (AI) in enhancing marketing effectiveness for businesses in Coimbatore.
- To examine the role of AI in marketing strategies and its impact on customer service and engagement in Coimbatore-based companies.
- To identify and analyze the key benefits and challenges faced by organizations in Coimbatore when implementing AI technologies in their marketing operations.

FRAMING OF RESEARCH HYPOTHESES

A hypothesis serves as the foundation for the research, allowing us to collect and analyze data to either prove or disprove the assumptions made. In this study, the hypotheses are framed to explore the strategic role of Artificial Intelligence (AI) in enhancing marketing effectiveness, specifically in the context of Coimbatore. The research aims to understand how AI impacts the simplicity, accuracy, and overall performance of marketing processes for businesses in this region.

- Null Hypothesis (H_0): Artificial intelligence simplifies the marketing process, increases targeting accuracy, and enhances overall marketing effectiveness for businesses in Coimbatore.
- Alternative Hypothesis (H_1): Artificial intelligence complicates the marketing process, reduces targeting accuracy, and does not significantly enhance marketing effectiveness for businesses in Coimbatore.

These hypotheses provide a structured approach to empirically investigate the impact of AI on marketing outcomes, including customer engagement, campaign efficiency, and organizational performance, within the specific context of businesses in Coimbatore.

METHODS FOR DATA COLLECTION & VARIABLES OF THE STUDY

This research adopts a descriptive method to explore the strategic role of Artificial Intelligence (AI) in enhancing marketing effectiveness in Coimbatore. Data is collected from both primary and secondary sources.

Primary Data

Primary data is original information collected directly from respondents. For this study, primary data was gathered through a Google Forms survey targeting businesses in Coimbatore. The survey focused on:

- AI Adoption in Marketing: Use of AI tools like chatbots and predictive analytics.
- Marketing Effectiveness: Perceived improvements in customer engagement and ROI through AI.
- Challenges in AI Implementation: Obstacles such as cost and technical limitations.

Secondary Data

Secondary data includes existing information from research papers, industry reports, and case studies. This data provides context and complements primary data by offering broader insights into AI's impact on marketing. Sources include:

- Academic Research and Journals
- Industry Reports
- Case Studies and Market Surveys

TECHNIQUES FOR DATA ANALYSIS

For this study, the survey method was employed to collect primary data, using a questionnaire distributed to businesses in Coimbatore. The responses were then analyzed using statistical techniques to assess the role of AI in enhancing marketing effectiveness.

Data Processing and Analysis

The collected data underwent a series of steps, including:

- Data Collection: Responses were gathered from the survey.
- Data Cleaning: The data was filtered, cleaned, and organized to ensure its reliability and accuracy.
- Data Analysis: The cleaned data was analyzed using Google Colab, an online platform for executing Python code, where the necessary statistical tests were conducted.

Hypothesis Testing

To evaluate the impact of AI on marketing effectiveness, the following hypotheses were tested:

- **Null Hypothesis (H_0):** AI simplifies and improves the accuracy of marketing processes.
- **Alternative Hypothesis (H_1):** AI complicates marketing processes and reduces their accuracy.

The hypothesis was tested using the One-Sample T-Test, which helps determine whether the average of the collected data differs significantly from a hypothesized value (in this case, the value of 0, suggesting that AI complicates marketing processes).

- **Decision Rule:**

If the p-value is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis.

If the p-value is greater than 0.05, we accept the null hypothesis and reject the alternative hypothesis.

One-Sample T-Test Execution

The following steps were taken to perform the one-sample t-test in Google Colab:

- import scipy.states as ss
- import pandas as pd
- df=pd.read_excel(„excel file path‟)
- x=df
- x=df['Using AI in recruitment process makes the process simple and accurate.']
- ss.ttest_1samp(x,0)

Result Interpretation:

Based on the calculated p-value: If the p-value > 0.05, we accept the null hypothesis that AI simplifies and enhances the accuracy of marketing processes in Coimbatore. If the p-value < 0.05, we reject the null hypothesis and accept the alternative hypothesis. In this study, the p-value was greater than 0.05, indicating that AI does indeed simplify the marketing process and makes it more accurate. Thus, the null hypothesis was accepted, confirming the positive role of AI in enhancing marketing effectiveness.

DATA INTERPRETATION

The sample data for this study was collected through a questionnaire, with 88 responses gathered from individuals in Coimbatore. The majority of respondents (66.7%) were in the 18-25 years age group, followed by 19% in the 26-35 years range and 14.3% in the 45+ years category. When asked about their awareness of Artificial Intelligence (AI), the responses indicated varying levels of knowledge. Out of the 88 respondents, 10 rated their knowledge as moderate (3), 6 rated it as good (4), and 3 rated it as excellent (5). The remaining respondents had lower ratings, suggesting limited awareness of AI. This indicates that while many people in Coimbatore have a basic understanding of AI, only a small portion possess a deep understanding, which could influence their perception of AI's strategic role in enhancing marketing effectiveness.

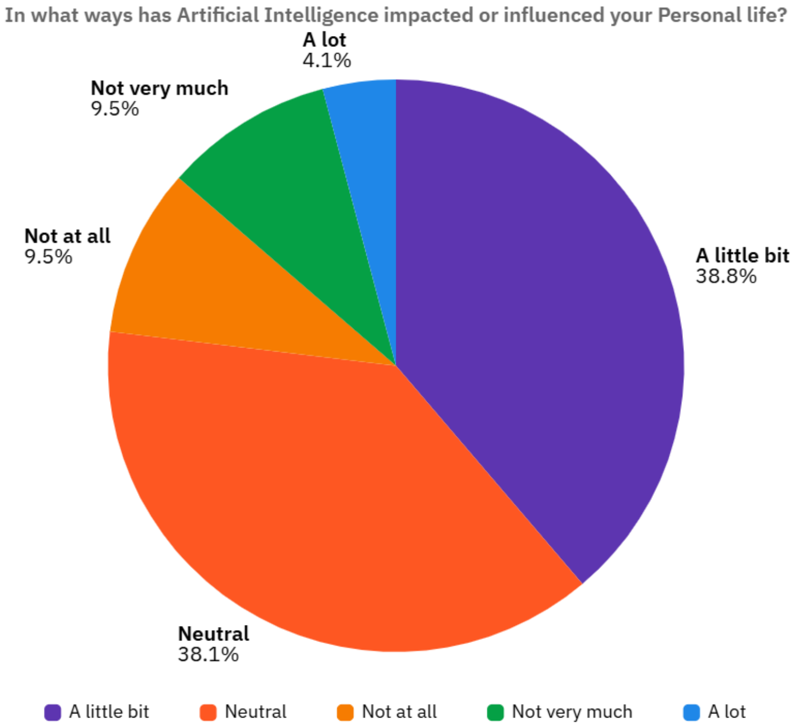

Figure 1.1 How has artificial intelligence impacted / influenced your personal life?

From Figure 1.1, it is evident that 38.1% of people feel AI has a neutral influence on their personal life. Meanwhile, 28.6% report that AI has a significant impact on their daily lives, and another 28.6% say its influence is minimal. Only 4.8% of individuals claim that AI has no impact on their personal life.

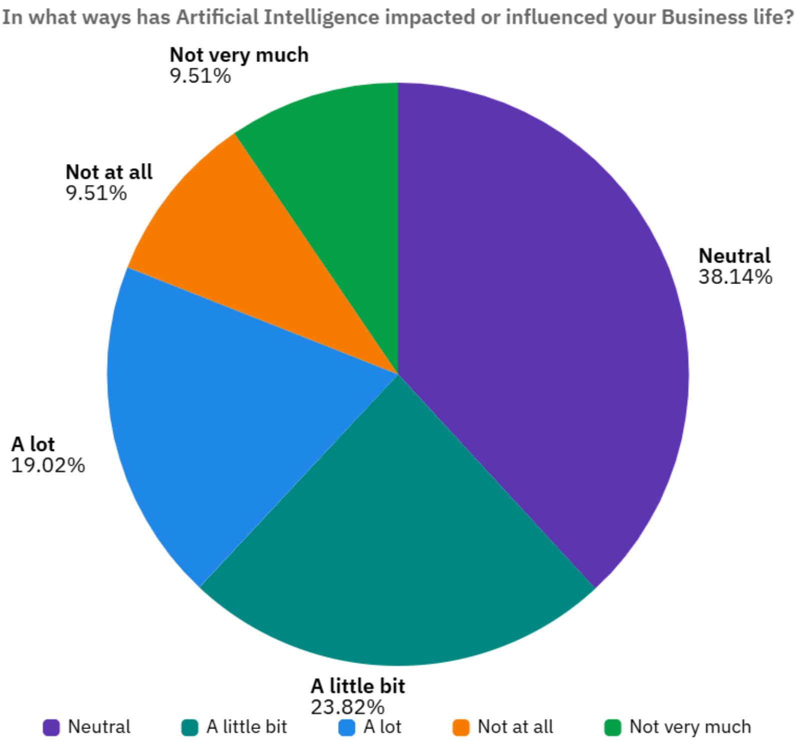

Figure 1.2 How has artificial intelligence impacted / influenced your business life?

From the above pie chart, we can see that 38.1% of people believe AI has a neutral influence on their business life. 23.8% feel AI has a minimal impact, while 19% claim it has a significant influence. 9.5% of people say AI has little impact on their business life, and 38.1% assert that AI has no influence at all on their business activities.

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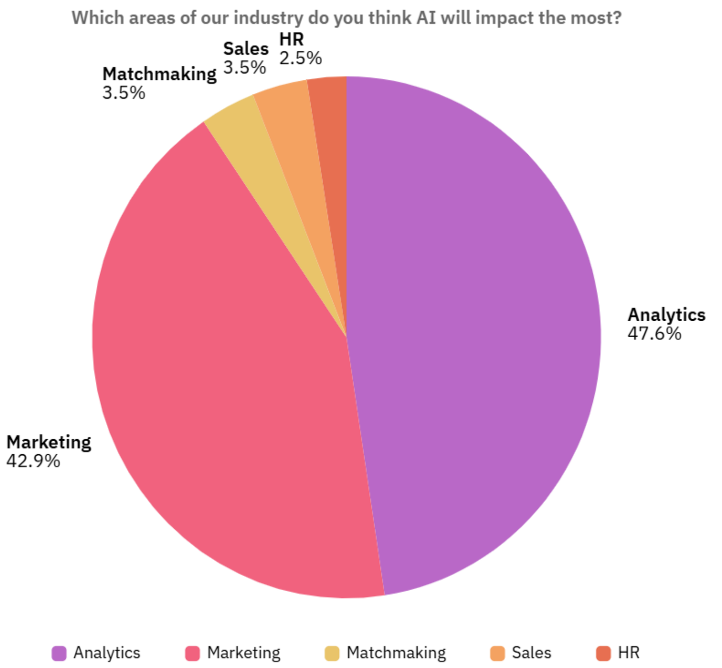

Figure 1.3 AI will have the biggest influence on which industry?

From Figure 1.3, we can observe that the highest percentage of respondents (47.6%) believe AI influences the analytics industry. Following closely, 42.9% say it impacts the marketing industry. The remaining industries, such as matchmaking and sales, see a much smaller influence, with only 4.8% of respondents indicating any impact.

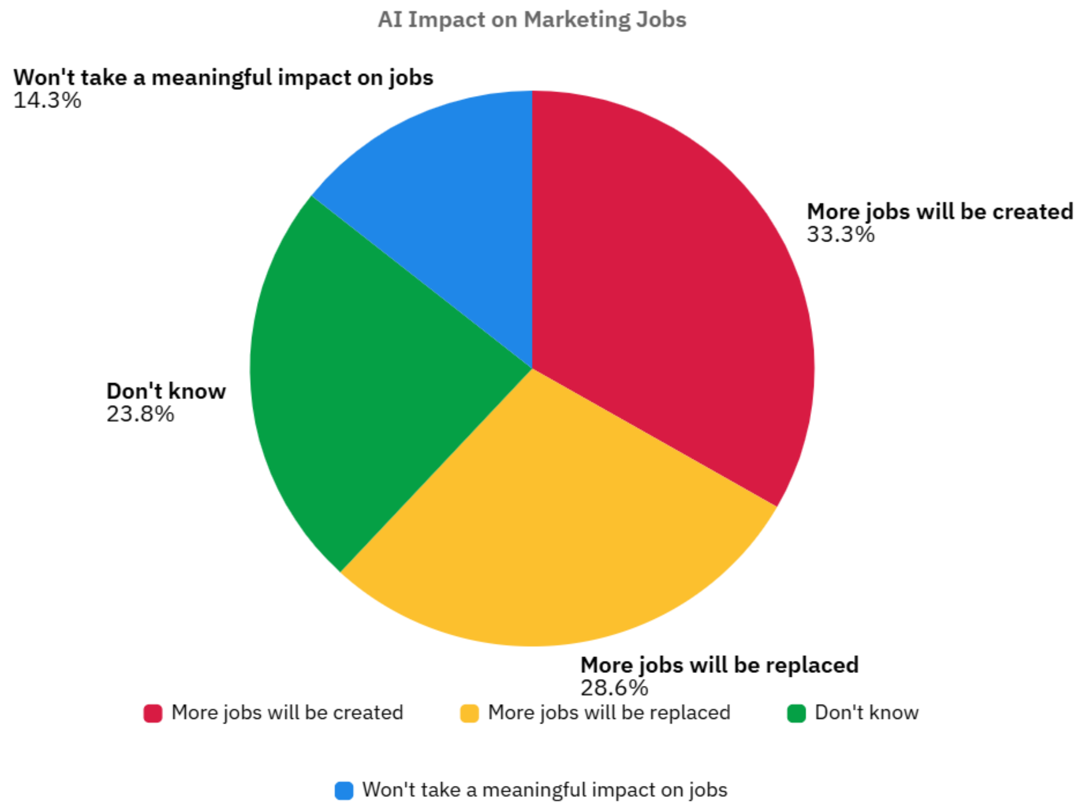

Figure 1. 4 AI's impact on marketing jobs

From the above pie chart, we can see that 33.3% of respondents believe AI will create more jobs. 28.6% think AI will lead to job losses, while 23.8% are unsure about the impact of AI on marketing jobs.

