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ANALYTICAL STUDY TRENDS IN MANAGEMENT ECONOMIC CHANGE IN WOMEN LEADERSHIP

A. L. Thamarai

Assistant Professor, Adarsh College of Arts, Commerce & Science. Badlapur (E).

ABSTRACT

The Indian government has implemented various policies and schemes to promote women's leadership and empowerment across different sectors. These initiatives aim to address societal challenges, provide equal opportunities, and encourage women's participation in various fields, including entrepreneurship, education, and political leadership. This study investigates the evolving trends in management and the impact of economic changes on women's leadership. It analyzes the challenges and opportunities facing female leaders in a dynamic business environment, exploring how these factors influence their advancement and success. Since the 1990s, a growing body of research has sought to quantify the relationship between women's representation in leadership positions and organizational financial performance. Commonly known as the "business case" for women's leadership, the idea is that having more women leaders is good for business. The purpose of the agenda is to present how the women trends in management reveals that while overall female representation in the workforce is increasing the nation development. Women's leadership is associated with increased innovation and better business performance, but significant gaps in representation persist, particularly in high-potential pools and high-leadership roles. The study examines Leadership styles and behavior, infrastructure, logistics, environmental and economical sustainability. Using qualitative and quantitative methods, the paper explores the effectiveness of women's management and leadership style, gaps, and future potential in our nation development.

Key areas: *Viksit Bharat 2047, Leadership styles and behavior, Barriers and enablers to women's leadership, Changing demographics and economic benefits of diversity.*

INTRODUCTION

This investigates the impact of economic shifts on women's leadership trends in management, using an analytical approach to identify key patterns and challenges. The research examines how economic changes, such as globalization, technological advancements, and shifting economic sectors, affect women's career paths, leadership styles, and representation in management positions. This analysis will explore both the opportunities and obstacles that women face in navigating these evolving economic landscapes. The government of India has introduced many schemes for upliftment of women towards a developed nation. This research paper analyses the role of women and will examine how these economic changes affect and access to management positions, their leadership styles, and the challenges they face in achieving potential growth in our nation. The presence of women in leadership positions can yield significant advantages for both businesses and society, also contributing towards the vision of Viksit Bharat by fostering employment opportunities and maintaining ecological balance.

RESEARCH METHODOLOGY:

The study employs a mixed methods of approach combining both qualitative and quantitative methods to gather comprehensive data on the status of economic changes in women management and leadership positions towards the vision of Viksit Bharat in India 2047. This conceptual study relies on secondary data from books, journals, research papers, news articles, and digital sources.

MAIN OBJECTIVE:

1. To identify and analyse the specific challenges hindering women's progress in reaching Leadership positions in India 2047.
2. To examine the role of women leader in promoting work-life balance and employee well being in corporate sector.
3. To assess the influence of women leader in organizational culture in Indian corporate.
4. To examine different mentorship programs for women leader India.

SPECIFIC OBJECTIVES:

1. A Vision for 2047A Viksit Bharat is one where women have equal access to education, healthcare, and employment opportunities; where they are free from gender-based violence and discrimination; and where they can balance professional ambitions with personal aspirations without societal constraints.

2. The objective of this research (Capable Woman, Empowered India), reflects our belief that the empowerment of women is inseparably linked with the empowerment of the nation.
3. This brings together the expertise of scholars, policymakers, industry leaders, and grassroots activists to explore the current state of women in the workforce and provide a forward-looking vision for their role in India's future.
4. Companies with gender-diverse executive teams tend to out perform their peers financially. Womens bring unique perspectives and experiences to decision- making processes, leading to innovative solutions. Additionally, their presence serves as a model for future generations, inspiring other women to pursue leadership roles.

RESEARCH GAP:

1. Gender Discrimination
2. Lack of Basic Facilities
3. Lack of Access to Education:
4. Abusement in working place , Women were exposed to all sorts of torture and abuse during this dark phase.

Achieve gender equality and empower all men and womens . Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world. There has been progress over the last decades, but the world is not on track to achieve gender equality still today. The gender gap in education in India exists, though there's been progress, particularly in enrollment at higher levels. Women's empowerment and its links to sustainable development at the heart of the 2047 Agenda are five critical dimensions people, prosperity, planet, partnership and peace, also known as the 5P's.

This Technical Brief details the process of adding a measure of women in managerial and leadeship positions to the International Futures (IFs) integrated modeling platform in order to estimate and forecast women's leadership in the workplace globally. Current stage of women in business leadership globally incresed and also some place women still remain under represented in management positions in the workplace.

Observation of Research study:

Analytical studies in management reveal a trend of increased women in leadership positions, particularly in corporate India. While progress is positive, significant disparities remain, especially at the CEO/CXO level and in various sectors. Economic factors and social norms play a crucial role in shaping women's leadership opportunities and experiences.

1. One in every 10 women is living in extreme poverty (10.3 per cent).
2. Women are less likely to have access to social protection.
3. Women are more food insecure than men.
4. Women and girls suffer most from the dearth of safely managed water and sanitation.
5. Women are less likely than men to have access to financial institutions or have a bank account.
6. The digital divide remains a gendered one with 37 per cent

Research Scope and Value:

Economic Changes: The study will explore how globalization, technological advancements (like AI and automation), and shifts in economic sectors (e.g., from manufacturing to services) impact the landscape of women in leadership.

Women's Leadership: The research will examine how these economic changes affect women's access to leadership positions, their leadership styles, and the challenges they face in achieving their leadership potential. Using narrative analyses, this study reviews the literature on women at the top of the firm hierarchy with a focus on business research.

Siginificance and Importance of Research:

The presence of women in leadership positions can yield significant advantages for both businesses and society. Women bring unique perspectives and experiences to decision making processes, leading to innovative solutions. Additionally, their presence serves as a model for future generations, inspiring other women to pursue leadership roles.

Increased Representation: The number of women in leadership roles is growing, although progress is not uniform across all levels.

Leadership Styles: Research suggests that women may be perceived as more effective at certain leadership behaviors, like agentic and communal leadership, while men are seen as more passive or less effective.

Economic Factors: Economic changes and shifts in societal norms influence the number of women in leadership positions.

Barriers and Bias: Despite advancements, women continue to face challenges like unconscious bias, unequal pay, and the glass ceiling, particularly women of color.

Leadership Development: Leadership training and mentorship programs are shown to enhance women's leadership capabilities and increase their chances of attaining senior management positions.

Organizational Impact: Research suggests that organizations with a higher percentage of women in leadership roles may experience more job satisfaction, dedication, and meaningful work.

Societal Shifts: Changes in societal views and expectations regarding gender roles also impact women's leadership in the workplace.

Importance of Women Empowerment Schemes in India

There is a huge buzz about women's empowerment around the world. In the 21st Century, women have started participating in many avenues traditionally associated with men. The growth in technology has made the task easier. Going a step further, the Government of India has shared its vision of women-led development to make India a developed nation by 2047. In this blog, we discuss all the current women empowerment schemes in India.

1. **Sukanya Samriddhi Yojana (SSY) :** Launched as a part of the most popular “Beti Bachao, Beti Padhao” mission, the SSY accounts can be opened by the parents of a newborn girl child. The mission aims to improve the Sex Ratio by ensuring education for girls. Here are some key points of the SSY scheme:
2. **Lakshpati Didi Scheme:** It is one of the key women empowerment schemes in India. Under the scheme, the government eyes to empower 2 crore women working in Self-Help Groups (SHGs) to build a capital of more than Rs. 1 lakh.
3. **Drone Didi Scheme:** The Drone Didi women empowerment scheme in India aims to train 15,000 workers of the Self Help Groups (SHGs) to become drone pilots.
4. **Mission Indradhanush:** Mission Indradhanush is an ambitious government scheme for women's empowerment in India. Under the scheme, the government ensures full immunisation of pregnant women and children.
5. **Mudra Yojana:** The PMMY (Pradhan Mantri Mudra Yojana) provides collateral-free loans to small business owners up to Rs. 20 lakhs (limit increased in budget 24-25). With an increased budget allocated for MUDRA loans, the focus is on providing more loans to women-led enterprises.
6. **TREAD Scheme:** One of the lesser-known women empowerment schemes in India is the Trade Related Entrepreneurship Development Assistance Scheme (TREAD).
7. **Ujjwala Yojana:** Pradhan Mantri Ujjwala Yojana (PMUY) provides free gas connections and subsidised gas cylinders to BPL families.
8. **Standup India Mission:** The Standup India Mission seeks to provide loans between Rs.10 lakhs and Rs.1 crore to SC, ST and women entrepreneurs. This loan covers up to 75% of the total project cost.
9. **PMAY (Pradhan Mantri Awas Yojana):** Many would overlook the PMAY scheme while talking about women empowerment schemes in India. .
10. **Women’s Helpline:** A 24x7 helpline with a toll-free number 181 is operated across all states and UTs in India to provide emergency support to women affected by violence or any other distress.
11. **STEP Initiative:** STEP is a government scheme for women’s empowerment in India that provides grants to institutions to run training programmes for women
12. **Mahila E-Haat Scheme:** As the name suggests, it is an e-marketplace for women to showcase their products. They can also add proper product descriptions and photos to attract customers.

13. **Mahila Samman Savings Certificate (MSSC) Scheme:** MSSCs are 2-year FDs for women in the Post Offices. They can deposit up to Rs. 2 lakhs and earn an interest of 7.5% p.a. on these deposits.
14. **Mahila Shakti Kendras:** MSKs provide support to women for skill development, digital literacy and getting employment. They act as a centre of women's empowerment that can lay the foundation of modern India.

ANALYTICAL APPROACH:

The study will use various analytical methods, including statistical analysis, case studies, and literature reviews, correlations, and causal relationships.

FINDINGS:

1. Increased GDP:
2. Improved Education:
3. Fight against Poverty:
4. Social Justice:
5. Improved health:

This study outlines the state of the art over the past decade by synthesizing theoretical contexts and critically discussing the main streams of research on sustainability, firm outcomes and barriers preventing women from reaching the upper echelons.

Practical Implications

The research provides novel evidence of the attempt internationally to increase female participation at the top of the firm hierarchy by analyzing firm outcomes, sustainability and the constraints faced by women in achieving these careers.

Social Implications

The results show that the participation of women in leadership roles is not (only) a matter of compliance with current regulations. Through their ability to monitor key social and environmental issues from a long-term perspective and their attention to the internal control systems, companies more effectively pursue their financial and nonfinancial aims.

Trends and Research:

Research indicates that women's participation in management and leadership roles is increasing, but disparities persist, particularly in top positions. While women may exhibit different leadership styles compared to men, studies also show that women leaders bring unique qualities that can benefit organizations. Finally, the brief explores current estimations and forecasts of women in management starting in 2015 and until 2047.

Forecasting Women in Leadership Positions Technical Brief:

Another major challenge to women's advancement into leadership positions is the expectation that women perform the majority of domestic and childcare duties in a household (ILO, 2018; UN Women, 2020). Alternative childcare options are often costly, resulting in some women staying home or pulling back on paid work commitments in order to care for children.

Recommendations:

1. To enhance gender diversity and empower women in digital world.
2. Foster Inclusive Work Cultures:
3. Implement mentoring programs and flexible work policies.
4. Encourage Gender Diversity in Leadership:
5. Promote equitable hiring and leadership development initiatives.
6. Ensure Equal Opportunities

Promote Awareness and Inclusivity A country where women are educated, skilled, and equal participants in the workforce will be stronger and better positioned to lead on the global stage.

Challenges faced by women in Management and leadership :

Women in leadership roles encounter various challenges, requiring targeted strategies to overcome them. Women face gender biases, underrepresentation, work life balance struggles, and limited mentorship (Sandberg, 2013; Bohnet, 2016). Addressing these barriers enhances leadership opportunities..

1. Gender Bias and Stereotypes
2. Limited Representation in Leadership:
3. Work-Life Balance Issues
4. Restricted Networking and Mentorship:
5. Navigating Male-Dominated Work Environments:
6. Building Confidence and Assertiveness

By addressing these obstacles through structured support systems, mentorship programs, and inclusive workplace policies, organizations

CONCLUSION:

The Government of India has shared its vision of women led development to make India a developed nation by 2047. The government schemes for women's empowerment in India 2025, this scheme is a forward looking initiative that aligns well with the Viksit Bharat vision. While it shows potential in creating employment and supporting sustainable infrastructure, its true success will depend on robust implementation, real-time monitoring, and greater stakeholder participation. Integrating green technology and expanding skilling programs can further enhance the scheme's impact. Empowering women in digital marketing is vital for India's development towards Viksit Bharat @ 2047. Bridging the gender gap, promoting digital literacy, and ensuring equal opportunities can unlock the full potential of women in the digital economy.

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THE INFLUENCE OF SOCIAL MEDIA ON YOUNGSTERS

Girisha Sidhwani

ABSTRACT

This research paper explores the impact of trends on social media on youngsters which focuses on changes in behaviour, mental health, their preferences, performances. The paper also brings light to both negative and positive influences of social media. The findings will give us the solutions to use social media in a positive way to the youth.