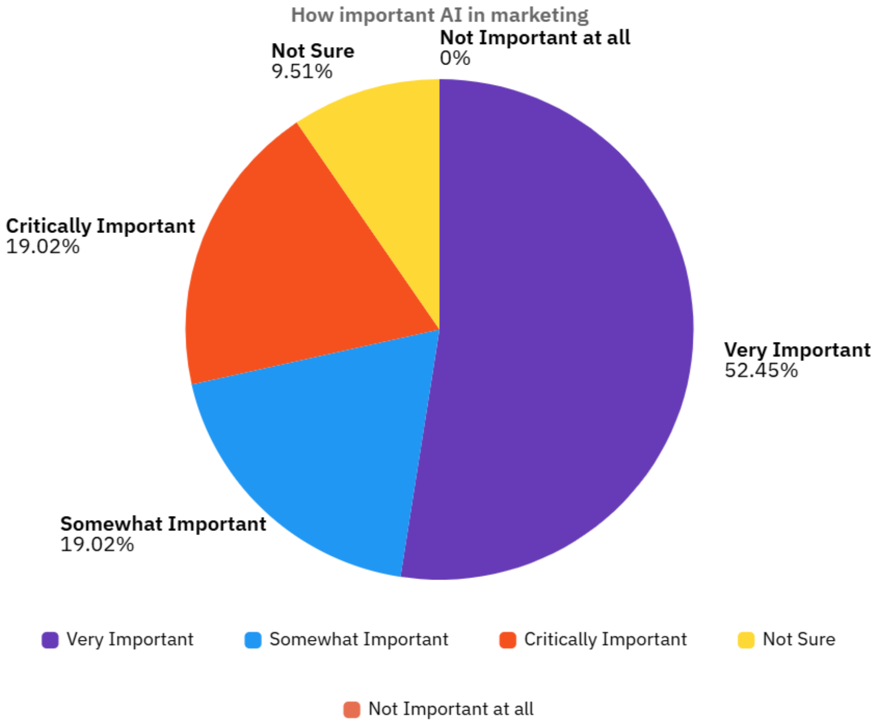

Figure 1.5 How important AI in marketing

In Figure 1.5, the pie chart shows that 52.4% of people believe AI plays an important role in marketing. Additionally, 19% consider it to be somewhat important, while another 19% view it as critically important. Meanwhile, 9.25% of people are uncertain about the role of AI in marketing.

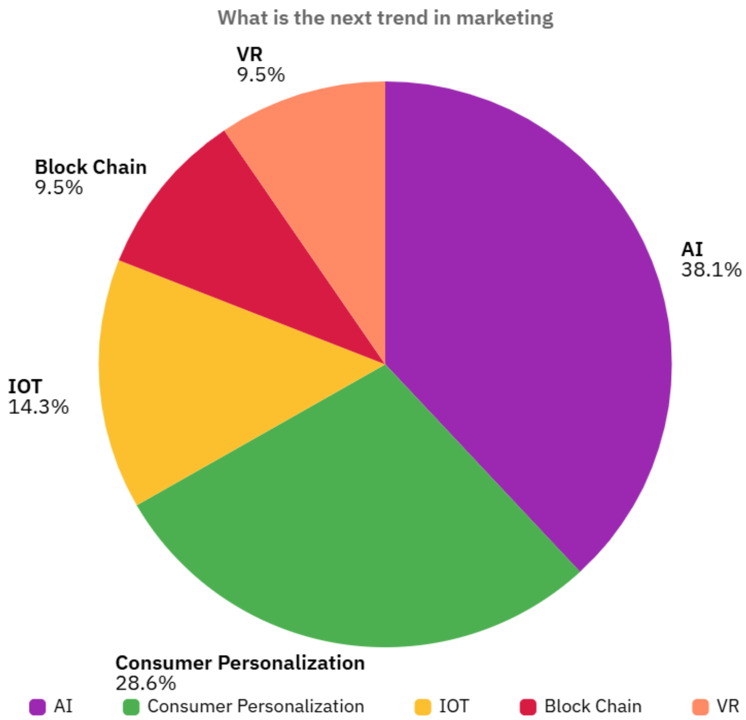

Figure 1.6 Next Trends in Marketing

The pie chart, above shows that 38.1% of people believe the next big trend in marketing will be Artificial Intelligence. Meanwhile, 28.6% feel consumer personalization will be the next trend. Both Virtual Reality (VR) and the Internet of Things (IoT) are seen as the next marketing trend by 14.3% of people each. Finally, 4.8% of people think blockchain will be the next major trend in marketing.

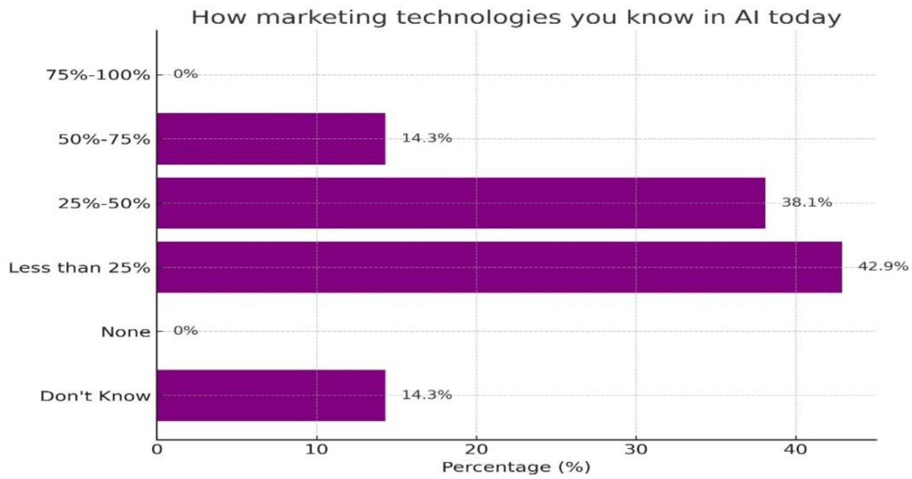

Figure 1.7 Marketing technologies you know in AI today

Figure 1.7 shows that 42.9% of respondents have limited knowledge of marketing technologies, knowing less than 25%. Meanwhile, 38.1% are somewhat familiar, with knowledge ranging from 25% to 50%. 14.3% have a moderate understanding, knowing between 50% and 75%. Additionally, 14.3% of respondents have no knowledge of marketing technologies at all.

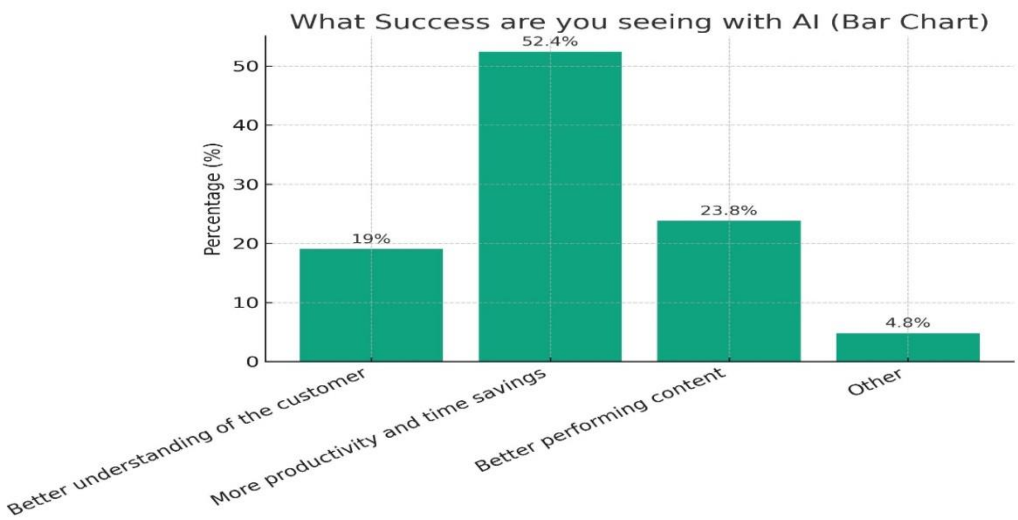

Figure 1.8 Success rate in AI

The Bar diagram indicates that 52.4% of respondents believe AI enhances productivity and saves time. Meanwhile, 23.8% see AI as a tool for creating better-performing content, and 19% feel it provides a deeper understanding of customers.

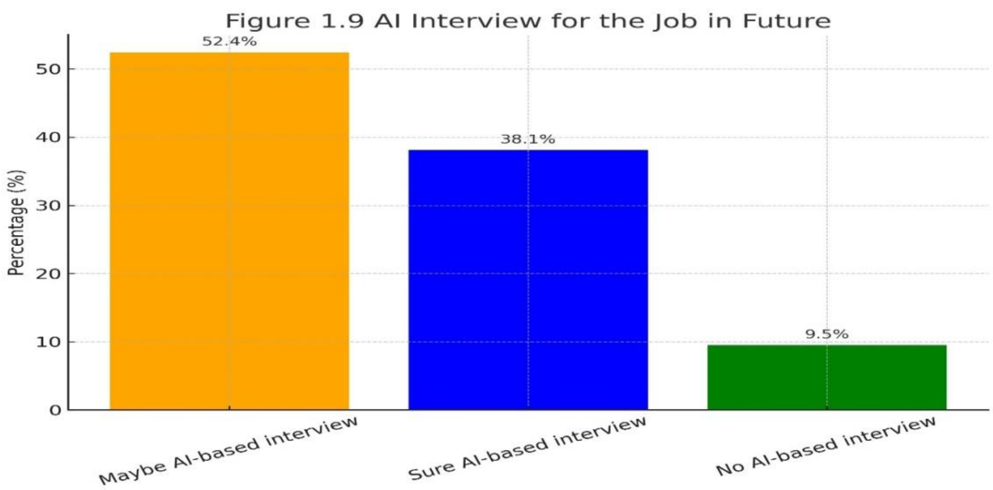

Figure 1.9 AI interview for the job in future

As the world rapidly advances in technology, the job interview process may evolve in the future. Based on the above pie chart, 52.4% of people believe that AI-based job interviews might be conducted in the future, 38.1% are certain they will take place, while 9.5% think there will be no AI-based job interviews in the future.

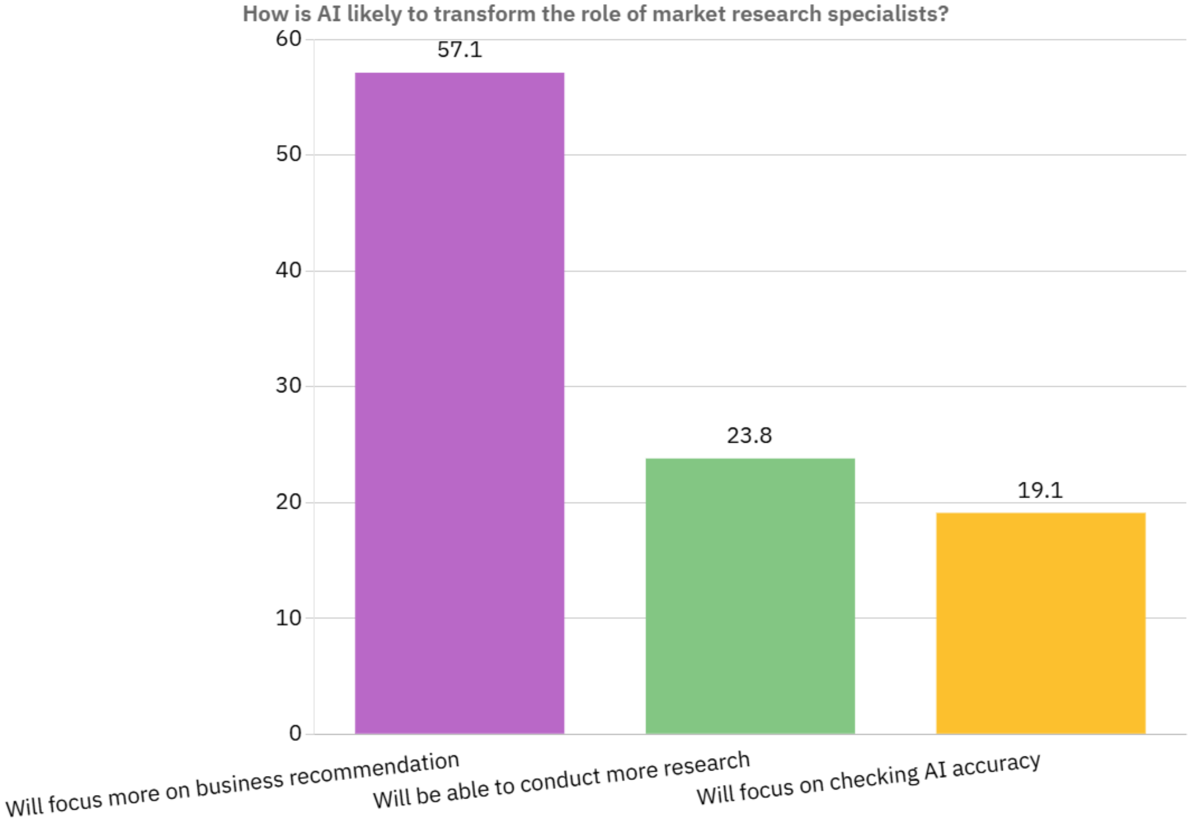

Figure 1.10 How AI is most likely to change market research Specialists

From the above bar diagram, we can conclude that 57.1% of respondents believe AI will primarily focus on making business recommendations, 23.8% think AI will be able to conduct more research, and 19% feel AI will focus on checking its accuracy.

SUMMARY OF RESULTS

The survey revealed that most respondents (66.7%) are aged 18–25, with the majority having limited knowledge of AI. Opinions on AI's influence vary, with 38.1% seeing a neutral effect on both personal and business life. AI is perceived to impact analytics (47.6%) and marketing (42.9%) the most, with smaller effects on matchmaking and sales. Regarding jobs, 33.3% believe AI will create more opportunities, while 28.6% think jobs will be lost; 23.8% are unsure. In marketing, 52.4% consider AI important, and 38.1% see AI as the next big trend. Awareness of marketing technologies is limited, with 42.9% knowing less than 25%. Perceived AI benefits include productivity and time savings (52.4%), better content (23.8%), and improved customer understanding (19%). Looking ahead, 52.4% think AI-based job interviews might happen, 38.1% are certain, and 9.5% disagree. Finally, AI is expected to focus mainly on business recommendations (57.1%), research (23.8%), and accuracy checks (19%).

SCOPE FOR FUTURE RESEARCH

Future studies on AI's strategic role in enhancing marketing effectiveness in Coimbatore should include larger, more diverse samples and a broader age range for inclusivity. Company-specific research can help address local AI-related marketing challenges, while interviews with industry professionals can provide practical insights. Research on required skillsets for AI-driven marketing roles could guide workforce adaptation. Longitudinal studies may assess AI's long-term impact on performance, competitive advantage, and sustainability. Finally, exploring AI integration across multiple channels can inform strategies for creating seamless, effective omnichannel marketing experiences in Coimbatore.

CONCLUSION

In the evolving business landscape of Coimbatore, building strong one-on-one relationships with customers remains a critical success factor. Effective marketing today requires not only delivering functional benefits but also creating an emotional connection that resonates with the customer's mind and heart. The way businesses communicate with customers is undergoing a significant transformation, driven largely by advancements in Artificial Intelligence (AI). AI opens new possibilities for marketing effectiveness by enabling data-driven insights, personalized storytelling, and enhanced customer engagement. It changes how people interact with brands, products, and services, as well as how businesses deliver value through technology. For Coimbatore's marketers to remain competitive, adapting marketing strategies to leverage AI capabilities is no longer optional it is essential. By integrating AI into marketing practices, businesses can improve targeting, personalization, and decision-making, ultimately strengthening customer relationships and achieving sustainable marketing success.

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ENGINEERING SOFTWARE FOR BIG DATA ANALYTICS: ISSUES AND OPPORTUNITIES

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ABSTRACT:
New data sources such as diverse business transactions, social media, high-resolution sensors, and the Internet of Things, are creating a huge volume of data at enormous speed which needs to be captured, processed, integrated, analyzed, and archived efficiently and effectively. This tsunami of data generated through huge volume of business transactions, social media users of ever increasingly popular whatsapp, facebook, twitter, linked and many more to mention is commonly referred to as Big Data. This Big Data needs to captured, processed, analyzed and archived for effective and efficient usages for Business Intelligence. To Process Big Data we need to develop sound Big data systems for storing and analyzing petabytes of data in many application areas. These systems belong to a family of major enterprise software which needs, long-term investments requiring considerable financial commitments and massive scale software and system deployments.

In this paper we will discuss some key issues which any one need to overcome for developing a Big Data system for Business Intelligence.

Keywords: Big Data, Business Intelligence (BI), Social Media

OBJECTIVES

The main objective of this paper is to provide basic concept of Business Intelligence, Big Data, Software Engineering and proposing a S/W development methodology for Big data to researchers, scientists and practicing Software Engineers. We will propose an integrated approach of software development for Big Data Analytics.

In the fast growing field of Big Data, we note that a disproportionately larger amount of effort is being invested in infrastructure development and data analytics in comparison to applications software development This prompted us to create a Software Engineering model for development of Big Data Software (SEMBD) containing various elements such as development process, Big Data systems, corporate decision-making, and research and their relationships. Our proposed model will consider software development from the perspective of various types of stakeholder like Enterprises, end users developers, researchers etc who are keenly interested in Software development for Big Data Analytics.. From the research perspective, we describe challenges in SEMBD, specifically requirements, architectures, testing and maintenance[2].

I. INTRODUCTION

New data sources such as diverse business transactions, social media, high-resolution sensors, and the Internet of Things, are creating a huge volume of data at enormous speed which needs to be captured, processed, integrated, analyzed, and archived efficiently and effectively. This tsunami of data generated through huge volume of business transactions, social media users of ever increasingly popular whatsapp, facebook, twitter, linked and many more to mention is commonly referred to as Big Data. This Big Data needs to captured, processed, analyzed and archived for effective and efficient usages for Business Intelligence. To Process Big Data we need to develop sound Big data systems for storing and analyzing petabytes of data in many application areas. These systems belong to a family of major enterprise software which needs, long-term investments requiring considerable financial commitments and massive scale software and system deployments. In this paper we will discuss some key issues which any one need to overcome for developing a Big Data system for Business Intelligence.

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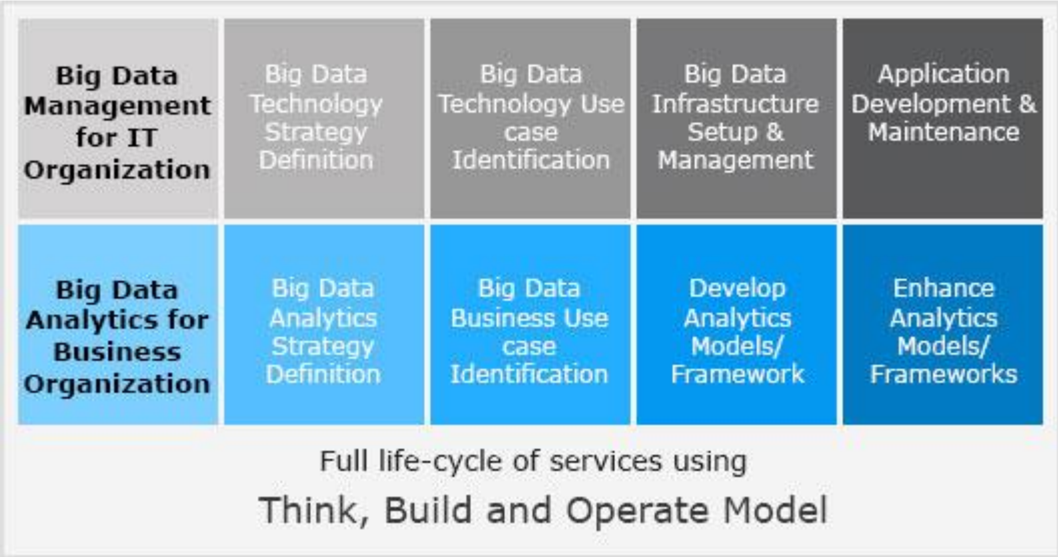

Figure 1: Big Data analytics: Think Build and Operate Model

(Source: www.slideshare.net)

- As described in Figure:1 Big Data Analytics Think , Build and Operate model represents various services offered by Big data Analytics in two layers:
- Big data Management for IT organizations:

This layer consist of following services:

- Big Data Technology Strategy Definition.
- Big data Technology Use Case Identification.
- Big Data Infrastructure setup and Management.
- Application Development and Maintenance.
- Big Data Analytics for Business Organizations:

This layer consists of following services:

- Big Data Analytics Strategy Definition.
- Big Data Business Use Case Identification.
- Develop Analytics Model/Framework.
- Enhance Analytics Model/Framework.

What is BI?

Business intelligence (BI) can be defined as a set of tools and techniques for acquiring and transforming raw data into useful information for business analysis purposes**.**

BI technologies provide historical, current and predictive views of business operations. Common functions of business intelligence technologies are: OLAP, reporting, data analysis, data mining, and text mining, benchmarking predictive and prescriptive analytics.

Integration of Big Data and Business Intelligence: Big data is growing fast as organizations devote technology resources to tapping the terabytes and petabytes of data flowing into their organizations and externally in social media data and other sources. In order to tap benefits of Big Data and Business Intelligence we need to answer these questions:

How Big data and BI go hands in hands together?

What does this all mean for business intelligence (BI) users and systems?

With all the attention on advanced analytics for big data, what’s the role for BI?

Integrating advanced analytics for big data with BI systems is an important step toward gaining full return on investment. Advanced analytics and BI can be highly complementary; advanced analytics can provide the deeper, exploratory perspective on the data, while BI systems provide a more structured user experience. In the process of designing and developing software for big data we need to identify sources and targets applications of big data. A better understanding of BI and Big data integration will help in designing better Big Data Application Software.

Big Data Sources	Big Data Target Applications
• Science • Telecom • Industry • Business • Social Media and Networking sites.	• Scientific Discovery • New technologies • manufacturing, Process control and Transport. • Personal Services.

Table 1: Big Data Origin and Target Applications

(Source: http://www.uazone.org/demch/worksinprogress/sne-2013-02-techreport-bdaf-draft02.pdf)

II. Basics of SEBDI (Software Engineering for Big Data and BI):

Designing and developing software for Big data analytics and BI involve handling various issues related to Data Modeling, Visualization and reporting services along with its integration with Business Intelligence. In order to develop highly efficient and potentially successful Software for Big Data and BI involves dealing with following challenges:

- The key challenges of handling and processing big data that are generated at exponential rate. Business operations, intelligence analysis, logistics, and health care all represent big data applications with data growing at exponential rates and the need for scalable software solutions to sustain future operations.
- Another key problem is non-standardized technologies.
- Using these new technologies to design and construct a massively scalable big data system creates an immense software architecture challenge for software architects.

Why Scale Matters in Big Data Management?

- Scale has many implications for software architecture. Scale induces changes in software architecture. The second is based upon economics, where small optimizations in resource usage at very large scales can lead to huge cost reductions in absolute terms. The following briefly explores these two issues:

○ **Designing for scale.** Big data systems are inherently distributed systems. Hence, software architects must explicitly deal with issues of partial failures, unpredictable communications latencies, concurrency, consistency, and replication in the system design.

○ **Economics at scale.**

Big data applications employ many thousands of compute-and-storage resources.

Designing for Scalability with Big Data

To mitigate the risks associated with scale and technology, a systematic, iterative approach is needed to ensure that initial design models and database selections can support the long-term scalability and analysis needs of a big data application.