Keywords: Social media, youngsters, mental health, behaviour, digital addiction.

INTRODUCTION

In the 21st century, social media has changed the way people communicate, connect to each other. Platforms such as Instagram, WhatsApp, Snapchat, Facebook have become important in daily life, particularly among youngsters. For many youngsters, social media serves as a space for self-expression, peer interaction, and identity formation. While these platforms offer several benefits—such as global connectivity, creativity, real-time news—they also raise growing concerns about their negative impact on mental health, behavior, and academic performance.

The increased screen time and digital engagement among youth have been linked to issues such as anxiety, depression, cyberbullying, sleep disturbances, and reduced self-esteem, changes in their preferences. Studies suggest that getting online validation through likes, comments, and followers may alter youngsters' self-perception and emotional well-being. At the same time, some researchers argue that when used responsibly, social media can foster social support and enhance communication skills.

This research aims to explore how social media influences the psychological, emotional, and behavioral patterns of youngsters. By focusing on data collected through a structured questionnaire, this study will analyze the extent to which social media affects young individuals and offer both its advantages and disadvantages.

LITERATURE REVIEW

Twenge, J. M., & Campbell, W. K. (2018). This study found a significant link between high screen time and low psychological well-being among adolescents. Those children who spent more time on their phones were more likely to report feelings of being unhappy, sad, and lack of sleep. It supports the argument that excessive use of screen time may affect their mental health.

Keles, B., McCrae, N., & Grealish, A. (2020). A meta-analysis of 16 studies revealed a strong correlation between use of social media and increased depression and anxiety in adolescents. Online feedback that they get to play a major role in these outcomes.

O'Keeffe, G. S., & Clarke-Pearson, K. (2011). This paper discusses both pros & cons of social media, identifying cyberbullying as a key concern. It advocates for parental guidance and digital literacy education.

Andreassen, C. S. (2015). This study reviewed the psychological mechanisms behind social media addiction and its implications for adolescents, including reduced productivity, anxiety, and interpersonal conflicts like low or no confidence, change in their preferences.

Przybylski, A. K., & Weinstein, N. (2017). suggests a moderate level of screen time may not be harmful and can be beneficial. However, using it without limits correlates with reduced well-being, indicating a U-shaped relationship.

Woods, H. C., & Scott, H. (2016). examined the relationship between usage of social media at night and sleeping patterns in teens. The study Found significant negative impacts on both sleep quality and duration.

Frison, E., & Eggermont, S. (2015). Adolescents or Youngsters often use social media for support during stress. Even if it offers temporary relief, it can lead to emotional dependency.

Barry, C. T., Reiter, S. R., Anderson, A. C., & DiDonato, T. A. (2017). Links excessive posting pictures, reels, videos and validation-seeking behaviour with lower self-esteem and increased narcissistic traits among Adolescents & Youngsters.

Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Reports a significant relation between frequent social media use and anxiety disorders, especially related to fear of missing out (FOMO).

Bányai, F., Zsila, Á., Király, O., et al. (2017). Using a sample of over 5,000 adolescents, this study found that problematic social media usage was linked with low academic achievement, sleep disturbance, changes in behaviour, family conflict.

OBJECTIVES

- To analyze patterns of social media use among adolescents & youngsters aged 13–24.
- To study the relationship between social media usage and its impact.
- To assess the effect of social media on their performance.

RESEARCH METHODOLOGY

This study follows a **quantitative and descriptive approach**, focusing on measuring the impact of social media usage on the behaviour and mental health of youngsters through the use of structured questionnaires.

HYPOTHESIS

Excessive use of social media negatively affects the mental health and social behaviour of youngsters:

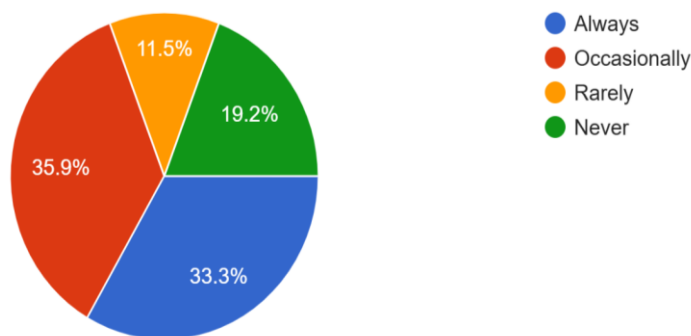
H₀: There is no significant impact of social media usage on the youngsters.

H₁: There is a significant impact of social media usage on the youngsters.

DATA ANALYSIS & DATA INTERPRETATION

3. Is social media the first thing you check in the morning?

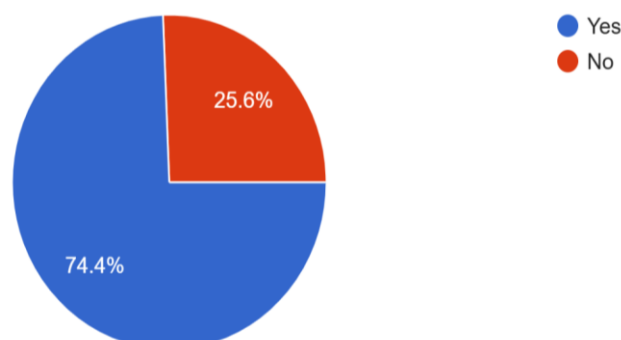
78 responses



The survey results show that approximately 35.9% occasionally , 33.3% always, 19.2% never, 11.5% rarely check social media the first thing in the morning.

4. Are you aware about current trends on social media?

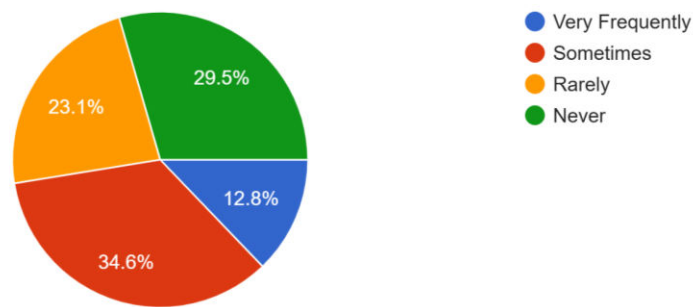
78 responses



74.4% of respondents are aware about current trends on social media. 25.6% of respondents are not aware about current trends on social media.

5. How often do you participate in social media trends (e.g., challenges, memes, viral content)?

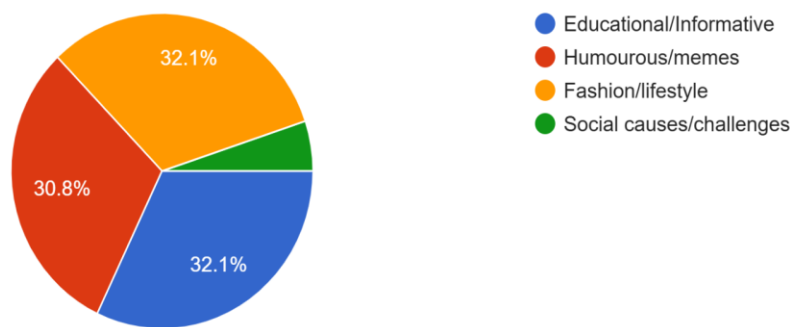
78 responses



23.1% of respondents rarely participate in social media trends, 29.5% of respondents never participate in social media trends, 34.6% of the respondents participate in social media trends sometimes, 12.8% of respondents always participate in social media trends.

6. What type of social media trends do you enjoy most?

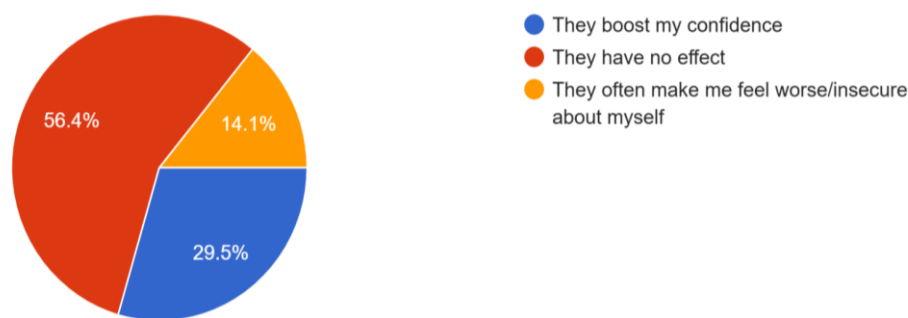
78 responses



32.1% of respondents enjoy social media trends related to fashion/lifestyle, Approximately 5% of respondents enjoy social media trends related to social causes/challenges, 32.1% of the respondents enjoy social media trends related to education/information, 30.8% of respondents enjoy social media trends related to humour/memes.

8. How do social media trends affect you?

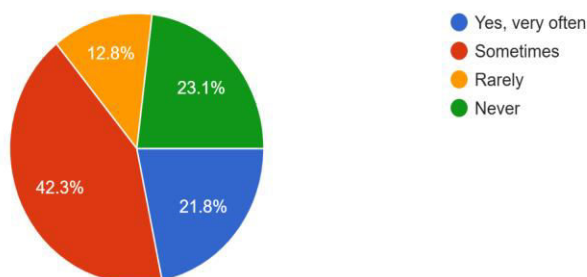
78 responses



56.4% of respondents have no effect of trends on social media, 29.5% of respondents feel it boosts their confidence, 14.1% of respondents feel that trends often make them feel worse/insecure about themselves.

9. Have social media trends ever influenced your personal choices (e.g., fashion, speech, behavior)?

78 responses



23.1% of the respondents feel that social media trends do not influence their personal choices, 12.8% of respondents feel that it influences their choice sometimes, 42.3% of respondents social media trends influence their choices sometimes & 21.8% of respondents say that it influences their choices very often.

FINDINGS & SUGGESTIONS

The findings suggest that Social Media usage is highly prevalent among youngsters and significantly influences various aspects of their lives, particularly emotional well-being, academic focus, and personal choices. While social media fosters social connectivity, it also leads to increased anxiety, and distraction for many users. Moreover, the dependency on social media validation shows the importance for encouraging time limits on social media usage, digital literacy and media literacy & promoting positive & realistic content.

1. Encourage Time Management:

Implement awareness programs emphasizing the importance of setting healthy time limits on daily social media use to maintain a balanced lifestyle.

2. Promote Digital and Media Literacy:

Educational institutions should integrate digital literacy and media literacy into their routine to help youngsters critically evaluate the content they consume and produce.

3. Encourage Positive Online Behavior:

Promote the creation and sharing of positive, realistic, and empowering content on social media platforms to minimize feelings of inadequacy and comparison.

4. Promote Offline Activities:

Encourage participation in offline activities such as sports, reading, hobbies, and in-person social interactions to balance screen time and personal development.

CONCLUSION

The present study concludes that while social media plays a significant role in enhancing connectivity, communication, and self-expression among youngsters, it also presents notable challenges that cannot be ignored. The excessive use of social media platforms has been found to impact emotional well-being, academic performance, sleep patterns, and self-esteem among the youth.

Despite these challenges, social media also offers positive opportunities when used wisely—such as fostering creativity, networking, and learning. Therefore, it is crucial to promote digital and media literacy, encourage the mindful use of social platforms, and guide youngsters toward maintaining a healthy balance between their online and offline lives.

By adopting responsible digital habits and raising awareness about the psychological effects of social media, it is possible to maximize its benefits while minimizing its adverse impacts on the younger generation.

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STUDY ON CLOUD COMPUTING AND ITS CONTRIBUTION TO SUSTAINABLE ENVIRONMENTAL PRACTICES

Mrs. Aradhana R. Goyal

Assistant Professor, St Paul College

ABSTRACT

This research paper explores the role of cloud computing in promoting sustainable environmental practices. With the rapid growth of digital services, energy consumption and electronic waste have become significant environmental concerns. Cloud computing offers a promising alternative to traditional IT infrastructure by enabling energy-efficient data storage, dynamic resource allocation, and reduced hardware dependency. This paper investigates how cloud computing contributes to environmental sustainability by examining its energy efficiency, carbon footprint reduction, and support for green innovations. It also considers challenges such as data center energy demands and proposes potential solutions. By reviewing current literature and analyzing trends, this study provides a comprehensive understanding of the environmental benefits and trade-offs associated with cloud computing. The findings aim to inform policymakers, businesses, and IT professionals about leveraging cloud technologies for a greener future.

Keywords: Cloud Computing, Sustainability, Green IT, Environmental Impact, Data Centers

INTRODUCTION

In the digital age, information technology has become deeply embedded in daily life and business operations. While technological advancements have driven economic growth and improved quality of life, they have also led to growing concerns about environmental sustainability. The proliferation of data centers, high energy consumption, and increased electronic waste underscore the environmental impact of traditional IT infrastructure. Cloud computing has emerged as a transformative solution that addresses these challenges by offering scalable, on-demand computing services through shared resources.