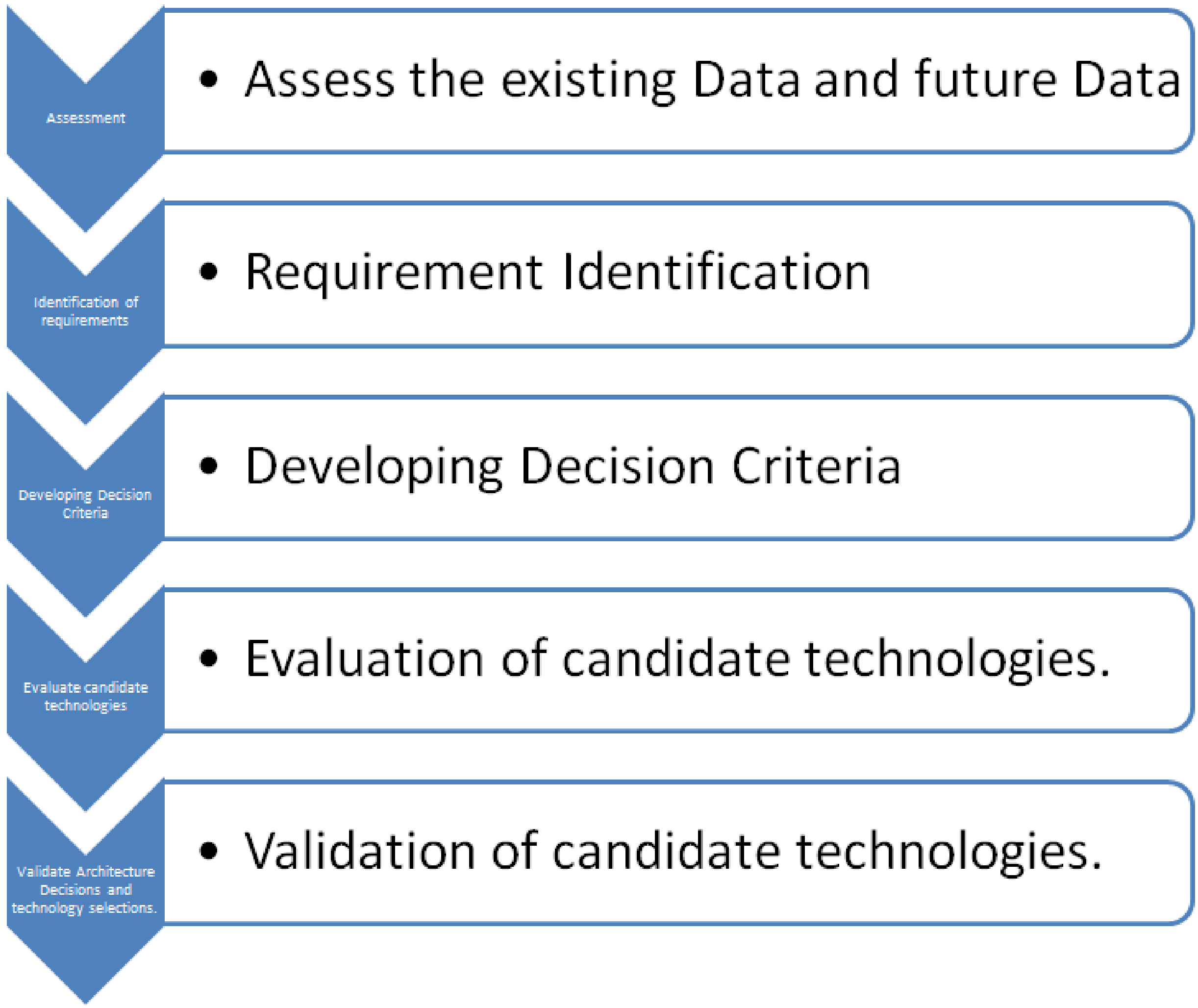

Figure 3: Software Engineering for Big data

Implementation of Big Data and BI involves evaluation, selection and validation of required Hardware and software Platform. Selection of tools and technologies for developing Enterprise Software for Data analytics and Business Intelligence. One need to develop and implement software for visualisation and presentation for data in suitable format for business decision making. Big data means volume, variety and velocity. These things have become critically important thanks to a flourishing social media revolution. Internet, digital and online advertising companies are dependent on technology because of the sheer volume of data they deal with every day. Further there is a need to deal with Integration of Big data system with Business Intelligence of an enterprise. Here are some of major obstacles which we need to overcome while implementing software for Big Data and BI:

- **Immature Vendors and Naïve Products:**

• Infrastructure Investment:

• Extended Gestation Periods:

• Capacity Planning:

• Commitment Concerns:

• Big Data Platform and Analytics Framework

• Perfection of Big Data BI Solutions

• Need for Big Data BI Solution Implementation Versus Current Daily Operations

• IT Budget Constraints:

Opportunities of Software for Big data and Business Intelligence (BI):

Big data and BI integration software has huge market potential for coming few decades. As per some prominent quotes from Industry leaders like Forbes, SAS IBM and Forester, Sales force. and many more market leaders BI and Big data will grow by leap and bound for coming future. These two promising technologies are going to be a boon for various Industries verticals like Transport, Healthcare, Financial sectors, Government, Military organizations, and many more sectors are ready to join soon and earn huge profit and market share in their respective verticals

III. CONCLUSION:

In this paper we covered fundamentals of developing software for Big Data and Business Intelligence. We have discussed issues and challenges which one need to tackle in order to develop software for Big data and Business Intelligence. We have also advocated that these two technologies has great market potential. Developing software for Big data and Integration of BI can be a promising field for Researchers, scientists, Software engineers and Software development organizations. Big data and BI opens plethora of new and emerging fields of software developments to be explored further:

Some of key areas are: Developing tools for Data Modeling, Data analysis, visualization and integration of BI with Big Data.

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MIOT (MEDICAL INTERNET OF THINGS): HOW IT IS REVOLUTIONIZING HEALTHCARE WITH ITS POTENTIAL AND SHORTCOMINGS

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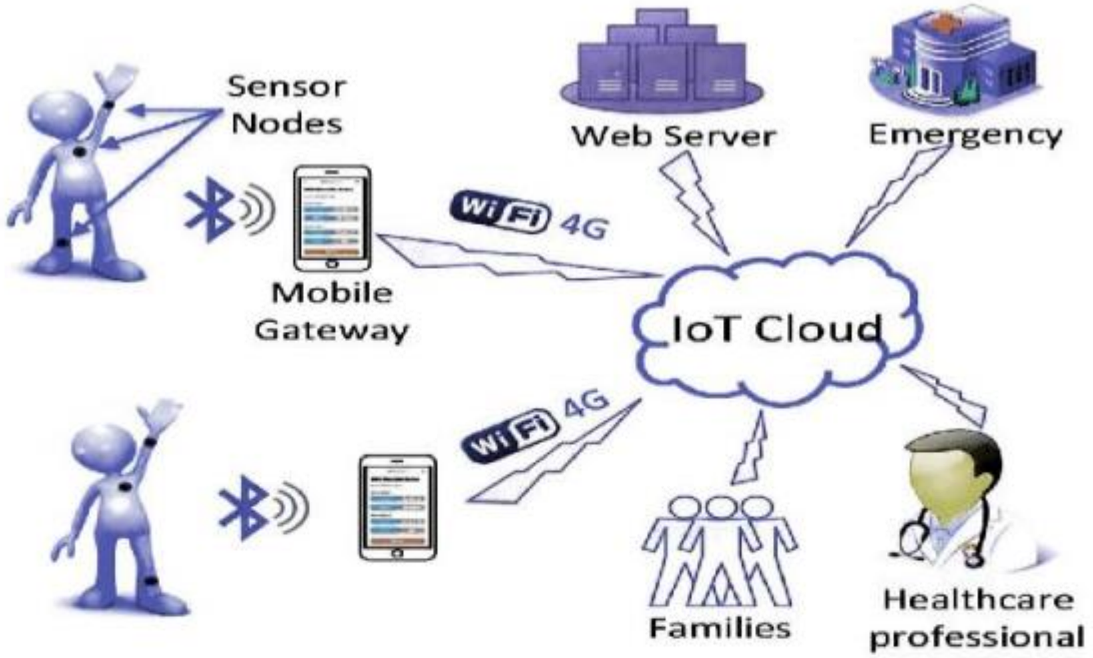
ABSTRACT
The IoMT is an amalgamation of medical devices and applications that can connect to health care information technology systems using networking technologies. It can reduce unnecessary hospital visits and the burden on health care systems by connecting patients to their physicians and allowing the transfer of medical data over a secure network. According to Frost & Sullivan analysis, the global IoMT market was worth $22.5 billion in 2016; it is expected to reach $72.02 billion by 2021, at a compound annual growth rate of 26.2%.

The IoMT market consists of smart devices, such as wearables and medical/vital monitors, strictly for health care use on the body, in the home, or in community, clinic or hospital settings; and associated real-time location, telehealth and other services.

Objective: *The main objective of this paper is to acquaint the readers in lucid language of what MIoT actually is, how it can change the future of healthcare. Like everything else, MIOT too has a flipside which also discussed in this paper.*

Keywords: *Medical Internet of Things, Healthcare, Technology*



INTRODUCTION
The healthcare industry is in a state of great despair. Healthcare services are costlier than ever, global population is aging and the number of chronic diseases are on a rise. What we are approaching is a world where basic healthcare would become out of reach to most people, a large section of society would go unproductive owing to old age and people would be more prone to chronic disease.

While technology can’t stop the population from ageing or eradicate chronic diseases at once, it can at least make healthcare easier on a pocket and in term of accessibility. Medical diagnostic consumes a large part of hospital bills. Technology can move the routines of medical checks from a hospital (hospital-centric) to the patient’s home (home-centric). The right diagnosis will also lessen the need of hospitalization.

A new paradigm, known as the Internet of Things (IoT), has an extensive applicability in numerous areas, including healthcare. The full application of this paradigm in healthcare area is a mutual hope because it allows

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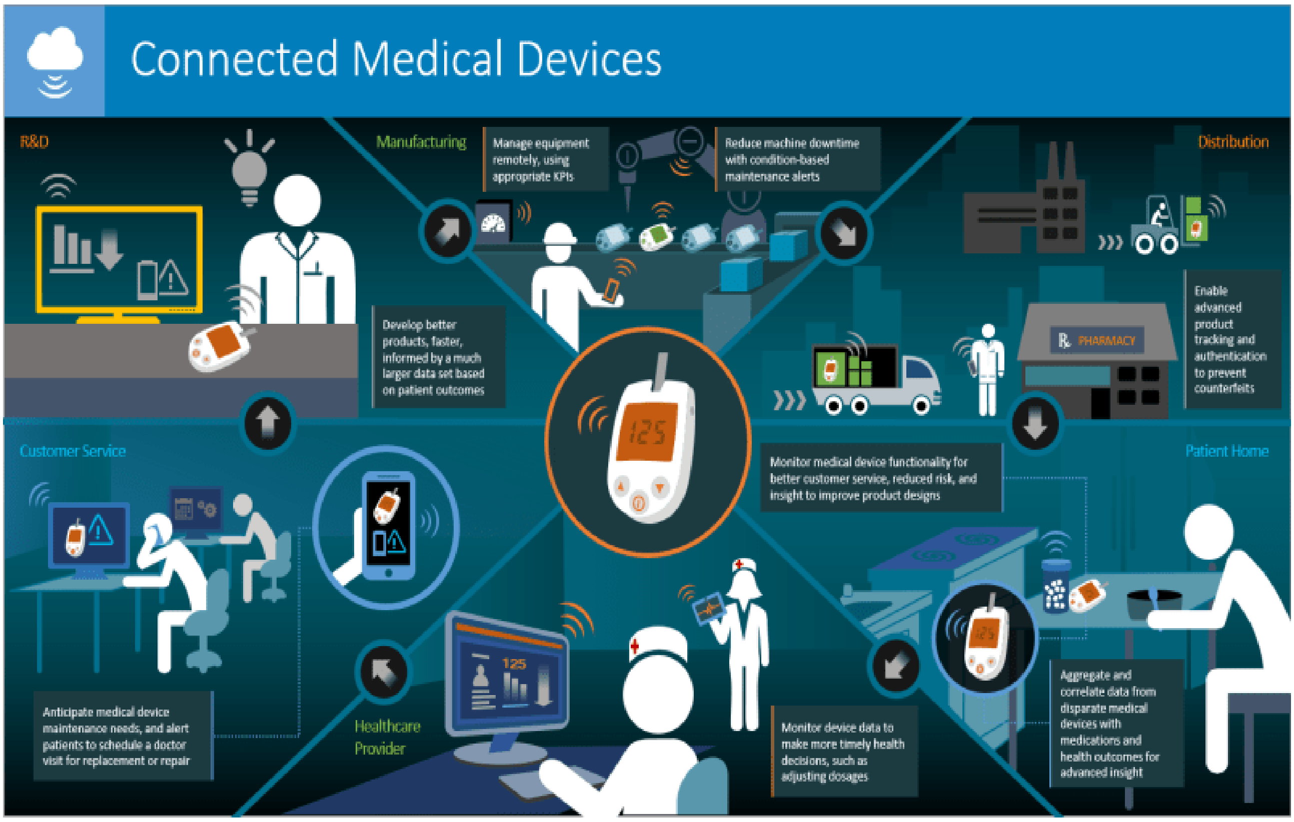
medical centers to function more competently and patients to obtain better treatment. With the use of this technology-based healthcare method, there are unparalleled benefits which could improve the quality and efficiency of treatments and accordingly improve the health of the patients.