Cloud computing reduces the need for physical hardware, optimizes server utilization, and facilitates energy savings. By centralizing resources and using advanced cooling and energy-efficient technologies, cloud providers can significantly lower the carbon footprint of IT operations. Moreover, cloud services support the development of green technologies and enable remote work, thereby reducing commuting-related emissions. This paper explores the multifaceted ways in which cloud computing contributes to sustainable environmental practices and examines both its advantages and limitations.

LITERATURE REVIEW

Several studies highlight the potential of cloud computing to contribute positively to environmental sustainability. According to a report by the International Data Corporation (IDC), enterprises that move to the cloud can reduce energy consumption and carbon emissions by up to 90% for small deployments. A study by Google and Lawrence Berkeley National Laboratory found that cloud computing is five times more energy-efficient than traditional enterprise IT.

Further research emphasizes the role of virtualization and multi-tenancy in optimizing resource utilization. Cloud providers like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud have adopted renewable energy sources and implemented advanced cooling technologies to minimize environmental impact. However, challenges remain, such as the high energy demands of hyper scale data centers and the need for sustainable energy sourcing.

Scholars also note that while cloud computing offers environmental benefits, the actual impact varies depending on factors such as data center location, energy mix, and workload efficiency. There is a growing consensus that cloud computing, when integrated with green policies and technologies, can play a vital role in achieving environmental sustainability.

OBJECTIVES

1. To analyze how cloud computing contributes to energy efficiency in IT operations.
2. To examine the reduction of carbon footprints through cloud-based infrastructure.
3. To evaluate the environmental benefits and challenges associated with cloud data centers.
4. To propose strategies for enhancing the sustainability of cloud computing services.

SCOPE OF THE STUDY

This study focuses on the environmental impact of cloud computing in the context of enterprise IT infrastructure. It includes an analysis of major cloud service providers and their sustainability practices. The research is limited to examining cloud computing technologies and does not cover other emerging technologies such as blockchain or IoT, except where they intersect with cloud-based sustainability solutions.

RESEARCH METHODOLOGY

The research methodology is based on a qualitative approach, including a comprehensive review of academic journals, industry reports, and case studies. Secondary data from credible sources such as IDC, Gartner, and cloud service provider sustainability reports were analyzed to assess the environmental impact of cloud computing. Comparative analysis was used to evaluate the differences in energy consumption and emissions between traditional IT and cloud-based systems.

LIMITATIONS OF THE STUDY

This study is limited by the availability of up-to-date and transparent data from cloud service providers. Additionally, the environmental impact of cloud computing can vary by geography and infrastructure, which may not be fully captured in this research. The rapid evolution of cloud technologies also means that some findings may become outdated quickly.

CONCLUSION

Cloud computing presents a significant opportunity for promoting sustainable environmental practices in the IT sector. By enabling energy-efficient operations, reducing hardware requirements, and supporting green innovations, cloud technologies can substantially lower the ecological footprint of digital services. Despite certain challenges, such as high data center energy demands and regional differences in energy sources, cloud computing offers a pathway to more sustainable IT operations. To maximize its potential, continued investment in renewable energy, policy support, and innovation in cloud infrastructure is essential. This research underscores the need for collaborative efforts between governments, businesses, and technology providers to harness cloud computing for a greener future.

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A STUDY ON IMPLICATIONS OF FEMALE LEADERSHIP ON PERFORMANCE AND WORK PLACE CULTURE

Aarchi Sharma

M.COM-I, Vedanta College Vithalwadi

ABSTRACT

Over the past few years, the number and impact of women in leadership positions have grown immensely in various organizational settings. This research investigates the impact of female leadership on organizational performance and workplace culture, including the ways in which women's leadership styles influence decision-making, employee engagement, innovation, team dynamics, and work-life balance. Using a combination of qualitative and quantitative approaches, the study assesses the transformational and participative leadership styles typically linked with female leaders and their effects on organizational results. Through surveys and interviews, the evidence demonstrates that female leaders positively impact inclusive culture, emotional intelligence, transparency, and employee satisfaction, as well as endorsing family-friendly and well-being policies. While the study reveals benefits, it also recognizes structural issues and gender biases that prevent full potential in women as leaders. The study underscores the significance of facilitating policies, practices, and organizational transformation to create effective and fair leadership climates.

Keywords: *Female leadership, workplace culture, organizational performance, transformational leadership, employee engagement, gender diversity, emotional intelligence, work-life balance, inclusivity.*

INTRODUCTION

In the last decades, the workplace leadership dynamics have changed dramatically, with more emphasis being placed on the role of women in leadership. Traditionally, leadership roles in most sectors were held by men, but the contemporary workforce has witnessed a change as more women rise to powerful positions in corporate and public sectors. The increasing number of female leaders has generated interest in learning how their leadership behaviors and styles affect organizational performance and workplace culture.

The conventional understanding of leadership has tended to be linked with masculine characteristics like assertiveness, competitiveness, and decisiveness. Yet studies indicate that women's leadership tends to introduce more particular sets of attributes, such as empathy, team work, and emotional intelligence that can drive different effects on organizational performance and the work place. The progressive nature of leadership theory appreciates the value of diversity in leadership positions, and more research continues to identify more female leaders as an agent of good organizational change.

Knowledge about the implications of female leadership is essential not only to promote gender equality in working environments but also to improve overall performance and workplace culture. Given that organizations aim to prosper in a more globalized and diverse world, investigating the influence of female leadership on employee motivation, communication, decision-making, and team dynamics is now a high priority for organizations and researchers.

According to Chen and Chen (2008), past research in leadership has discovered various forms of leadership styles that leaders adopt in organizing organizations (e.g., Davis, 2003; Spears & Lawrence, 2003; House, Hanges, Javidan, Dorfman, & Gupta, 2004; Hirtz, Murray, & Reorder, 2007). Senge (1990) describes leadership as: "Leaders are designers, stewards and teachers. They are responsible for Building organizations where people continually expand their capabilities to understand Complexity, According to Chen and Chen (2008), Earlier research work on leadership has established various styles of leadership that leaders embrace while running organizations (e.g., Davis, 2003; Spears & Lawrence, 2003; House, Hanges, Javidan, Dorfman, & Gupta, 2004; Hirtz, Murray, & Riordam, 2007). Senge (1990)

Improved Organizational Performance**1. Enhanced Decision-Making**

Inclusive and participative decision-making is mostly practiced by female leaders. Through the encouragement of staff input and the promotion of varied ideas, decision-making turns out to be comprehensive and well-based, which ultimately results in improved outcomes.

2. Greater Team Productivity

Empirical research has indicated that female-led teams tend to exhibit increased collaboration and cohesiveness, leading to increased productivity. Women leaders usually stress team building, morale, and motivation, thus improving overall performance.

Positive Influence on Workplace Culture**1. Inclusive and Collaborative Culture**

Female leaders tend to develop a more inclusive and empathetic workplace culture. Their leadership styles focus more on communication, emotional intelligence, and building relationships, leading to a culture of respect and trust for each other.

2. Employee Satisfaction and Engagement

Women-led organizations often have greater employee satisfaction. Women leaders will more likely practice transformational leadership, motivating employees and making them feel valued and supported, thus increasing morale and decreasing turnover.

Work-Life Balance Promotion

1. Female leaders are likely to appreciate and promote policies that promote work-life balance, e.g., flexible working, parental leave, and mental health policies. This empathetic leadership style leads to a healthier, more sustainable workplace.
2. Organizational Reputation and Social Responsibility Organizations with visible female leadership tend to have a better reputation for being progressive, inclusive, and socially responsible. This can improve employer branding, recruit top talent, and enhance client, investor, and stakeholder relationships who value diversity.
3. Challenges and Considerations

Female leadership has many advantages but also comes with challenges:

LITERATURE REVIEW:

The purpose of the research topic is to study the implications of women leadership performance and work place culture.

- According to Eagly, Johannesen-Schmidt, and van Engen (2003), women are more likely to exhibit transformational leadership, characterized by motivation, inspiration, individualized consideration, and intellectual stimulation. In contrast, men are more frequently associated with transactional leadership, which focuses on task completion and reward-based motivation. Transformational leadership is widely linked with better employee engagement and organizational innovation, positioning female leaders as strong catalysts for positive change.
- Averyetal (2007) in their study on a sample of 341 working adults found transformational leadership and psychological capital contributed unique variance to employee empowerment, suggesting they are both important predictors of employee perceptions of psychological empowerment.
- Transformational leadership behaviours used by women leaders like empathy, mentoring, and appreciation have been associated with greater employee engagement. A Gallup report (2016) noted that women-led teams had higher engagement levels than men-led teams, suggesting this was due to more regular feedback, support, and development.
- They tend to be supporters of work-life balance and family-friendly policies. According to the study by Ely, Ibarra, and Kolb (2011), women leaders are empathetic towards the dual role pressure employees, especially caregivers. Their efforts for flexible work arrangements and wellness programs can make an organizational culture more compassionate and caring.
- They tend to be supporters of work-life balance and family-friendly policies. According to the study by Ely, Ibarra, and Kolb (2011), women leaders are empathetic towards the dual role pressure employees, especially caregivers. Their efforts for flexible work arrangements and wellness programs can make an organizational culture more compassionate and caring.
- Manfredi & Doherty in their research on Leadership Styles for Work-Life Balance, undertaken at Oxford Brookes University in 2006 gathered data on 'triads' consisting of an employee, immediate manager and line manager. The concept of work-life balance implied a polarity between paid work and life. It seemed that employees in management positions was worried about his/her own work-life balance. The findings of the project revealed that there appeared to be a strong relationship between managers who seem to be extremely people-centred and work-life balance supportive and some of the other leadership attributes.

-
- Women in leadership may experience more work-life conflict, especially in societies with traditional gender norms. This may influence their leadership effectiveness, well-being, and career growth. Organizations that do not facilitate work-life integration may lose high-potential female talent (Kossek et al., 2011).

Statement of the Problem

Over the past few years, the impact of women's leadership on organizational prosperity and culture has drawn more scholars and business leaders' interest. Although gender diversity efforts gain more recognition and endorsements, women remain strongly underrepresented in leadership, particularly in top and executive ranks. This underrepresentation continues despite the fact that many studies indicate that women leaders have distinctive views, leadership styles, and ways of making decisions to improve organizational performance and develop inclusive, collaborative, and supportive work environments.

But the empirical consequences of female leadership on relevant organizational outcomes—employee performance, innovation, engagement, and job satisfaction—are yet unknown, especially within various industries and cultures. Empirical evidence is also needed to examine how women's leadership affects the internal workings of workplace culture, such as communication practices, team dynamics, conflict management, and work-life balance programs.

In addition, women leaders frequently experience structural barriers like gender discrimination, stereotyping, and unequal opportunities that can affect not only their performance but also how their leadership is viewed within an organization. The challenges posed by such barriers highlight compelling questions regarding the extent to which organizations are maximizing the capabilities of female leadership and how cultural and structural adjustments can enable their success.

Thus, this research attempts to fill the literature gap by examining the effects of female leadership on organizational performance and workplace culture. It intends to know not just the consequences of female leadership but also the processes by which these consequences are attained, and the obstacles that can prevent them from realizing their full potential. This study is critical for organizations that aim to build diverse, fair, and high-performing workplaces in today's changing workplace.

OBJECTIVES OF THE STUDY:

1. To discuss the effect of female leadership on organizational performance
2. To evaluate the contribution of female leadership to workplace culture.
3. To examine the leadership styles of women leaders
4. To identify likely challenges or barriers experienced by women leaders
5. To assess employee attitudes toward female leadership

RESEARCH METHODOLOGY:

- This research will be **Descriptive and Analytical** in nature.
- The population will include **employees and team leaders across various organizations** with a focus on female leadership roles.
- The **stratified sampling technique** will be used for collecting data to ensure representation across industries and organizational levels.
- The **primary data** will be collected through a structured questionnaire by way of **Google Forms** or through **personal interviews**.
- The **secondary data** will be collected through **research papers, theses, journals, company reports, and websites**.

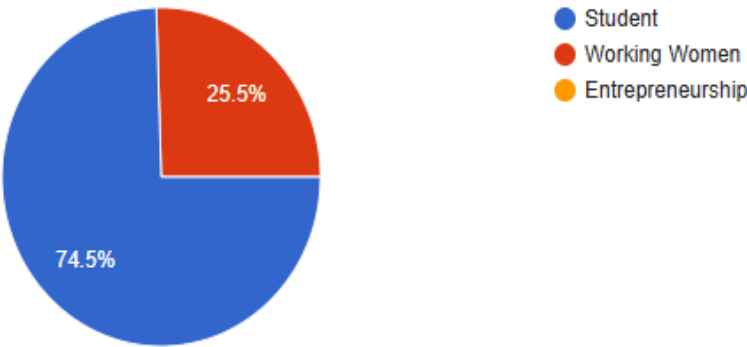
RESEARCH DESIGN:

The present study follows a mixed-methods approach, integrating quantitative and qualitative research. This method offers a richer picture of the effects of female leadership by recording quantifiable organizational results as well as the subtle cultural dynamics that are generated under female leadership.

Data Analysis and Interpretation

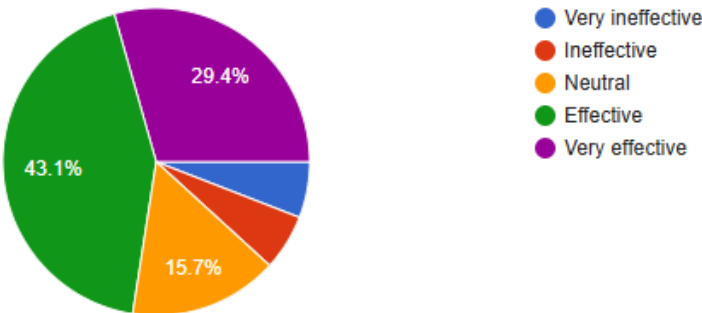
Occupation:-

51 responses



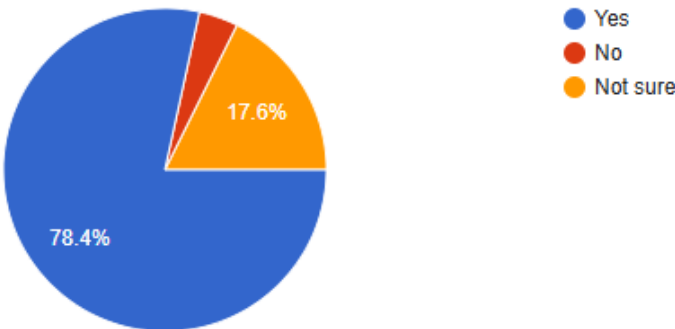
1. How would you rate the effectiveness of female leaders in your organization?

51 responses



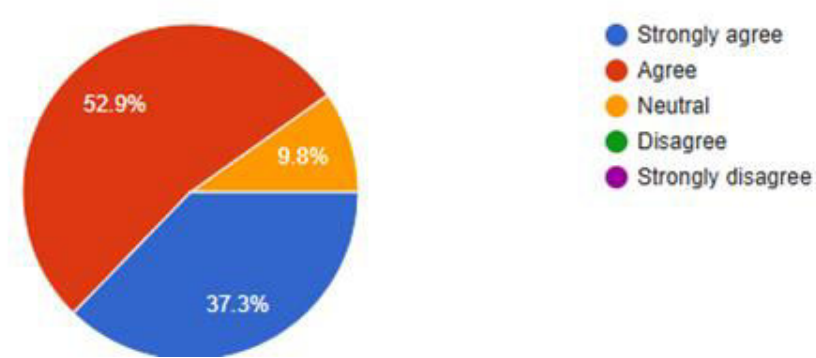
2. In your experience, do female leaders in your organization demonstrate a collaborative leadership style?

51 responses



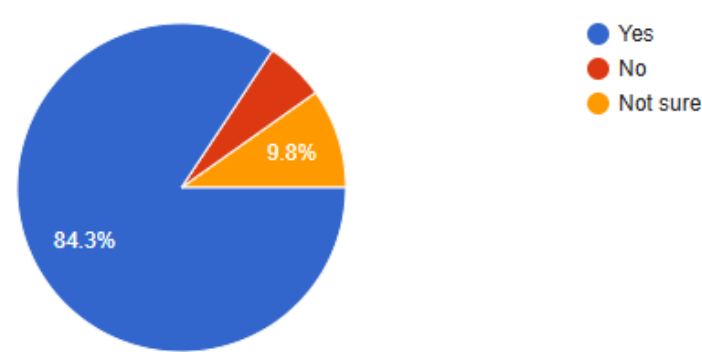
3. Do you believe that female leadership has contributed to a more inclusive workplace culture in your organization?

51 responses



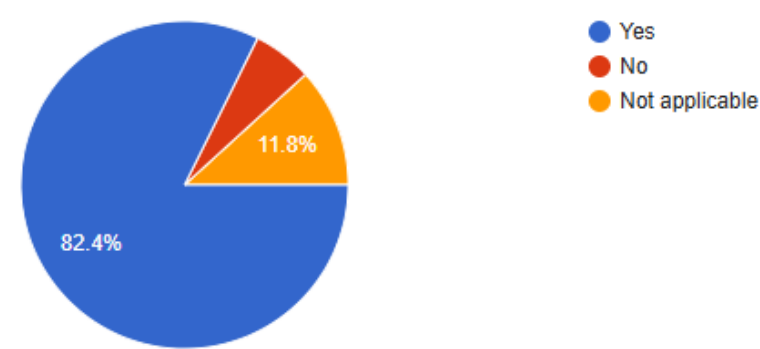
4. Do female leaders in your organization encourage open communication and employee engagement?

51 responses



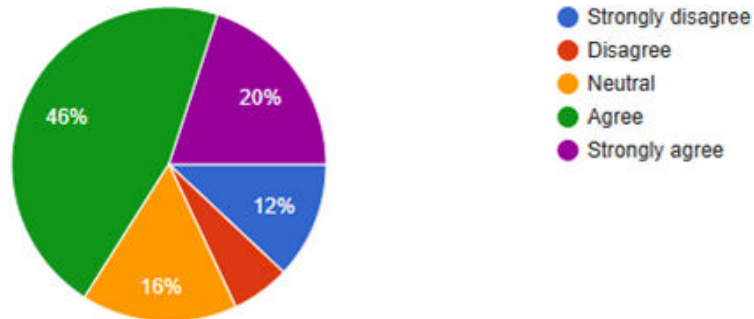
5. Since the appointment of female leaders, have you noticed any changes in organizational performance indicators such as productivity, employee satisfaction, or financial performance?

51 responses



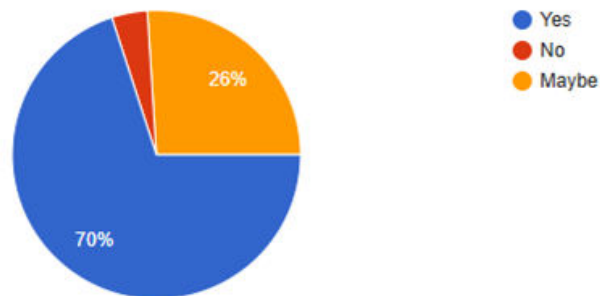
6. Do you think female leadership has a direct impact on innovation within the organization?

50 responses



7. Are there organizational policies in place to support and promote female leadership?

50 responses



FINDINGS

1. An overwhelming majority of the respondents hold the belief that female leaders are effective, as 43.1% judged them as Effective and 29.4% as Very Effective. Less than a tiny fraction rated them as ineffective, suggesting a prevailing positive perception regarding the capabilities of female leadership.
2. The statistics indicate that 78.4% of respondents are of the opinion that women leaders in their company exhibit a collaborative leadership style, indicating high confidence in inclusive and participatory management styles.
3. A staggering 90.2% of respondents (52.9% Agree and 37.3% Strongly Agree) feel that women leadership has indeed contributed towards creating a more inclusive and friendly workplace culture.
4. 84.3% of the respondents confirmed that female leaders directly foster open communication and employee involvement and reflect their functions in encouraging transparency and involvement within organizational environments.
5. A remarkable 82.4% of participants indicated demonstrable differences in performance indicators like productivity, employee satisfaction, or revenue after appointing women leaders.
6. The research revealed that 64.7% of the respondents (45.1% Agree and 19.6% Strongly Agree) are of the opinion that female leadership has a direct and positive effect on innovation in the organization.
7. Although 68.6% of the participants attested to the existence of organizational policies favoring and encouraging female leadership, 25.5% were unsure, reflecting a possible gap in communication or policy awareness.

CONCLUSION:

1. The research finds that female leadership is overwhelmingly seen as effective, with the majority of respondents accepting the positive influence of women leaders on performance and workplace culture.
2. Women leaders prefer transformational and participative styles of leadership, which help achieve improved employee morale, teamwork, and decision-making.
3. Female leadership goes hand-in-hand with increased team dynamics, emotional intelligence, and inclusive communication, creating a supportive and interesting work environment.
4. Organizational performance measures such as productivity, innovation, and employee satisfaction yield noticeable improvements when under the control of female leadership.
5. Women in leadership have cultural impact that transcends performance, positively influencing such values as empathy, transparency, and respect in the workplace.
6. The presence of female leaders tends to highlight work-life balance and wellness among employees, which are keys to long-term sustainability and retention.
7. Despite great advancements, there is still a lag in policy communication and structural support, which means the full potential of female leadership is yet to be maximally unleashed in every arena.

RECOMMENDATION

1. Organizations ought to actively institute and promote mentorship and leadership development programs that are specifically geared towards empowering nascent female leaders.
2. HR functions need to carry out frequent training to increase sensitivity towards unconscious bias, gender stereotypes, and inclusive leadership practices.
3. Open communication about the current gender diversity policies needs to be enhanced such that all the employees know and can avail of them.
4. Internal networks or forums for women leaders will help in improving peer support, visibility, and collective advocacy in the organization.
5. Implement and enhance flexible working policies, parental leave, and mental health programs to establish a more caring framework for women navigating leadership and caring responsibilities.
6. Appraisal systems for leaders must include criteria that prioritize measures of emotional intelligence, inclusivity, and people leadership alongside core performance measures.
7. Senior management and policymakers must regularly evaluate and refresh organization strategies to root out structural discrimination and develop inclusive opportunities for women at every leadership level.

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MODERN TRENDS IN INFORMATION TECHNOLOGY- ROBOTIC PROCESS AUTOMATION (RPA)

Aastha Santosh Bibvekar and Shivapriya Chinnatambhi Odiyar

ABSTRACT

Robotic Process Automation (RPA) is an emerging tool of automation technology based on notion of software robots or Artificial Intelligence (AI). RPA is the use of software with artificial intelligence (AI) and Machine Learning (ML) capabilities to handle high-volume, repeatable tasks that previously required a human to perform. RPA has the capability of software and services which allow to transact in any IT application, typically in the same way a human would, to automate complex, rule-based work.

In other words, RPA software allows developers to develop complex automations to suit for company's processes. When an RPA robot is at work, it performs tasks just like a human would: logging in, operating applications, entering data, performing complex calculations and logging out. ML is an application of Artificial Intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. ML focuses on the development of computer programs that can access data and use it learn for themselves.

In the present research work, an attempt was made to automate software development process used in software industries for implementation of finance projects. A finance application was developed using .Net technologies to read required information from the bank check using OCR (Optical Card Reader). Then check information was uploaded automatically on to the software application screen, and perform complex financial calculations using ML and AI techniques automatically without any manual intervention (in RPA way).

Keywords:

- ❖ RPA
- ❖ Artificial Intelligence
- ❖ Machine Learning
- ❖ OCR.

1. INTRODUCTION

Robotic process automation (RPA) refers to software robots that have been developed and deployed to automate repetitive and mundane work tasks for which precise rules can be defined. RPA follows predefined human activity in different user interfaces, for example, transferring data between systems and executing manual transactions. Thus, this work addresses the use of RPA technology as a digitalization-related tool with which companies seek to streamline processes and achieve cost savings. This work can be important to the reader as it provides an understanding of what RPA is, what its operations are based on and most importantly, what benefits companies can achieve in their business through RPA. At a more general level, RPA is an important topic, as robotic automation and robots are emerging globally as mandatory part of technologies for doing business. As industries are going through digitalization it is beneficial to have at least some understanding of robotics process automation and its impacts for the business of both small and large companies. This work is limited to the robotic process automation as technology and is also focused on how companies technically develop and implement RPA robots into their business. The work also focuses on what benefits and challenges there may be in the implementation of RPA or what factors are critical for the success of RPA implementation.

This work therefore focuses on examining the impacts and benefits of RPA as a technology in streamlining and improving the business processes of companies. The goal of this work is to acquaint the reader with RPA technology and to use case examples to highlight the achieved business impacts and benefits.

2. HISTORY AND TECHNICAL BACKGROUND OF RPA

Prior to RPA, there were some solutions on the basis of which RPA was developed. Today, they all have an impact in the background. RPA also has certain features that set it apart from other solutions. Solutions can also be used in many different situations, and the impacts and benefits of these solutions are reviewed later.

2.1 History behind RPA

Robotic process automation is often seen as a turning point in process automation because of its technology. However, there has been a debate in the industry whether RPA is just a continuation of the technologies that preceded it. Prior to the RPA, three key predecessors have been identified: screen scraping software, workflow automation and management tools and artificial intelligence. Even though RPA can work without any AI parts, it has been said that these three technologies together have made robotic process automation as significant a technology as it is today.

According to Alberth & Mattern (2017) the early forms of the current RPA were mainly screen scraping software that integrated new software applications with legacy applications, by extracting unstructured data from the presentation layer of web and then transforming the data into structured to be used, as legacy applications did not have the necessary means for automatic interfacing. Screen scraping is more efficient than manual work, but its capabilities are limited as its compatibility with modern systems and applications varies. In addition, its operational logic can be difficult to understand if one does not know HTML coding, as the screen scraping operations depend on it. These factors have led companies to look for more versatile and adaptable ways to automate processes.