While IoT-based medical technology applications are still in a nascent stage, recent research in sensor, networks, cloud, mobility, and the big data domain is witnessing significant activity towards developing maximum IP coverage by companies.

Although the development of telemetric devices was first commenced in 1970 with a patent filed by both Warner–Lambert and Pacemakers Diagnostics clinic of America to disclose the telemetry, actual patent filing activities grew robustly after 1989, with the integration of biosensors into existing systems in order to capture dynamic physiological data and transmit it through wireless networks. The Internet-based medical device and remote healthcare assistance segments first flourished in the US due to the country's major market share in conventional medical devices. Remote location-enabled technologies were rapidly adapted in the market due to their widespread clinical acceptance and healthcare policies. Due to this, major corporations opted to protect their inventions in North America, followed by Europe.

Philips, GE Healthcare, and Medtronic are the leading players in IoMT technology. Philips primarily offers cardiac monitoring, remote patient communication devices, and sensor-related products, whereas GE and Medtronic focus on cloud-based technologies in existing monitoring devices, implants, and cardiac pacemakers. Siemens and IBM, two other players in the value chain, extend solutions in upper layers, which enable data analytics and cloud-based services to biometric data obtained from physical devices and sensors.



Exciting Applications of IoT in healthcare

The rise of IoT is exciting for everybody due to its different scope of use in various sectors. In Healthcare it has several applications. IoT in healthcare helps in:

•Reducing emergency room wait time

•Tracking patients, staff, and inventory

•Enhancing drug management

•Ensuring availability of critical hardware

IoT has also introduced several wearables & devices which has made lives of patients comfortable. These devices are as follows.

1. Hearables

Hearables are new-age hearing aids which have completely transformed the way people who suffered hearing loss interact with the world. Nowadays, hearables are compatible with Bluetooth which syncs your smartphone with it.

It allows you to filter, equalize and add layered features to real-world sounds. Doppler Labs is the most suitable example of it.

2. Ingestible sensors

Ingestible sensors are genuinely a modern-science marvel. These are pill-sized sensors which monitor the medication in our body and warns us if it detects any irregularities in our bodies.

These sensors can be a boon for a diabetic patient as it would help in curbing symptoms and provide with an early warning for diseases. Proteus Digital Health is one such example.

3. Moodables

Moodables are mood enhancing devices which help in improving our mood throughout the day. It may sound like science fiction, but it's not far from reality.

Thync and Halo Neurosciences are already working on it and has made tremendous progress. Moodables are head-mounted wearables that send low-intensity current to the brain which elevates our mood.

4. Computer vision technology

Computer vision technology along with AI has given rise to drone technology which aims to mimic visual perception and hence decision making based on it.

Drones like Skydio use computer vision technology to detect obstacles and to navigate around them. This technology can also be used for visually impaired people to navigate efficiently.

5. Healthcare charting

IoT devices such as Audemix reduce much manual work which a doctor has to do during patient charting. It is powered by voice commands and captures the patient's data. It makes the patient's data readily accessible for review. It saves around doctors' work by 15 hours per week.

6. Cancer treatment

In June 2018, data was presented at the ASCO Annual Meeting from a randomized clinical trial of 357 patients receiving treatment for head and neck cancer. The trial used a Bluetooth-enabled weight scale and blood pressure cuff, together with a symptom-tracking app, to send updates to patients' physicians on symptoms and responses to treatment every weekday.

The patients who used this smart monitoring system, known as CYCORE, experienced less severe symptoms related to both the cancer and its treatment when compared to a control group of patients who carried on with regular weekly physician visits (with no additional monitoring).The study demonstrates the potential benefits of smart technology when it comes to improving patient contact with physicians, and monitoring of patients' conditions, in a way that causes minimal interference with their daily lives.

7. Smart continuous glucose monitoring (CGM) and insulin pens

Diabetes has proven to be a fertile ground for the development of smart devices, as a condition that affects roughly one in ten adults, and one that requires continual monitoring and administration of treatment.

A Continuous Glucose Monitor (CGM) is a device that helps diabetics to continuously monitor their blood glucose levels for several days at a time, by taking readings at regular intervals. The first CGM system was approved by the US Food and Drug Administration (FDA) in 1999, and in recent years, a number of smart CGMs have hit the market.

Smart CGMs like Eversense and Freestyle Libre send data on blood glucose levels to an app on iPhone, Android or Apple Watch, allowing the wearer to easily check their information and detect trends. The FreeStyle LibreLink app also allows for remote monitoring by caregivers, which could include the parents of diabetic children or the relatives of elderly patients.

Another smart device currently improving the lives of diabetes patients is the smart insulin pen. Smart insulin pens – or pen caps – like Gocap, InPen and Esysta have the ability to automatically record the time, amount and type of insulin injected in a dose, and recommend the correct type of insulin injection at the right time. The devices interact with a smartphone app that can store long-term data, help diabetes patients calculate their insulin dose, and even (in the case of the Gocap) allow patients to record their meals and blood sugar levels, to see how their food and insulin intake are affecting their blood sugar.

8. Closed-loop (automated) insulin delivery

One of the most fascinating areas in IoT medicine is the open-source initiative OpenAPS, which stands for Open Artificial Pancreas System. OpenAPS is a type of closed-loop insulin delivery system, which differs from a CGM in that as well as gauging the amount of glucose in a patient’s bloodstream, it also delivers insulin – thus “closing the loop”.

OpenAPS was started in 2015 by Dana Lewis and her husband Scott Leibrand, who hacked Dana’s CGM and her insulin pump in order to automate the delivery of insulin into her system. Using the data feed from the CGM and a Raspberry Pi computer, their own software completes the loop and continuously alters the amount of insulin Dana’s pump delivers.

Automating insulin delivery offers a number of benefits that can change the lives of diabetics. By monitoring an individual’s blood glucose levels and automatically adjusting the amount of insulin delivered into their system, the APS helps to keep blood glucose within a safe range, preventing extreme highs and lows (otherwise known as hyperglycemia – excessively high glucose – and hypoglycemia – excessively low glucose).

The automatic delivery of insulin also allows diabetics to sleep through the night without the danger of their blood sugar dropping (also known as night-time hypoglycemia).

Although OpenAPS is not an “out of the box” solution and requires people to be willing to build their own system, it is attracting a growing community of diabetics who are using its free and open-source technology to hack their insulin delivery.

The OpenAPS community aren’t the only ones to have had this idea. In 2013, Bryan Mazlish, a father with a wife and young son who both have Type 1 Diabetes, created the first automated and cloud-connected closed-loop artificial pancreas device. In 2014, he founded SmartLoop Labs – now known as Bigfoot Biomedical – to scale and commercialize the development of an automated insulin delivery system based on his invention.

9. Connected inhalers

Like diabetes, asthma is a condition that impacts the lives of hundreds of millions of people across the world. Smart technology is beginning to give them increased insight into and control over their symptoms and treatment, thanks to connected inhalers.

The biggest producer of smart inhaler technology is Propeller Health. Rather than producing entire inhalers, Propeller has created a sensor that attaches to an inhaler or Bluetooth spirometer. It connects up to an app and helps people with asthma and COPD (Chronic Obstructive Pulmonary Disease, which includes emphysema and chronic bronchitis) understand what might be causing their symptoms, track uses of rescue medication, and also provides allergen forecasts.

One of the benefits of using a connected inhaler is improved adherence – in other words, medication is taken more consistently and more often. The Propeller sensor generates reports on inhaler use that can be shared with a patient’s doctor, and show whether they are using it as often as is prescribed. For patients, this provides motivation and also clarity, showing how the use of their inhaler is directly improving their condition.

10. Connected contact lenses

Medical smart contact lenses are an ambitious application of the Internet of Things in a healthcare context. While the concept has a great deal of potential, so far, the science hasn’t always managed to live up to expectations.

In 2014, Google Life Sciences (now known as Verily, a subsidiary of Google’s parent company Alphabet) announced it would be developing a smart contact lens that could measure tear glucose and provide an early warning system for diabetics to alert them when their blood glucose levels had dropped or risen beyond a certain threshold. It partnered with Alcon, the eye care division of pharmaceutical company Novartis, for the project.

However, the project attracted a great deal of skepticism from researchers who believed that the idea of measuring blood glucose levels via tears wasn’t scientifically sound – and ultimately, they were proven correct. After a lengthy period with no real news about project developments, in November 2018 Verily confirmed that the project was being shelved.

But other medical applications for smart contact lenses might prove more successful. Verily is still working on two smart lens programs with Alcon, which aim to treat presbyopia (long-sightedness caused by a loss of elasticity in the lens of an eye) and cataract surgery recovery.

11.The Apple Watch app that monitors depression

Wearable technology doesn't always have to be designed with a medical use in mind to have healthcare benefits. Takeda Pharmaceuticals U.S.A. and Cognition Kit Limited, a platform for measuring cognitive health, collaborated in 2017 to explore the use of an Apple Watch app for monitoring and assessing patients with Major Depressive Disorder (MDD).

The results from the exploratory study were presented in November 2017 at pharma and biotech conference CNS Summit.

The study found a very high level of compliance with the app, which participants used daily to monitor their mood and cognition. The app's daily assessments were also found to correspond with more in-depth and objective cognition tests and patient-reported outcomes, showing that cognitive tests delivered via an app can still be robust and reliable.

While the study was only an exploratory pilot, it has demonstrated the potential for wearable tech to be used to assess the effects of depression in real-time. Like other smart medical devices that gather data, the Apple Watch app could also give patients and healthcare professionals more insight into their condition, and enable more informed conversations about care.

12.Coagulation testing

In 2016, Roche launched a Bluetooth-enabled coagulation system that allows patients to check how quickly their blood clots.

This is the first device of its kind for anticoagulated patients, with self-testing shown to help patients stay within their therapeutic range and lower the risk of stroke or bleeding.

Being able to transmit results to healthcare providers means fewer visits to the clinic. The device also allows patients to add comments to their results, reminds them to test, and flags the results in relation to the target range.

13.Apple's ResearchKit and Parkinson's Disease

In 2018, Apple added a new 'Movement Disorder API' to its open-source Research Kit API, which allows Apple Watches to monitor Parkinson's Disease symptoms.

Normally symptoms are monitored by a physician at a clinic via physical diagnostic tests, and patients are encouraged to keep a diary in order to give a broader insight into symptoms over time. The API aims to make that process automatic and continuous.

An app on a connected iPhone can present the data in a graph, giving daily and hourly breakdowns, as well as minute-by-minute symptom fluctuation.

Apple's ResearchKit has also been used in a number of different health studies, including an arthritis study carried out in partnership with GSK, and an epilepsy study that used sensors in the Apple Watch to detect the onset and duration of seizures.

Apple is keen to tout the potential for its apps to aid with medical research and care, and to that end, in 2017 it launched CareKit, an open-source framework designed to help developers to create apps for managing medical conditions. Unlike HealthKit, which is aimed more at general fitness and wellbeing, CareKit can be used to design apps with a specific medical purpose – so watch this space for more medical innovations that make use of iPhone and Apple Watch technology.

CHALLENGES

1. Data security & privacy

One of the most significant threats that IoT poses is of data security & privacy. IoT devices capture and transmit data in real-time. However, most of the IoT devices lack data protocols and standards.

In addition to that, there is significant ambiguity regarding data ownership regulation. All these factors make the data highly susceptible to cybercriminals who can hack into the system and compromise Personal Health Information (PHI) of both patients as well as doctors.

Cybercriminals can misuse patient's data to create fake IDs to buy drugs and medical equipment which they can sell later. Hackers can also file a fraudulent Insurance claim in patient's name.

2. Integration: multiple devices & protocols

Integration of multiple devices also causes hindrance in the implementation of IoT in the healthcare sector. The reason for this hindrance is that device manufacturers haven't reached a consensus regarding communication protocols and standard.

So, even if the variety of devices are connected; the difference in their communication protocol complicates and hinders the process of data aggregation. This non-uniformity of the connected device's protocols slows down the whole process and reduces the scope of scalability of IoT in healthcare.

3. Data overload & accuracy

Data aggregation is difficult due to the use of different communication protocols & standards. However, IoT devices still record a ton of data. The data collected by IoT devices are utilized to gain vital insights.

However, the amount of data is so tremendous that deriving insights from it are becoming extremely difficult for doctors which, ultimately affects the quality of decision-making. Moreover, this concern is rising as more devices are connected which record more and more data.

4. Cost

The situation is such that it has given rise to "Medical Tourism" in which patients with critical conditions access healthcare facilities of the developing nations which costs them as less as one-tenth. IoT in healthcare as a concept is a fascinating and promising idea. IoT has not made the healthcare facilitates affordable to the common man yet. The boom in the Healthcare costs is a worrying sign for everybody especially the developed countries.

However, it hasn't solved the cost considerations as of now. To successfully implement IoT and to gain its total optimization the stakeholders must make it cost effective otherwise it will always remain out of everyone's reach except the people from the high class.