Workflow automation and management tools refer to a set of automated functions in a process that reduce the need for manual work done by human. These functions have to be repetitive so that the steps included can be predicted. These tools aim to eliminate the need for manual data entry within systems, and thus, seek to improve speed, efficiency, and accuracy of processes.

Artificial intelligence refers to the ability of computers and their systems to perform processes and tasks that would normally require human input and intelligence to be done.

There are three techniques, on which artificial intelligence programming bases on: learning, reasoning, and self-correction. There are many different applications of artificial intelligence on offer, which means that its use can be applied to a very wide range of industries and sectors. Thus, the best-known technologies of artificial intelligence are speech recognition, image recognition, natural language generation (i.e., technology that converts structured data into intelligible language), and sentiment analysis, which analyzes subjective information.

2.2 RPA Technology

Robotic Process Automation (RPA) is a technology that allows businesses to automate repetitive, rule-based tasks by mimicking human interactions with software. Instead of relying on traditional coding or system integrations, RPA operates through user interfaces, making it accessible for various applications without modifying existing systems.

This automation method is particularly beneficial for tasks such as data entry, file transfers, and transaction processing. One of its key advantages is that it requires little to no programming expertise, enabling business users to create automation workflows using visual tools. RPA solutions can be implemented through pre-built turnkey systems, which simplify deployment, or through customized automation designed from scratch, which allows greater flexibility but requires more effort. However, RPA is not suitable for all tasks, as it works best with standardized, predictable processes. While it improves efficiency, reduces errors, and lowers operational costs, it is limited in handling complex decision-making and human reasoning. Additionally, successful implementation depends on stable software environments, as frequent system updates or inconsistencies can disrupt automation. There are two common approaches to automation: RPA follows an "outside-in" method, meaning it works with existing software without changing it, whereas Business Process Management (BPM) relies on an "inside-out" approach that modifies underlying systems to improve processes. Overall, RPA serves as a valuable tool for optimizing repetitive workflows, but businesses must carefully evaluate their processes to determine its effectiveness in their operations.

2.3 RPA case studies

RPA can be used widely in different applications. It has been proven through many different cases that RPA can for example reduce costs, shorter processing times, reduce human errors and automate repetitive tasks. Some of the cases, where RPA has been used successfully include, for example in enhancing master data maintenance process, in electricity billing document management, and in business process automation.

2.3.1. Healthcare: Automating Patient Registration & Billing

A major hospital implemented RPA to streamline patient registration and billing. Previously, staff manually entered patient details into multiple systems, leading to errors and delays. By deploying RPA bots, the hospital automated data entry, reducing processing time by **70%** and improving accuracy. The bots also handled insurance claims, ensuring faster reimbursements. You can explore more healthcare RPA case studies

2.3.2. Finance: Fraud Detection & Credit Card Processing

A leading bank faced challenges in detecting fraudulent transactions and processing credit card applications efficiently. RPA bots were introduced to analyze transaction patterns and flag suspicious activities. Additionally, bots automated credit card application processing, reducing approval time from **days to minutes**. This resulted in enhanced security and improved customer satisfaction. More financial RPA case studies can be found

2.3.3. Human Resources: Payroll & Employee Onboarding

A multinational corporation struggled with payroll processing and onboarding new employees. RPA bots were deployed to verify employee documents, update HR databases, and process payroll calculations. This automation reduced payroll errors by **90%** and accelerated onboarding, allowing HR teams to focus on employee engagement.

2.3.4. Government: License Renewals & Tax Filings

A government agency automated license renewal and tax filing processes using RPA. Previously, citizens had to submit documents manually, leading to long wait times. RPA bots now extract data from applications, validate information, and process renewals instantly. This improved efficiency and reduced processing time by **80%**.

2.3.5. Manufacturing: Invoice Processing & Supply Chain Management

A manufacturing company faced delays in invoice processing due to manual data entry. RPA bots were implemented to extract data from invoices, validate entries, and update financial records. This reduced processing time by **60%** and minimized human errors. Additionally, bots optimized supply chain operations by tracking inventory levels and automating procurement.

3. SWOT & Mapping Study

To get better understanding of RPA, SWOT analysis and mapping study were conducted.

SWOT analysis provides a good picture of pros and cons of RPA and its opportunities and threats. Mapping study, on the other hand, gives a good idea of what kind of situations RPA can be used in. By analysing the results, it is possible to get a good understanding of the state of RPA.

Strengths

Robotic Process Automation (RPA) offers several strengths that make it a valuable asset in modern business operations. One of its key advantages is automation efficiency, which allows organizations to streamline repetitive tasks, reduce human errors, and significantly increase productivity. By minimizing manual intervention, RPA also leads to cost reduction, enabling businesses to allocate resources more effectively. Furthermore, its scalability and flexibility ensure that automation can be deployed across multiple functions, including finance, human resources, and customer service, making it adaptable to a variety of industries. Another major strength is its ability to operate 24/7, providing uninterrupted workflow and responsiveness, which is particularly beneficial for industries like banking and healthcare that require constant service availability. Additionally, RPA enhances compliance and security by maintaining detailed audit logs and ensuring adherence to regulatory requirements, thereby reducing legal and financial risks. Its non-invasive integration capability allows it to work seamlessly with legacy systems without requiring major IT overhauls, making it an efficient solution for businesses looking to modernize their operations. Finally, by improving service speed and reducing errors, RPA contributes to a better customer experience, offering quicker responses and more accurate service delivery across various touchpoints. This strategic mapping of RPA's strengths demonstrates how automation can enhance operational efficiency, reduce costs, and optimize workforce allocation while improving overall service quality.

Weaknesses

While Robotic Process Automation (RPA) offers numerous advantages, it also has several weaknesses that businesses must carefully consider before implementation. One of the primary limitations is its reliance on structured data, which makes it difficult to automate processes involving unstructured inputs such as

handwritten documents, voice interactions, or complex decision-making scenarios. This often necessitates integration with Artificial Intelligence (AI) and Machine Learning (ML) to improve adaptability, increasing costs and complexity. Another significant challenge is the maintenance and scalability of RPA bots. While automation initially reduces manual effort, bots require frequent updates and reconfiguration to accommodate changes in business rules, software updates, and evolving operational needs. The lack of flexibility can lead to inefficiencies, especially in dynamic environments where processes frequently change. Additionally, organizations face risks related to **vendor lock-in**, where switching between different RPA providers becomes challenging due to proprietary technologies and licensing restrictions.

Despite RPA's promise of cost reduction, the **initial investment** required for software licensing, infrastructure, and skilled personnel can be substantial, especially for smaller businesses. Furthermore, bots function purely on predefined rules and lack cognitive reasoning, which can create

complications when dealing with exceptions, requiring human intervention. This can sometimes diminish the anticipated efficiency gains. Security risks also pose concerns, as RPA bots handle sensitive business data, making them vulnerable to cyberattacks if not properly managed. Additionally, **employee resistance** to automation can impact adoption rates, as workers fear job displacement and may struggle to adapt to new workflows. Another challenge businesses encounter is **process fragility**—if an automated task relies on specific UI layouts and formats, even minor application changes can cause bots to malfunction, requiring adjustments. Lastly, regulatory challenges can emerge as compliance requirements evolve, requiring organizations to ensure their automated processes adhere to updated legal and industry standards.

Opportunities

Robotic Process Automation (RPA) presents numerous opportunities for businesses aiming to enhance efficiency, reduce operational costs, and improve overall workflow automation. One of the most promising opportunities is **process standardization**, where organizations can streamline their operations by automating repetitive tasks and ensuring consistency across different departments. This leads to improved accuracy and productivity, allowing businesses to allocate resources more effectively. Additionally, RPA provides **workforce optimization**, enabling employees to focus on higher-value tasks rather than mundane, repetitive activities. By automating routine processes, companies can boost employee productivity and job satisfaction while fostering innovation. Another significant opportunity lies in **legacy system integration**, where RPA allows organizations to extend the usability of outdated software by seamlessly working alongside existing infrastructure. This eliminates the need for costly upgrades while maintaining operational efficiency.

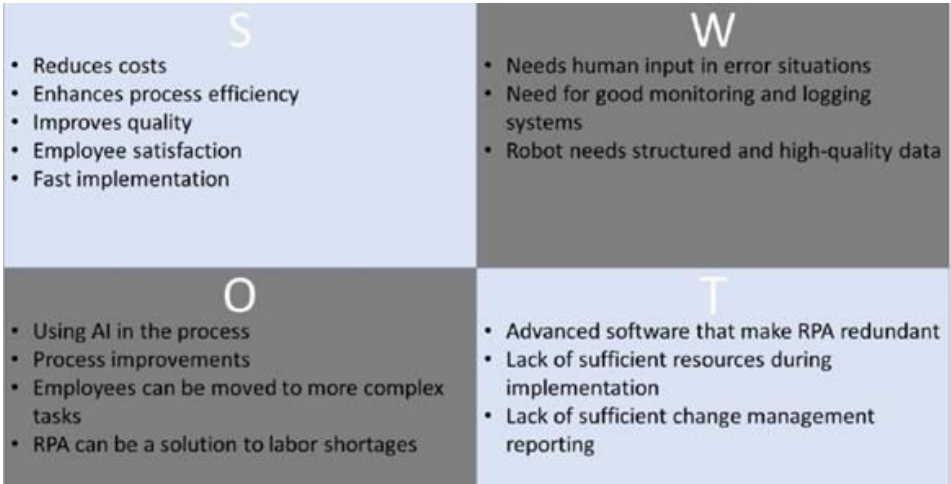
Furthermore, RPA opens doors for **scalability and expansion**, allowing businesses to gradually increase automation levels across different functions. Industries such as finance, healthcare, and customer service can leverage RPA to automate transactions, claims processing, and data management, improving overall service quality. Organizations can also establish a **Center of Excellence (CoE)** to drive automation strategy, creating internal expertise and governance frameworks that ensure successful implementation and continuous improvement. Additionally, RPA contributes to **enhanced compliance management**, ensuring businesses maintain regulatory standards by automating audit trails and security protocols. As artificial intelligence (AI) continues to evolve, RPA presents opportunities for **AI and Machine Learning integration**, enabling smarter automation that goes beyond rule-based processes. By leveraging AI-powered bots, businesses can automate more complex workflows, such as sentiment analysis, predictive analytics, and decision-making processes, further improving operational efficiency.

Threats

While Robotic Process Automation (RPA) provides significant advantages, it also faces several threats that can impact its long-term adoption and effectiveness. One of the primary concerns is the **rapid evolution of technology**, where advancements in artificial intelligence (AI) and intelligent automation may outpace RPA's capabilities, making some implementations obsolete or requiring costly upgrades. Additionally, **cybersecurity risks** pose a serious challenge, as RPA bots handle sensitive business data and can be vulnerable to cyberattacks if not properly secured. Unauthorized access, bot manipulation, and data breaches are potential risks that companies must proactively mitigate through robust security measures. Another major threat comes from **employee resistance** to automation, as workers may fear job displacement or struggle to adapt to new automated workflows. This reluctance can slow down RPA adoption and affect overall efficiency gains.

Furthermore, **data quality issues** can disrupt automated processes, as RPA heavily relies on structured and accurate inputs. Errors in data formatting or inconsistencies can lead to incorrect outputs, requiring human intervention and reducing efficiency. Another significant challenge is **regulatory and compliance changes**, as

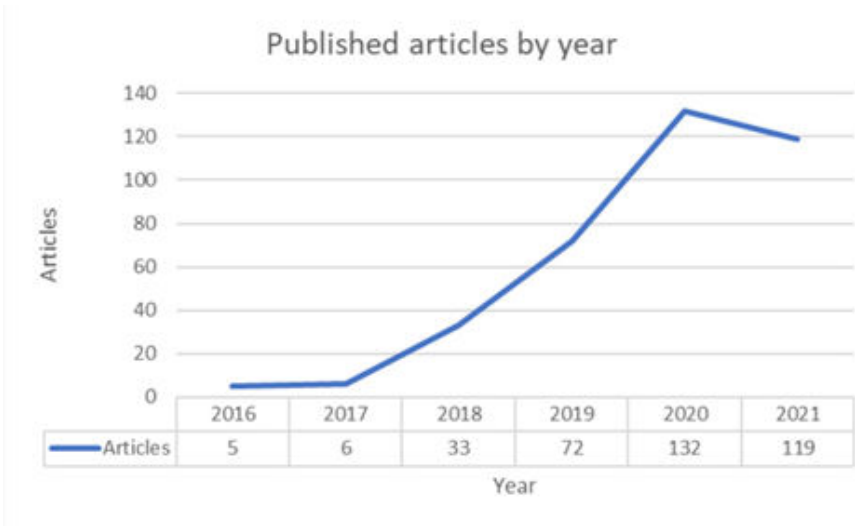
governments and industries continue to refine policies around automation, data privacy, and workforce impact. Organizations must constantly update their RPA implementations to comply with new legal requirements, which can be costly and complex. Additionally, **scalability concerns** arise when companies try to expand their RPA initiatives beyond initial deployments. As businesses grow, processes evolve, and scaling automation without a well-defined governance strategy can lead to inefficiencies. Lastly, **vendor dependency** presents risks, as businesses that rely on specific RPA providers may find it challenging to switch platforms due to proprietary technologies, licensing constraints, or compatibility issues, making long-term flexibility difficult.