CONCLUSION

Approximately 60% of global health care organizations have already implemented Internet of Things technologies, and an additional 27% are expected to do so by 2019. Traditional health care is witnessing a paradigm shift as digital transformation puts technologically advanced and connected products in the hands of consumers and gives patients and physicians even in the poorest and most remote locations better access to health care facilities. This paper attempts to take both the pros and cons of using MIOT into scrutiny and figure out a probable balanced approach so that this remarkable field does more good than harm in the coming future.

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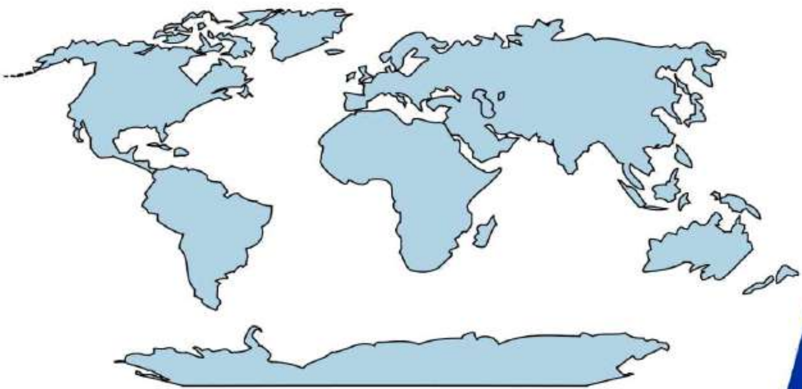

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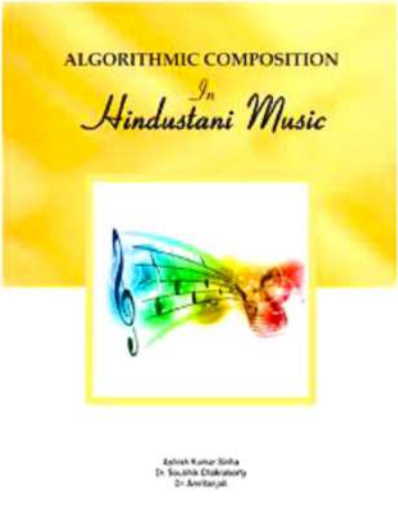

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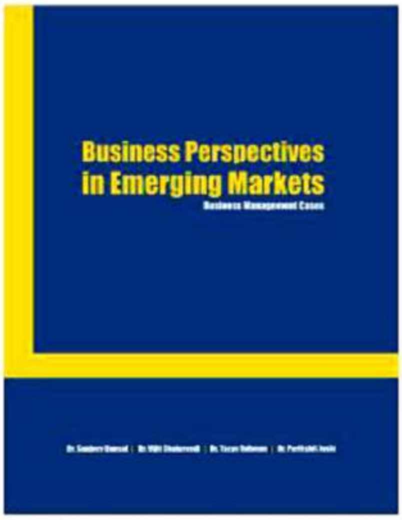

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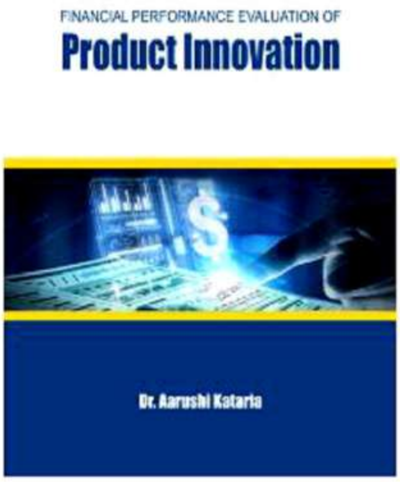

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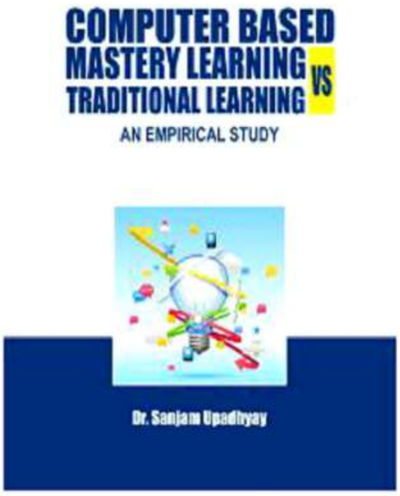

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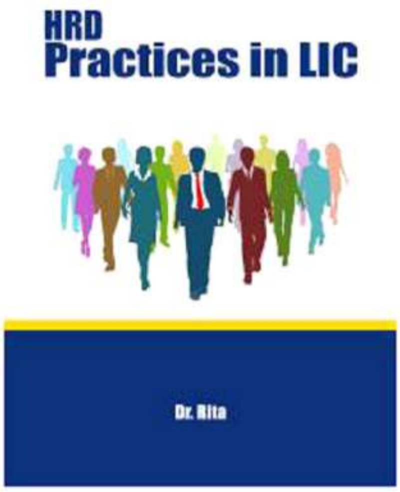

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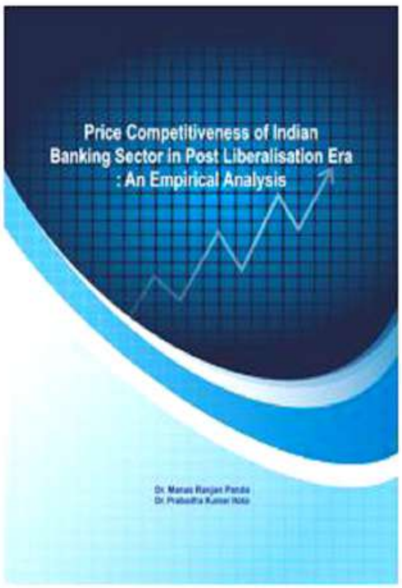

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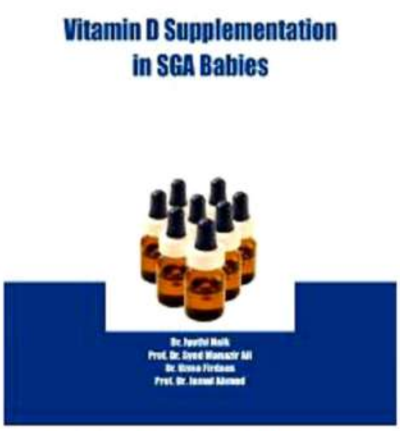

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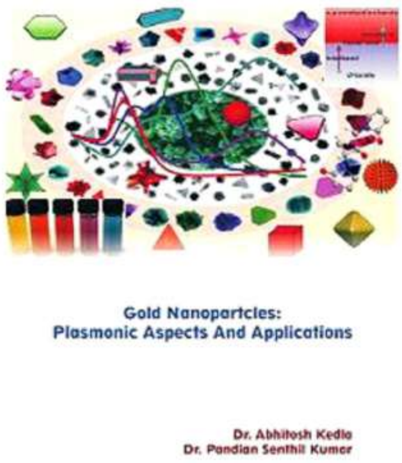

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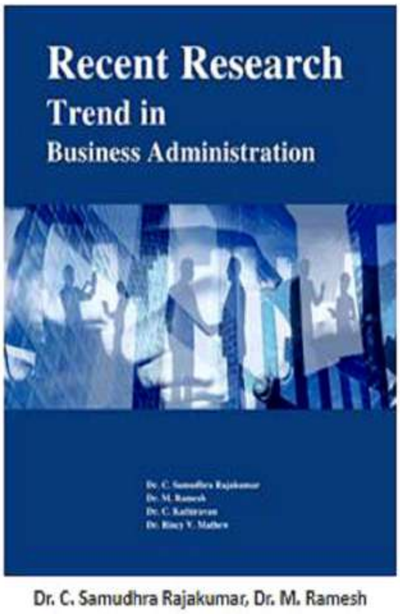

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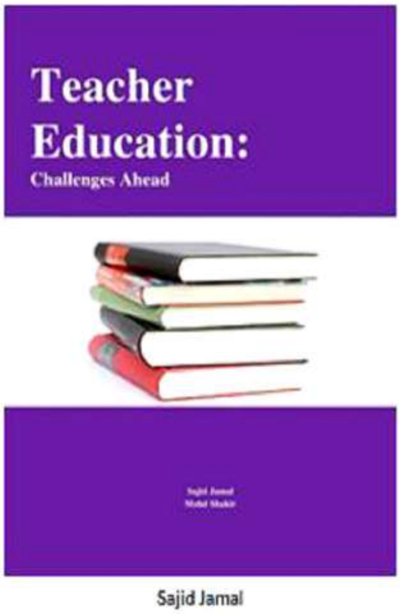

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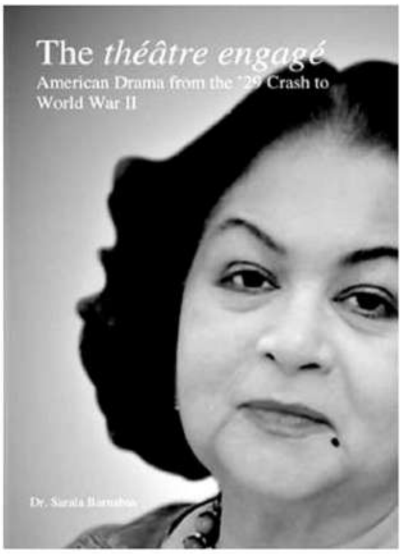

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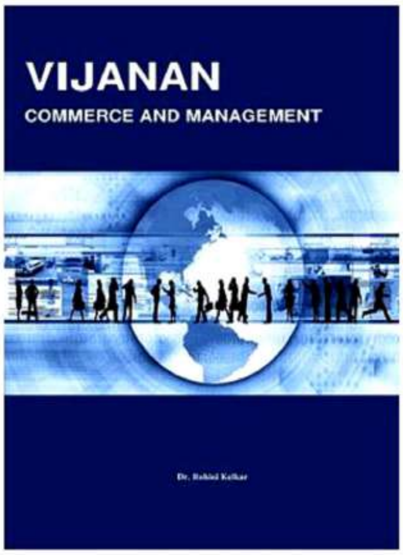

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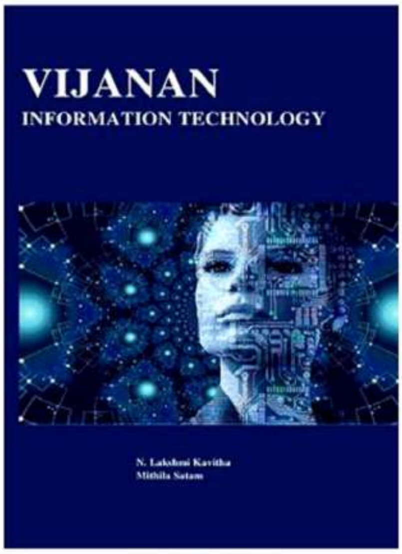

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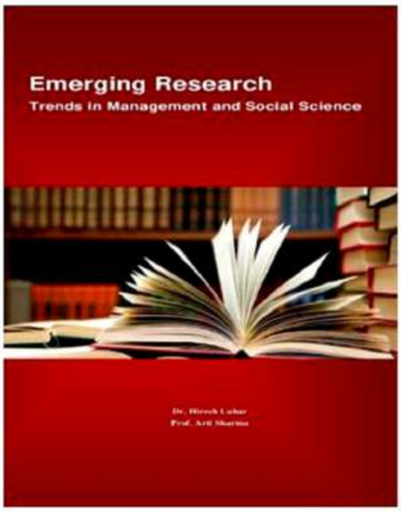

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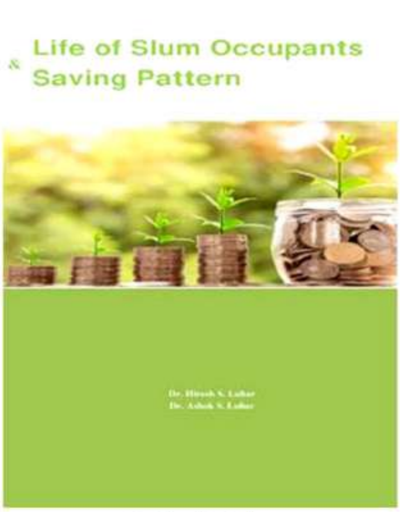

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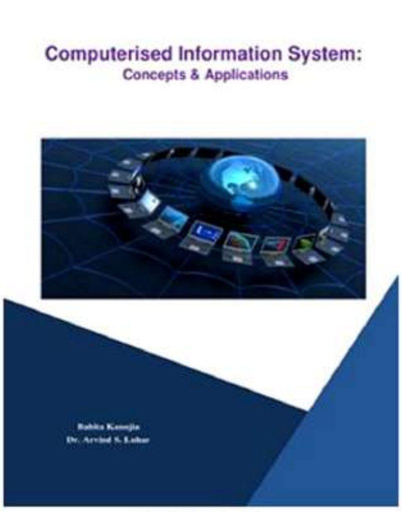