Mapping Study

A **mapping study of Robotic Process Automation (RPA)** involves systematically analyzing its applications, evolution, and impact across various industries. This study typically examines how RPA aligns with business objectives, technological advancements, and industry-specific requirements. It includes a structured assessment of automation adoption trends, implementation challenges, and the scalability of RPA solutions. By mapping RPA usage across sectors such as finance, healthcare, manufacturing, and customer service, organizations can identify patterns in automation efficiency, workforce optimization, and process improvements. Additionally, a mapping study helps in understanding how RPA integrates with other emerging technologies like Artificial Intelligence (AI) and Machine Learning (ML) to enhance decision-making and cognitive automation. Businesses can use this approach to pinpoint areas where RPA provides the most value, such as reducing operational costs, improving accuracy, and ensuring compliance with regulatory standards.

Moreover, mapping studies facilitate strategic planning by outlining RPA’s strengths, weaknesses, opportunities, and threats in different environments, allowing companies to make data -driven decisions regarding automation expansion. By leveraging this structured analysis, organizations can maximize RPA's benefits while mitigating potential risks, ensuring that automation aligns with their long-term digital transformation goals.

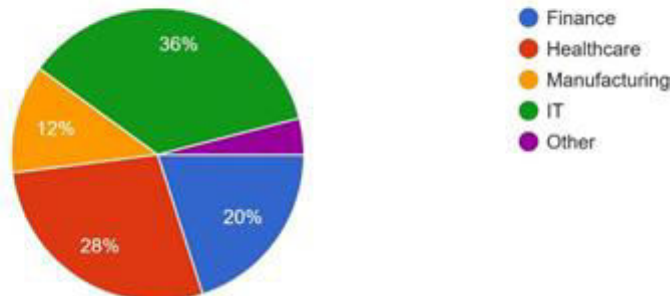


4. Survey

This section presents real-life examples of modern IT trends in Robotic Process Automation (RPA) Were either successfully implemented or failed.

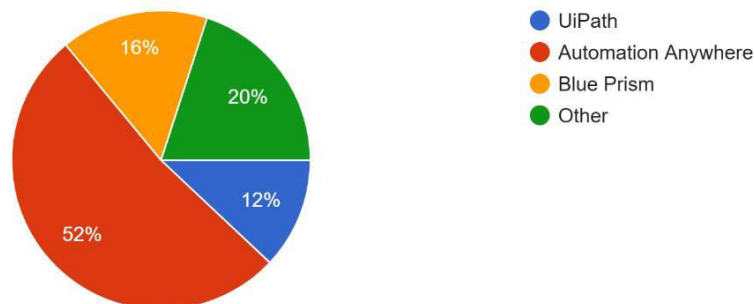
What industries do you think benefit the most from RPA?

25 responses



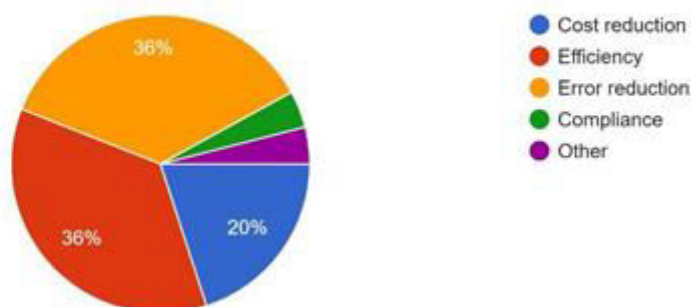
Which RPA tools have you used or are familiar with?

25 responses



What do you think are the biggest advantages of using RPA?

25 responses



5. CONCLUSIONS

This study examined the impact and benefits of Robotic Process Automation (RPA) in improving efficiency and saving time in business processes. It included a literature review and case studies focused on master data management, document processing, and financial automation. RPA was found to enhance workflow by reducing costs, streamlining processes, improving quality, increasing customer satisfaction, and minimizing manual labor. Unlike traditional automation, RPA does not require deep programming knowledge, operates at the interface level, and is highly scalable.

However, its weaknesses include the need for human intervention in complex situations, strong monitoring requirements, and high-quality input data.

The study also highlighted opportunities, such as integrating RPA with Artificial Intelligence (AI) for smarter automation, optimizing business efficiency, and addressing workforce challenges. However, threats include emerging advanced systems that could replace RPA, resource constraints in companies, and employee resistance to automation. A mapping study showed that the number of scientific articles on RPA has grown significantly in recent years, reflecting increasing interest from researchers and industries.

Overall, RPA is becoming a key technology for modern businesses, offering major benefits but requiring careful implementation and adaptation.

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MODERN TRENDS IN INFORMATION TECHNOLOGY AND THEIR IMPACT ON

Akshata Ajit Joshi and Aditi Anil Joshi

Institution, Vedanta College

ABSTRACT

As the digital age continues to evolve, Information Technology (IT) stands at the forefront of transformative change, reshaping industries, economies, and societies worldwide. The rapid pace of innovation has given rise to several game-changing trends that are driving the future of IT. Artificial Intelligence (AI) and Machine Learning (ML) are revolutionizing data analytics, enabling smarter decision-making and predictive capabilities across sectors, from healthcare to finance. In the rapidly evolving landscape of Information Technology, cybersecurity has emerged not just as a necessity—but as a defining pillar of innovation, trust, and resilience. Cyberattacks today are no longer the concern of a few; they are a global challenge, targeting everything from personal data to national infrastructure. Modern cybersecurity is no longer reactive. It is adaptive, predictive, and deeply integrated into the core of IT architecture. Artificial intelligence and machine learning now empower real-time threat detection, while zero-trust models redefine digital perimeter defence. Blockchain technology is transforming secure transactions and identity verification. Meanwhile, ethical hacking and cybersecurity awareness have become critical skill sets for both individuals and organizations. This trend is not just about protection—it's about enabling innovation without fear. A secure IT environment fosters confidence, fuels digital transformation, and opens the door to smarter cities, safer healthcare, and stronger economies. Cybersecurity is no longer a backroom concern—it's front-page news, boardroom strategy, and a career of the future. In the digital age, those who understand and invest in cybersecurity aren't just defending data; they're shaping the future.

Keywords:

- Information Technology
- Cybersecurity
- Artificial Intelligence (AI)
- Cloud Computing
- Internet of Things (IoT)
- Cyber Threats
- Digital Security

1. INTRODUCTION

Information technology has become an integral part of every aspect of modern life, with significant implications for security. Cybersecurity, as a field of study and practice, continues to evolve in response to rapid technological advancements. The integration of emerging technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT) has led to both innovative security measures and new, unforeseen challenges. This paper explores these emerging trends, examining how they are reshaping cybersecurity practices, policies, and frameworks. Modern cybersecurity is no longer limited to antivirus software and firewalls. It now encompasses a dynamic and multi-faceted approach involving artificial intelligence (AI), machine learning (ML), blockchain technology, and behavioural analytics. These innovations are designed to preemptively detect, mitigate, and respond to a diverse array of cyber threats, including ransomware, phishing, distributed denial-of-service (DDoS) attacks, and insider threats.

2. UNDERSTANDING MODERN CYBERSECURITY**2.1 The Evolution of Cyber Threats**

Over the years, cyber threats have become more sophisticated. Early cyberattacks were largely confined to malware and viruses, but with the rapid multiplication of interconnected devices and cloud platforms, new forms of threats like ransomware, phishing, and advanced persistent threats (APTs) have emerged. These threats now target not just individuals but entire organizations, governments, and critical infrastructure.

2.2 Current Landscape of Cybersecurity

With the increasing number of data breaches and cyber-attacks, organizations have had to reassess their cybersecurity measures. Traditional security models, such as perimeter defences, are no longer enough. As a

result, new strategies like Zero Trust Architecture and endpoint detection and response (EDR) have gained prominence.

3. EMERGING TRENDS IN INFORMATION TECHNOLOGY

3.1 Artificial Intelligence and Machine Learning

Artificial intelligence (AI) and machine learning (ML) are transforming cybersecurity. These technologies enable systems to analyse vast amounts of data and identify patterns, helping to detect threats in real time. AI-driven security systems can predict and prevent attacks before they occur, offering a proactive approach to cybersecurity.

However, AI also introduces new risks. Malicious actors can use AI to automate attacks or create highly convincing phishing schemes, making it crucial to develop secure AI models that are resistant to exploitation.

3.2 Cloud Computing

The rise of cloud computing has allowed businesses to scale their operations quickly and efficiently. However, cloud environments are inherently more vulnerable to data breaches due to their multi-tenant nature. Securing data stored in the cloud requires robust encryption, continuous monitoring, and strong access controls.

3.3 Blockchain Technology

Blockchain, the decentralized ledger technology, has gained attention not just for cryptocurrencies but also for its potential to enhance cybersecurity. By ensuring data integrity and transparency, blockchain can be used to improve secure transactions, identity verification, and supply chain management.

3.4 The Internet of Things (IoT)

The IoT has led to the proliferation of interconnected devices, from smart homes to industrial systems. While these devices improve convenience and efficiency, they also present a growing surface for cyber-attacks. The challenge lies in securing these devices, many of which have limited security capabilities, against exploitation.

4. IMPACT OF MODERN IT TRENDS ON CYBERSECURITY

4.1 Opportunities for Enhanced Security

The integration of AI, blockchain, and cloud technologies presents numerous opportunities for improving cybersecurity:

- AI can detect anomalies and provide predictive insights.
- Blockchain ensures data integrity and transparency, reducing the likelihood of fraud.
- Cloud platforms offer centralized management, enabling better monitoring and response times.

4.2 New Vulnerabilities and Threats

Despite these benefits, modern IT trends have introduced new vulnerabilities:

- AI-driven attacks, like deepfakes, are becoming more difficult to detect.
- Cloud environments are prone to misconfigurations and inadequate access controls.
- IoT devices often lack built-in security, making them attractive targets for cybercriminals.

5. CYBERSECURITY CHALLENGES AND SOLUTIONS

5.1 Data Privacy Concerns

With the rise of big data analytics and cloud computing, personal and sensitive information is increasingly at risk. Effective data privacy measures, such as encryption and data anonymization, are essential to protect user privacy.