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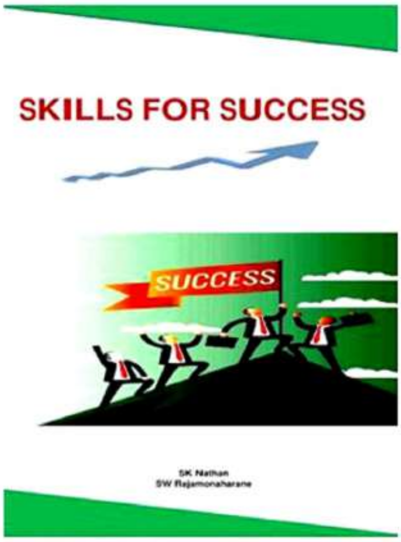

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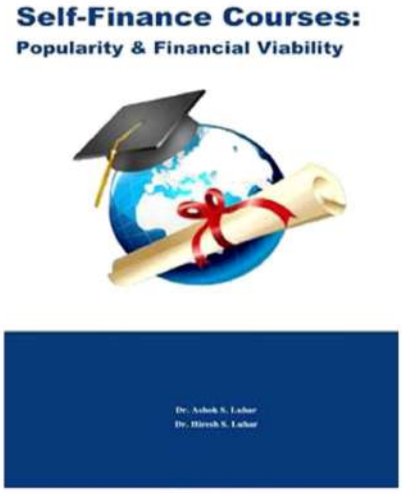

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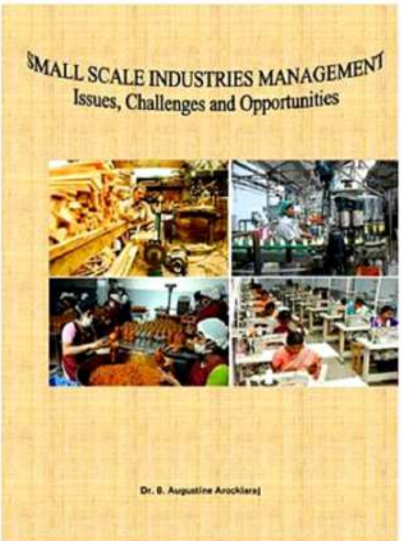

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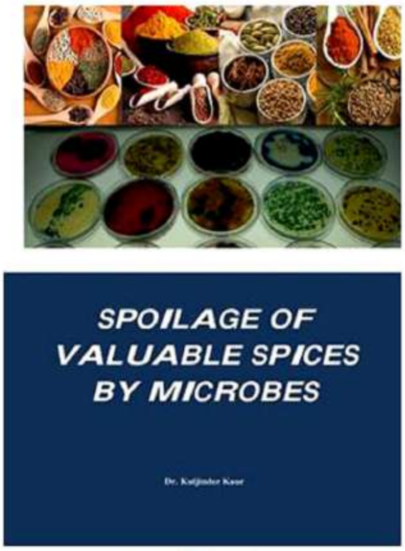

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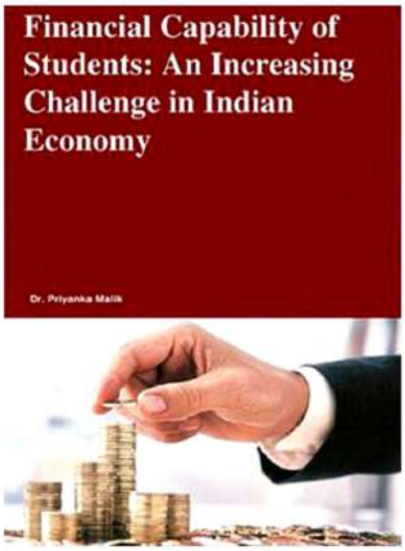

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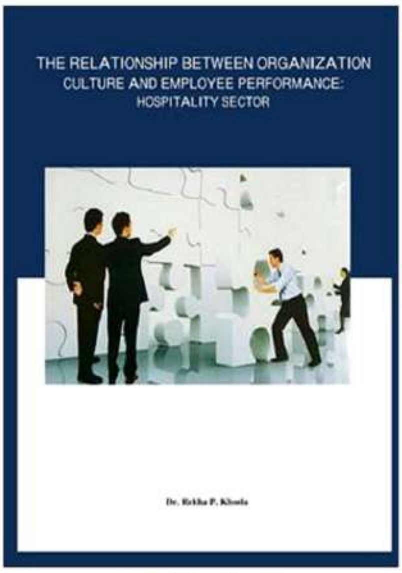

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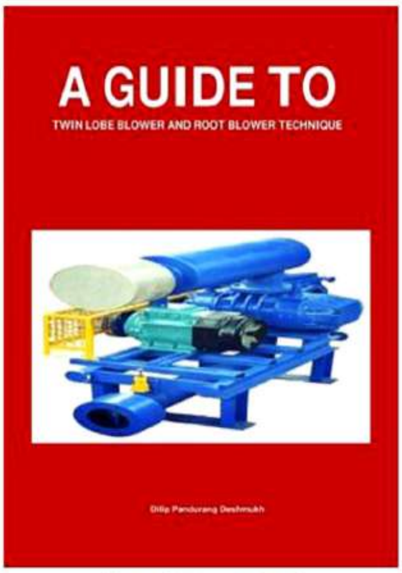

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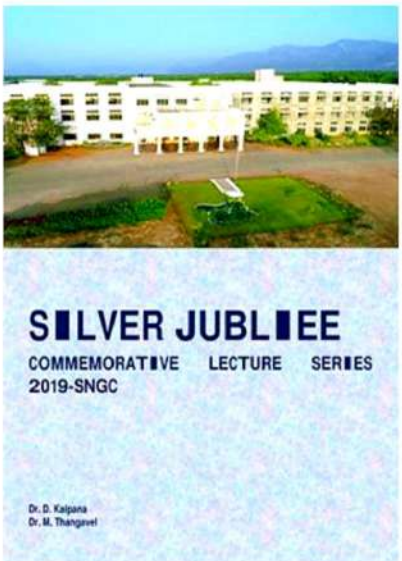

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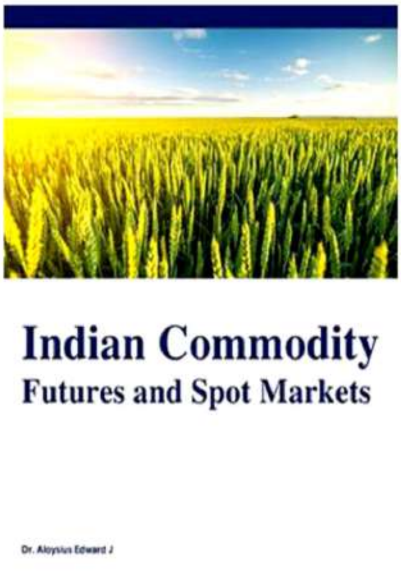

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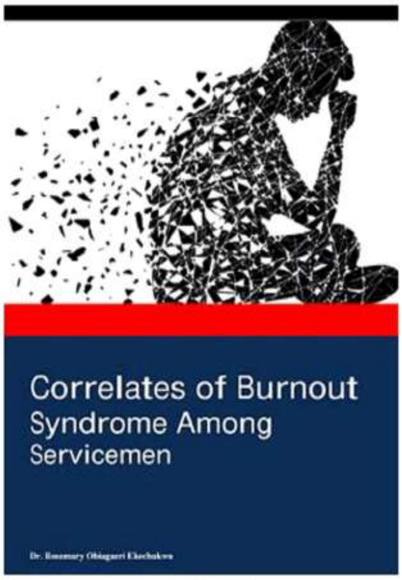

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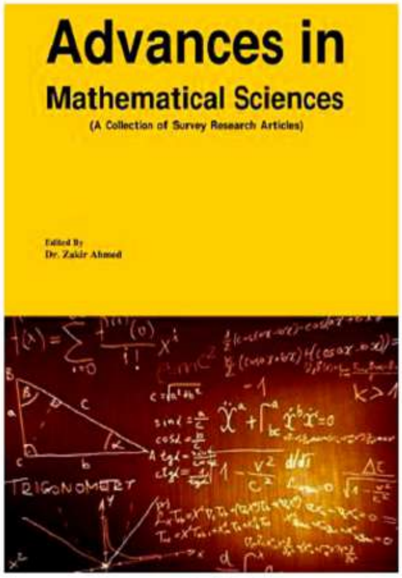

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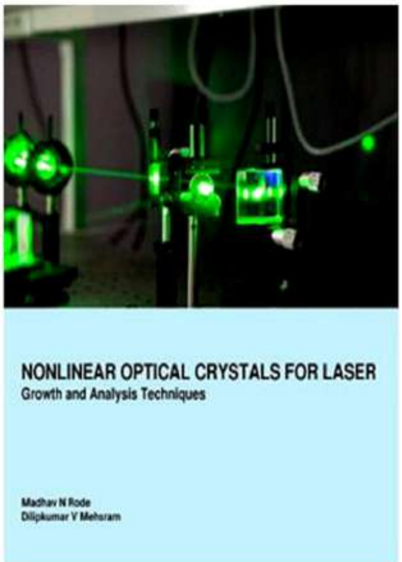

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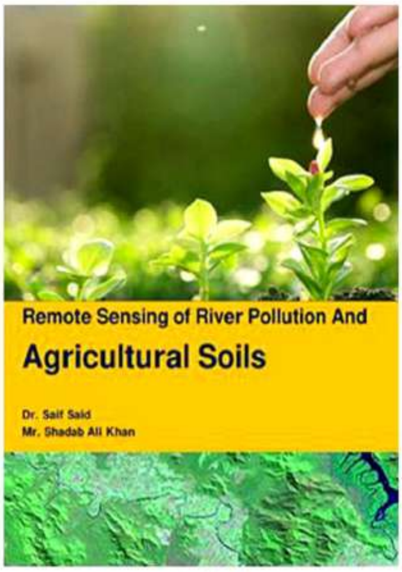

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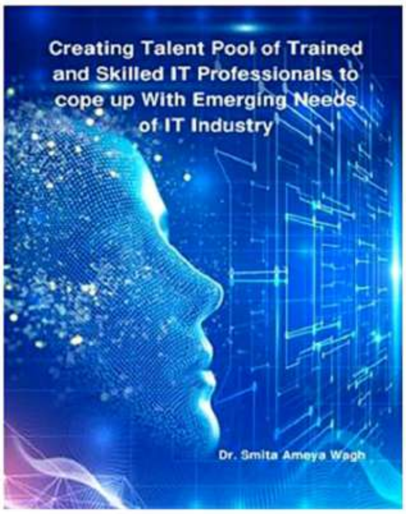

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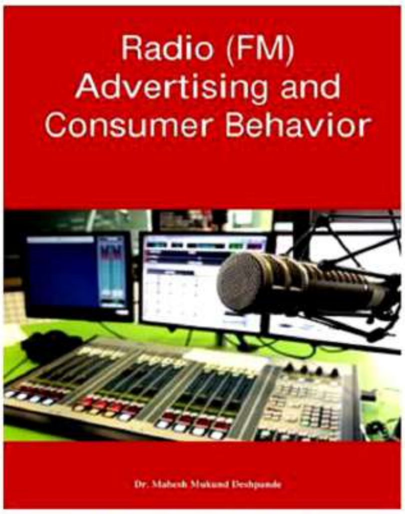

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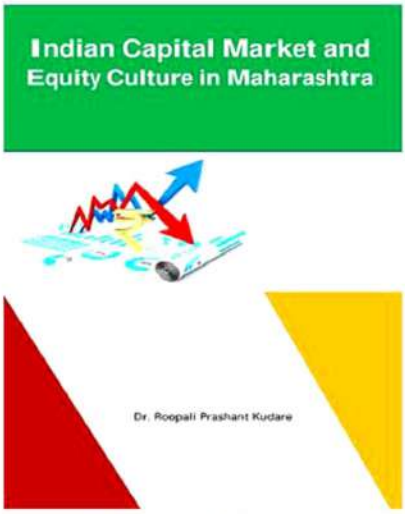

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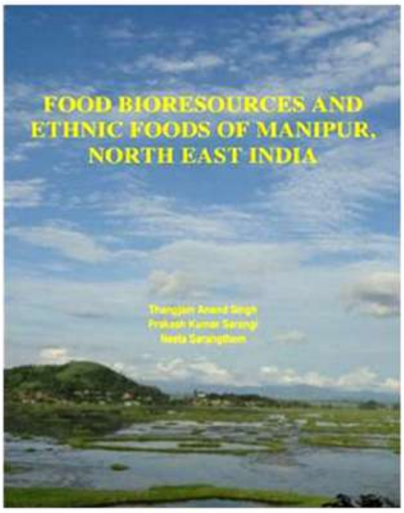