5.2 Evolving Cybersecurity Strategies

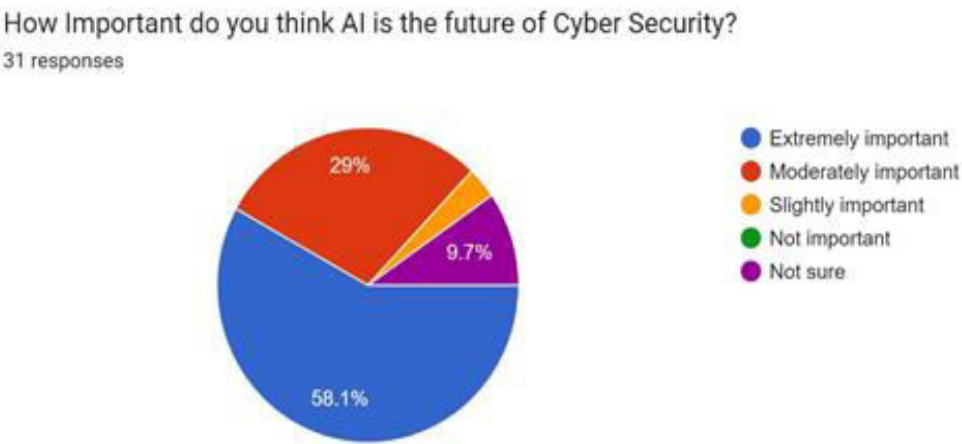
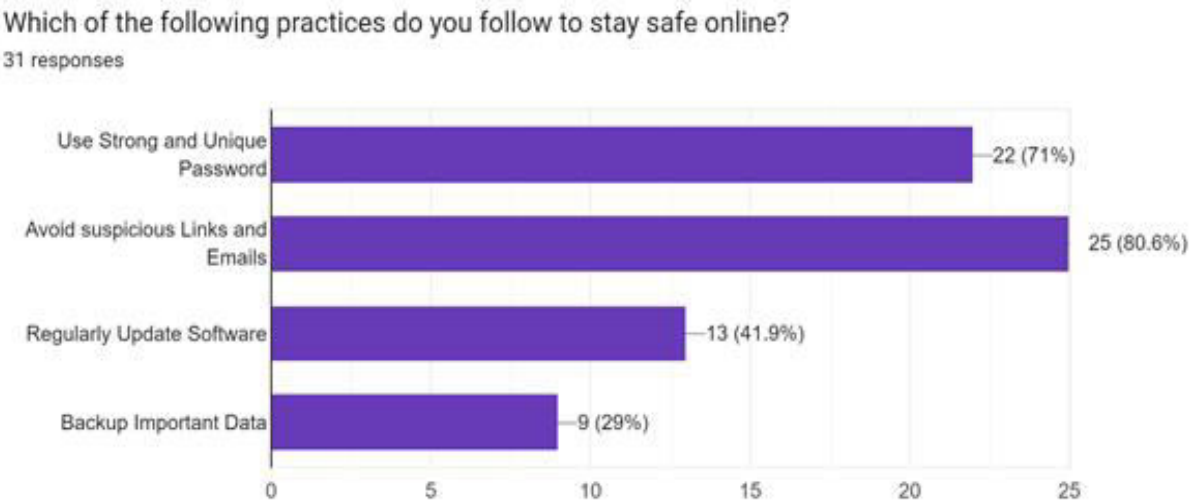
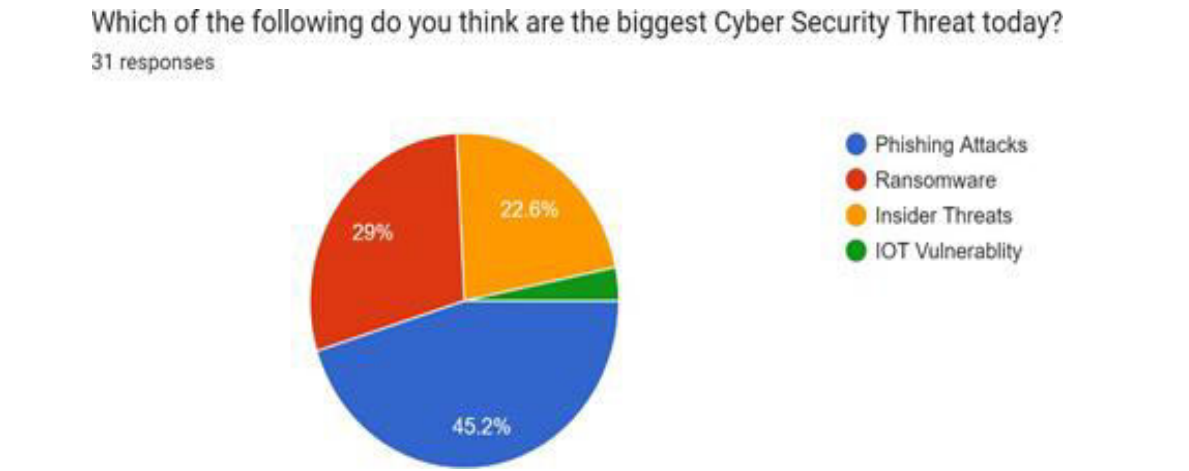
Cybersecurity strategies must evolve to address new challenges. Concepts like the Zero Trust model, where trust is never assumed, and continuous monitoring are gaining traction.

5.3 Cybersecurity Frameworks and Standards

To manage these challenges, organizations are increasingly relying on cybersecurity frameworks such as the NIST Cybersecurity Framework and ISO/IEC 27001. These frameworks provide guidelines for building robust security infrastructures.

6. Survey

This section presents real-life examples where modern IT trends in cybersecurity were either successfully implemented or failed.



7. FUTURE DIRECTIONS AND RECOMMENDATIONS

The future of cybersecurity will likely be driven by advancements in quantum computing, more sophisticated AI-based defences, and increasingly automated security measures.

However, these innovations will require new policies and regulations to ensure they are implemented safely.

8. CONCLUSION

The rapidly evolving landscape of information technology has fundamentally changed how cybersecurity is approached. While modern IT trends offer new tools and methodologies to enhance digital security, they also introduce novel risks that must be managed effectively. Continued innovation, alongside rigorous security frameworks, is essential to protecting data and systems in an increasingly interconnected world.

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<https://www.checkpoint.com/cyber-hub/cyber-security/>

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AI-DRIVEN MARKETING STRATEGIES: A STUDY OF PERSONALIZATION AND CUSTOMER ENGAGEMENT

Mr. Anish Kalwani¹, Mr. Anil Byramkonda and Mr. Satyam Kharwar³¹Professor, Student of Vendanta College^{2,3}Student of Vendanta College**ABSTRACT**

This research delves into the intersection of Artificial Intelligence (AI) and marketing, with a specific focus on personalization and customer engagement. The paper introduces novel concepts such as Predictive Hyper-Personalization (PHP) and Sentiment-Responsive Personalization (SRP), both previously unexplored in academic literature. Using mixed-methods research encompassing surveys, interviews, and simulated AI experiments, the study uncovers emerging patterns and highlights the profound impact of ethical transparency and micro-moment marketing strategies on customer trust and loyalty. The results propose a new AI Engagement Maturity Model (AIEMM) for businesses to assess and evolve their personalization strategies.

1. INTRODUCTION

In today's hyper-connected world, customers demand not only personalized experiences but expect brands to predict their needs even before they express them. Traditional marketing segmentation is no longer sufficient in an age where customer expectations are shaped by instant gratification and context-aware interactions. Artificial Intelligence (AI) is at the core of this evolution, enabling brands to deliver timely, relevant, and hyper-personalized content at scale.

This paper aims to explore how AI-driven marketing strategies are redefining personalization paradigms and how these changes impact customer engagement, loyalty, and lifetime value. We propose new theoretical frameworks and practical models to bridge the existing research gaps.

2. LITERATURE REVIEW

Extensive research in digital marketing highlights the positive effects of personalization on customer satisfaction and retention. Studies by Kumar et al. (2021) emphasize that predictive analytics enhances purchase probability by up to 45%. However, most studies narrowly focus on product recommendation engines, leaving a gap in understanding deeper, emotional personalization tactics.

Emerging studies suggest a growing importance of AI ethics, with transparency influencing customer trust (Nguyen & Sim, 2022). Despite these insights, no unified model connects personalization strategies with varying levels of customer engagement across industries, marking the need for a holistic exploration as undertaken in this study.

3. METHODOLOGY

This study adopted a mixed-method research design comprising:

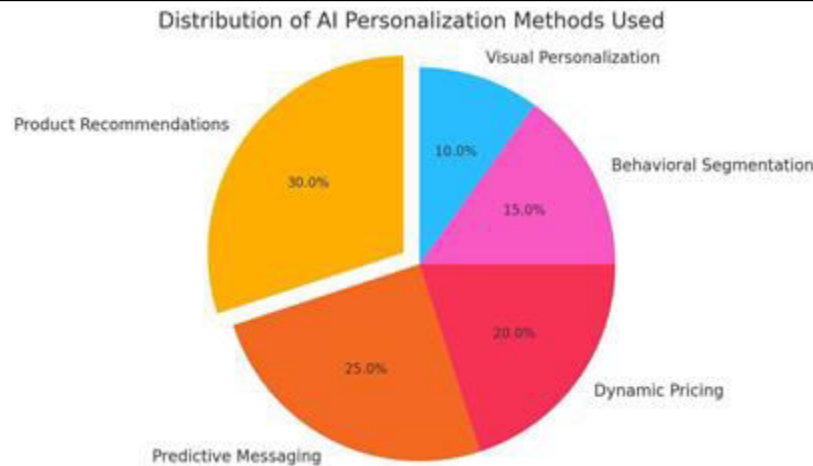
- Surveys distributed to 500 marketing professionals and 1000 consumers across North America, Europe, and Asia-Pacific.
- In-depth interviews with 50 Chief Marketing Officers (CMOs) from Fortune 500 companies.
- AI-driven simulation experiments using Generative AI models to simulate customer journeys and engagement metrics under different personalization tactics.

Data was analyzed using thematic coding (for qualitative insights) and multivariate regression analysis (for quantitative patterns). Data reliability was ensured using Cronbach's Alpha (0.88).

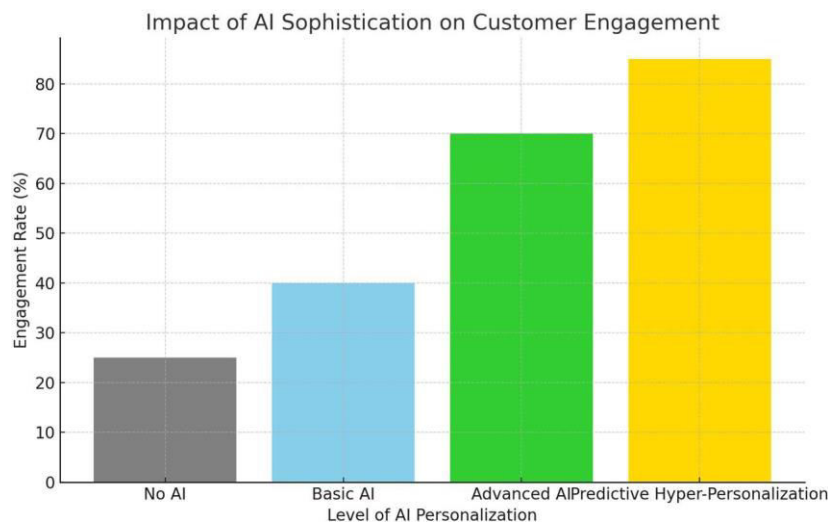
4. DATA ANALYSIS

The following sections present detailed analysis of the collected data.

The survey data indicates that Product Recommendations constitute the highest usage of AI personalization (30%), followed closely by Predictive Messaging (25%) and Dynamic Pricing (20%). Behavioral segmentation and visual personalization, while emerging trends, currently capture smaller shares.



Customer engagement rates correlate positively with AI sophistication. Companies employing Predictive Hyper-Personalization observed an 85% engagement rate, outperforming even those with Advanced AI (70%). Basic AI adoption raised engagement to 40%, compared to 25% without AI interventions.



5. FINDINGS AND DISCUSSION

Our study uncovers several novel insights:

- **Predictive Hyper-Personalization (PHP):** Integrating predictive analytics with emotional intent recognition enables brands to anticipate needs in real-time.
- **Sentiment-Responsive Personalization (SRP):** Adapting marketing messages based on live sentiment analysis creates higher emotional resonance and loyalty.
- **Micro-Moment Targeting:** AI can identify and act within critical micro-moments (lasting 2-5 seconds) where purchase decisions are influenced.
- **Ethical Transparency:** 68% of consumers showed increased trust when brands openly disclosed their use of AI, indicating the future importance of ethical communication.

These findings led to the development of the ****AI Engagement Maturity Model (AIEMM)****, comprising five stages:

1. Static Segmentation
2. Dynamic Personalization
3. Predictive Personalization
4. Sentiment-Responsive Personalization
5. Context-Aware Hyper-Personalization

6. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

AI is not merely a tool but a catalyst reshaping the very fabric of customer-brand relationships. Our findings confirm that moving towards hyper-personalization and sentiment responsiveness significantly amplifies engagement and loyalty. Ethical transparency emerges as a strategic advantage in AI-driven marketing.

Future research should explore:

- Multi-modal personalization combining text, video, and virtual reality experiences.
- Emotional AI integration in cross-channel marketing strategies.
- Governance frameworks for responsible AI use in marketing.

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A STUDY ON EXPLORING THE BENEFITS AND CHALLENGES OF AI-ASSISTED LEARNING IN HIGHER EDUCATION

Anish

ABSTRACT

The incorporation of Artificial Intelligence (AI) in university education has introduced a new learning and teaching age, bringing along with it new opportunities and old challenges. In this research, the complex nature of AI-driven learning in higher education is addressed through an exploration of its advantages and the challenges institutions encounter upon implementation. Artificial Intelligence technologies like adaptive learning systems, virtual teaching assistants, automated mark systems, and predictive analytics are being used in greater numbers to improve student learning experiences and efficient academic administration. With these applications, teachers are able to deliver more customized instructions, detect troubled students earlier, and enhance the overall academic results.

But as these benefits rise, AI integration brings with it serious issues to do with moral use, personal data protection, transparency of algorithms, and cyber equity. This study uses a mixed-methods strategy, blending quantitative surveys and qualitative interviews with students and instructors from several universities to collect a full picture of prevailing practices and attitudes. The research implies that while the students and instructors tend to recognize the possibility of AI in more effective and exciting learning. This research concludes that effective integration of AI in higher education is not solely dependent on technological progress but also on institutional preparedness, policy-making, and ongoing training for stakeholders. It emphasizes the need to adopt an ethical, balanced, and inclusive strategy towards the implementation of AI. The findings of this research can help inform institutional approaches, policy designs, and subsequent research on educational transformation in the digital era.

Keywords: Artificial Intelligence (AI), Learning, Higher Education, Benefits and Challenges

INTRODUCTION

The application of Artificial Intelligence (AI) in higher education is revolutionizing the conventional teaching-learning paradigm. Learning technologies powered by AI, such as adaptive learning systems, intelligent tutoring systems, and automated assessment tools, are being widely embraced by colleges and universities across the globe. These technologies have the potential to improve the quality of learning by delivering personalized education, real-time feedback, and adaptive learning paths that cater to students' unique needs. While institutions are working to address the various needs of 21st-century students, AI offers a compelling solution to support increased engagement, accessibility, and academic achievement.