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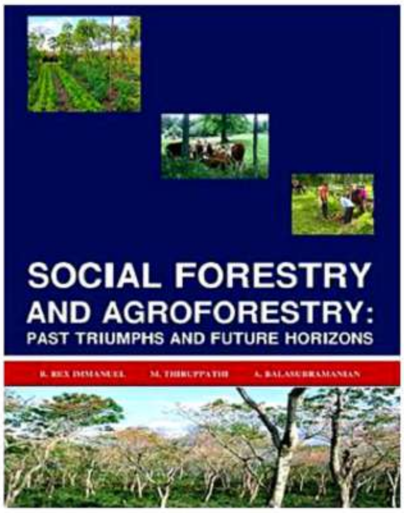

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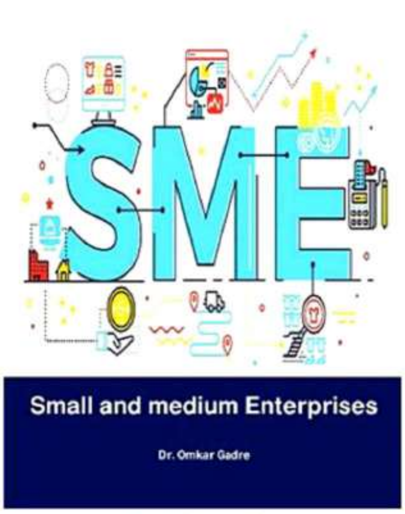

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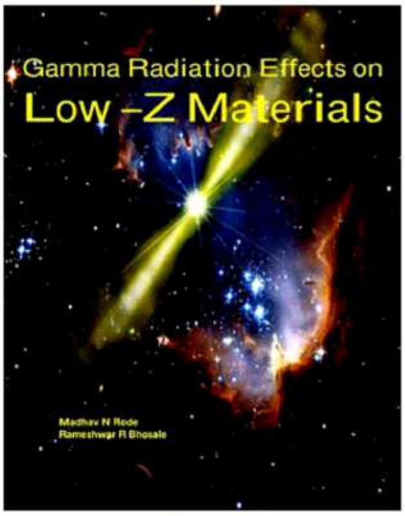

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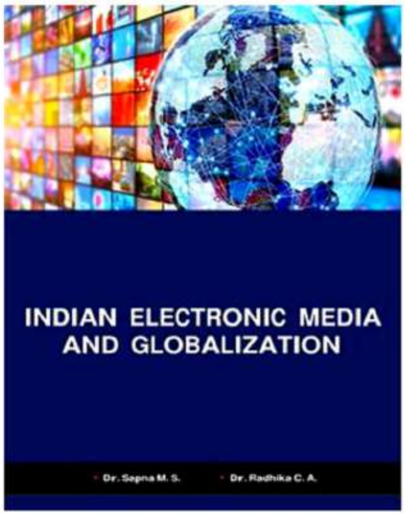

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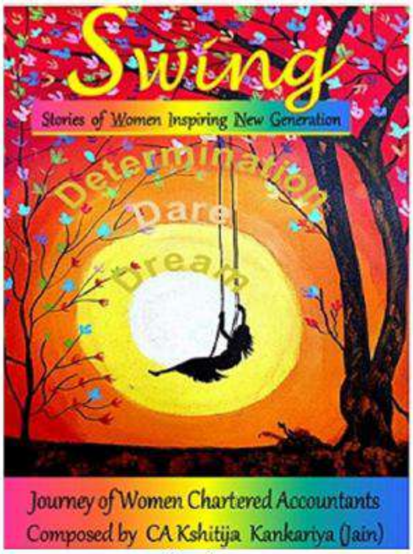

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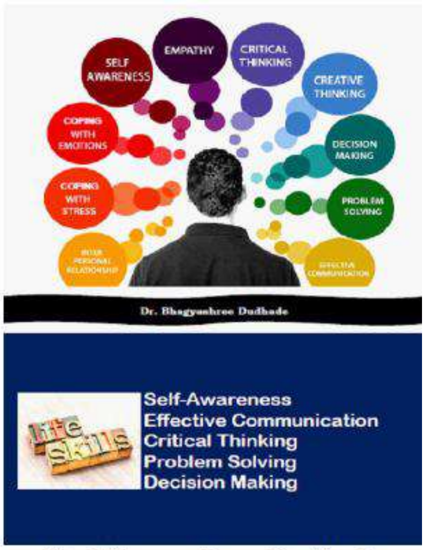

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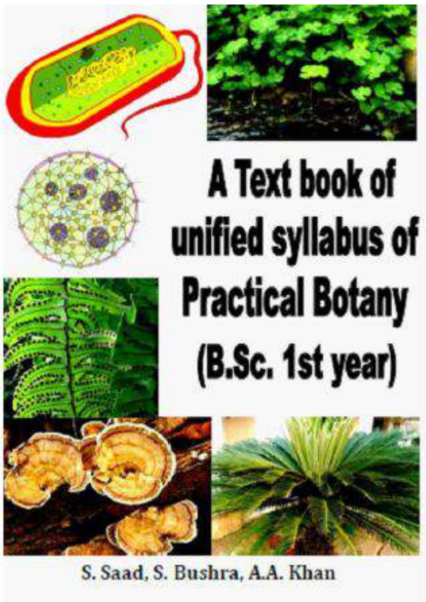

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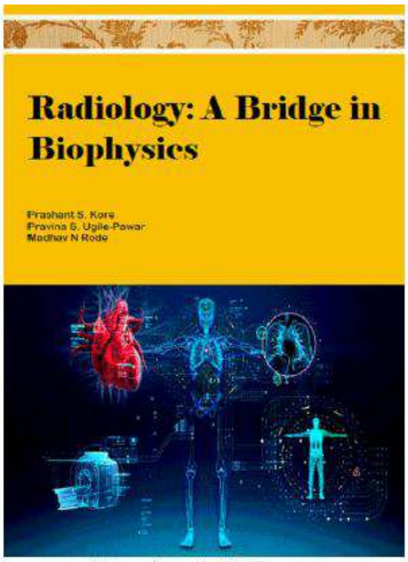

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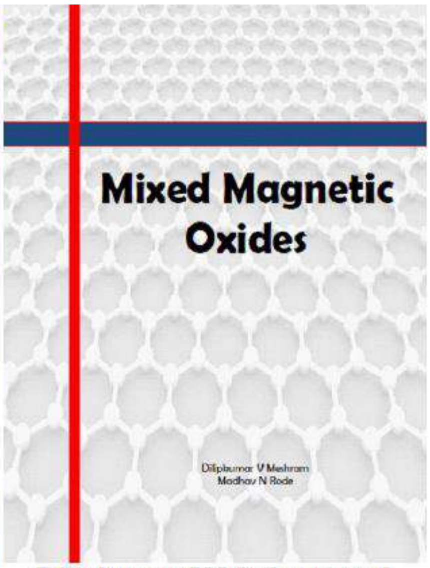

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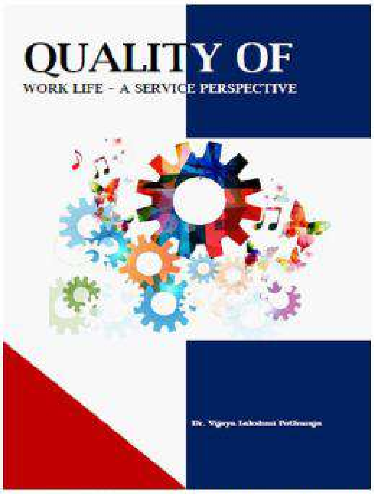

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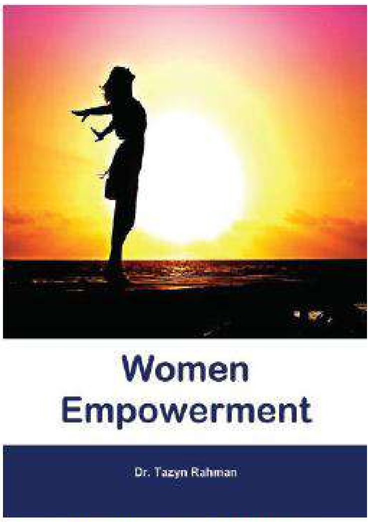

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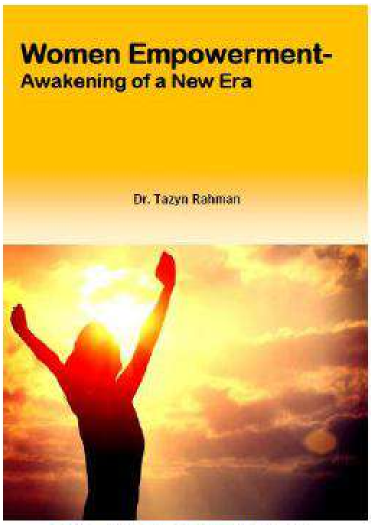

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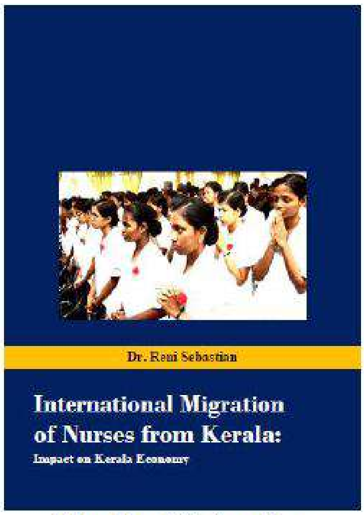

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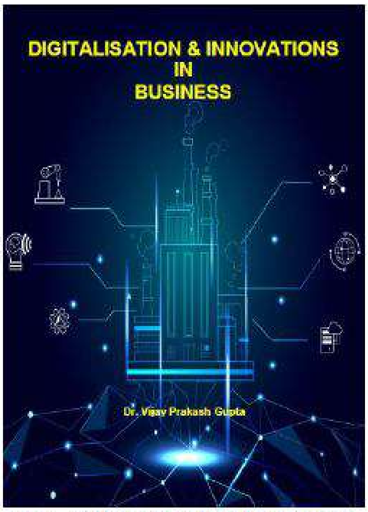

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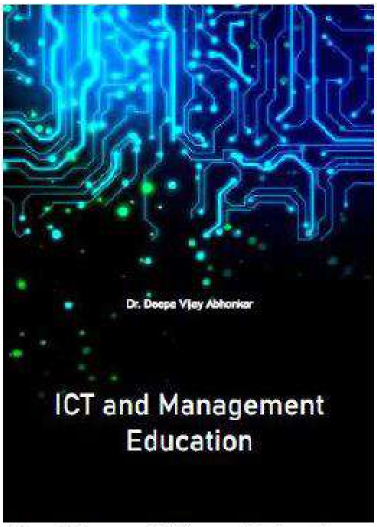

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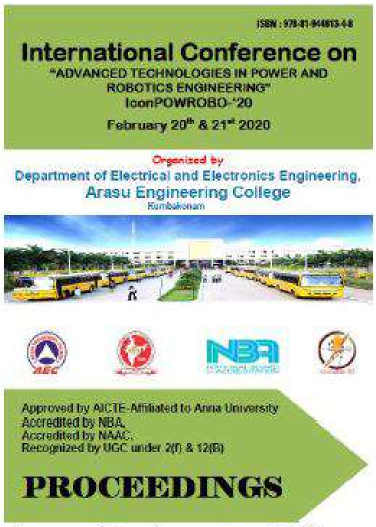

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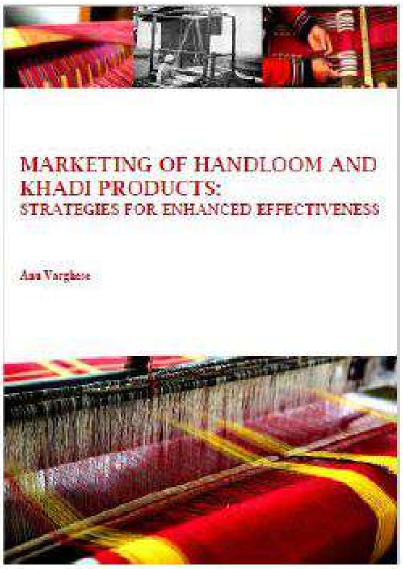

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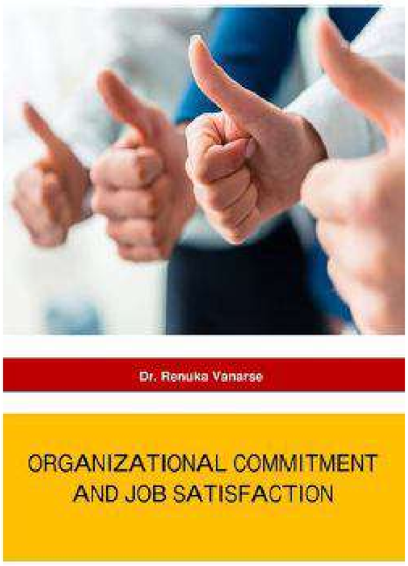

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