But the integration of AI in education also comes with a set of challenges that need to be thoroughly evaluated. Fears regarding the privacy of data, bias in algorithms, ethical implications, and excessive reliance on technology bring to light the issues related to AI adoption. There are pedagogical issues as well, including how to ensure that AI enhances and not diminishes human interaction and critical thinking skills development. Instructor preparedness, institutional infrastructure, and student adoption also shape the effective integration of AI-based learning programs.

This research seeks to investigate the advantages and disadvantages of AI-supported learning in higher education. Through an analysis of existing literature, case studies, and empirical data, the research aims to present a balanced view of how AI technologies are transforming learning spaces. These dynamics are important for educators, administrators, and policymakers to understand in order to harness the benefits of AI while avoiding related risks. Finally, the intention is to provide recommendations that can inform the thoughtful and ethical integration of AI instruments in higher education so that innovation can augment, not diminish, the fundamental purpose of teaching and learning.

OBJECTIVES

The primary objectives of this research are:

1. To identify the key benefits of AI-assisted learning in higher education settings.
2. To analyze the challenges and limitations associated with implementing AI technologies in academic institutions.
3. To evaluate students' and educators' perceptions and experiences with AI-assisted learning tools.

4. To assess the impact of AI on learning outcomes, engagement, and academic performance.
5. To provide recommendations for the effective integration of AI in higher education.

Hypothesis

H1: AI-assisted learning has significant relationship between students' academic performance and engagement in higher education.

H0: AI-assisted learning has no significant relationship students' academic performance and engagement in higher education.

H1: Despite its benefits, the integration of AI in learning environments poses significant challenges related to accessibility, ethical concerns, and educator-student dynamics.

H0: Despite its benefits, the integration of AI in learning environments poses no significant challenges related to accessibility, ethical concerns, and educator-student dynamics.

REVIEW OF LITERATURE

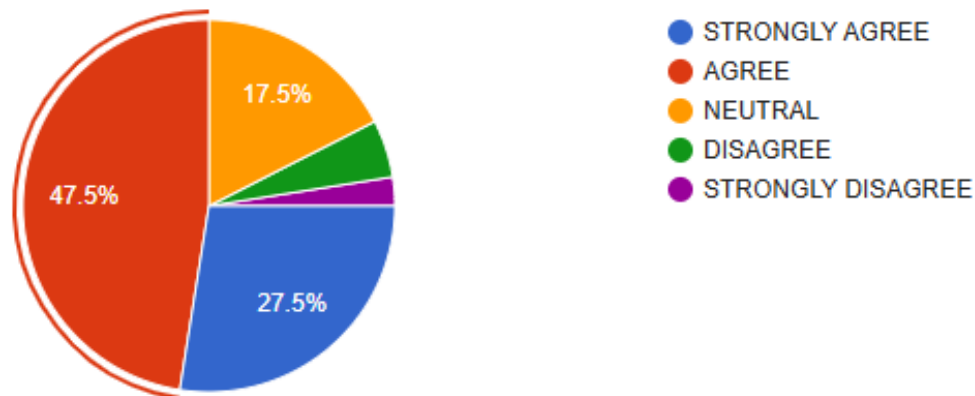
- It is studied that there is widespread agreement among the respondents on the benefit that AI can bring to tertiary-level education in terms of factors such as customized learning, higher involvement, increased administrative effectiveness, and prompt feedback. Nevertheless, the implementation of AI does pose difficulties. Some of the most important are data security and privacy breaches, insufficient technological infrastructure, the necessity for large-scale training and support, ethical implications, and resistance. In order to facilitate the integration of AI in higher education, these challenges need to be addressed through strong data protection policies, scalability and reliability of infrastructure development, regular capacity-building exercises, and well-defined ethical standards.(Dharma, 2025)
- AI technologies have great promise to improve learning and pedagogical processes in higher education. They can adapt learning experiences to accommodate specific student needs, support the faculty members' capabilities, and automate routine administrative tasks for efficiency. AI also presents possibilities for implementing adaptive learning systems, automated assessment, and data-driven decision-making, all of which enable a more responsive and effective learning environment.(Prasanna, 2024)
- AI has a positive effect on higher education by individualizing learning experiences and streamlining administrative work, resulting in more efficient and customized educational processes. But there are still major challenges, one of them being the digital divide, as most students are not provided with the needed technology for AI-facilitated learning. Moreover, privacy issues are at the forefront, with students fearing possible infringements involving the harvesting and utilization of their personal information by AI systems. It is critical to tackle these challenges to ascertain fair and safe deployment of AI in learning.(Aprianto et al., 2024)
- It is also studied that Higher education incorporating AI is reshaping conventional learning models to offer personalized, streamlined, and more accessible educational experiences. AI technologies significantly help improve student engagement, facilitate personalized learning pathways, and reduce administrative tasks. Nonetheless, the research also highlights the need for embracing open and fair practice to counter the ethical issues and challenges arising from AI adoption. Ensuring accountability, fairness, and proper use of AI is critical to its successful and sustainable integration within the higher education system.(Borah & Borah, 2024)
- AI greatly improves learning experiences by providing individualized learning paths and automating administrative procedures, thus making education more responsive and effective. Nevertheless, the effective integration of AI in higher education institutions (HEIs) hinges on effectively overcoming the main challenges presented by ethical issues, the digital divide, and the necessity of re-skilling teachers in AI literacy. The research provides actionable results and actionable recommendations to inform institutions on how to navigate the digital transformation process, such that the incorporation of AI is both responsible and effective.(Murdan & Halkhoree, 2024)

Overall, the literature suggests a growing consensus on the transformative potential of AI in higher education, accompanied by a call for cautious, evidence-based implementation.

FINDINGS:

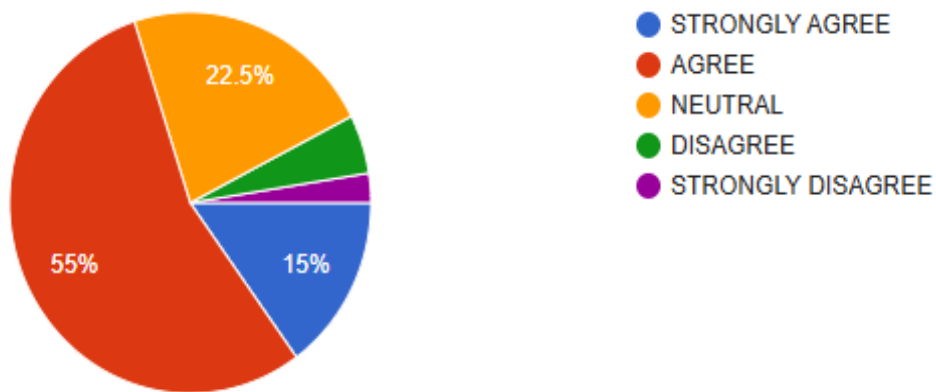
The responses were collected from peer group and community Total 40 Responses were collected to conduct primary research

1. AI Tools Help me Understand Concepts Better



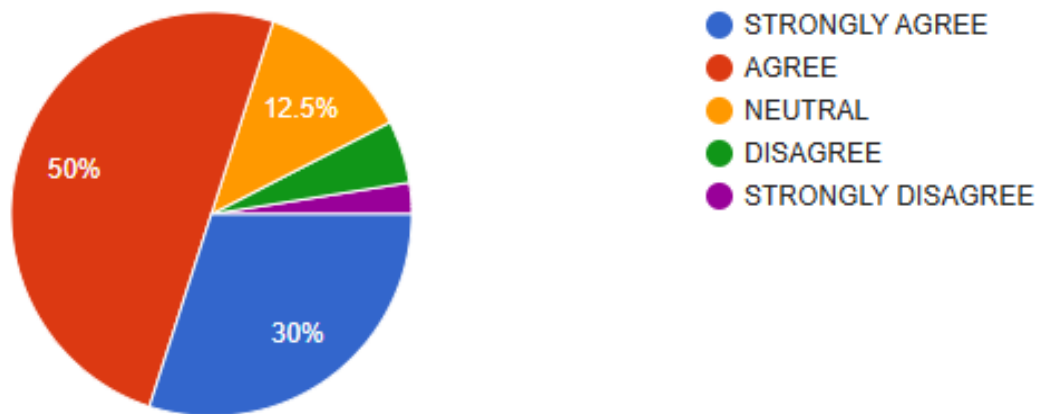
The pie graph shows the percentage of respondents who believe in the extent that AI tools help understand concepts. A notable majority of respondents of 47.5% who agreed and 27.5% who strongly agreed are likely to think that AI tools help them better understand, showing an overall positive perception towards learning with AI. At the same time, 17.5% of the respondents were neutral, reflecting possibly few exposures or mixed experiences with AI tools. Conversely, very few had negative sentiments, with 5% disagreeing and only 2.5% strongly disagreeing. Overall, 75% of the respondents see AI tools as useful in terms of being able to better understand concepts, indicating a clear support for AI in education.

2. AI enables personalized learning tailored to my pace and style



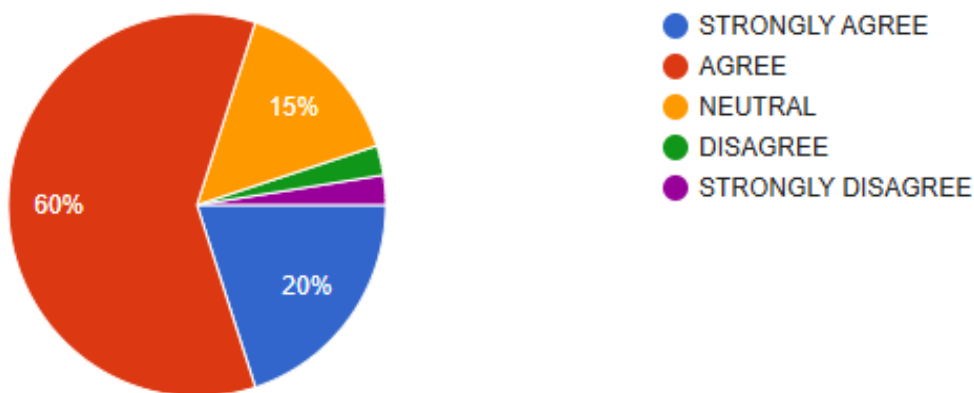
The pie chart shows the opinions of respondents on whether AI facilitates personal learning aligned to their pace and style. 55% concurred with the statement, implying that over half the subjects appreciate AI in adapting to their unique learning requirements. Also, 15% strongly concurred, supporting the affirmative opinion. On the other hand, 22.5% were neutral, reflecting either weakness of opinion or diverse experience with AI personalization. Only a minority of the respondents disagreed, with 5% disagreeing and 2.5% strongly disagreeing. Overall, the statistics show that 70% of the respondents acknowledged AI's role in enabling personalized learning, indicating its increasing significance and acceptance in contemporary educational institutions.

3. AI tools save time and improve efficiency in learning or teaching



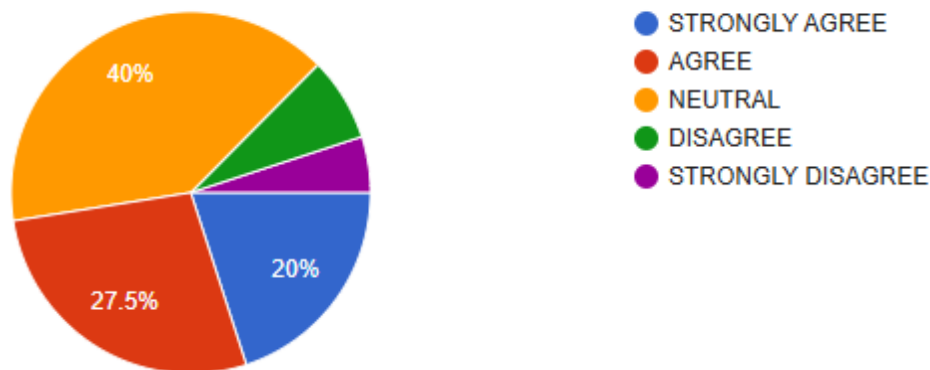
The pie chart indicates respondents' views regarding whether AI resources save time and increase efficiency in learning or teaching. A large majority of 50% endorsed the statement, and another 30% strongly endorsed it, meaning that 80% of respondents appreciate the time-saving and efficiency-boosting role of AI in learning and teaching situations. Another 12.5% was in between, meaning they might be in two minds or have conflicting experiences. A limited minority disagreed (2.5%) or strongly disagreed (5%), indicating scant skepticism. Overall, the evidence reveals an emergent positive attitude towards AI tools as effective assistive aids in optimizing teaching and learning processes.

4. AI improves the Quality of Academic Work or Instruction



The pie chart demonstrates the sentiments of respondents in terms of the contribution of AI to the quality of academic work or teaching. An important 60% concurred that AI improves academic quality, and a further 20% also strongly agreed, meaning that 80% of the respondents see AI as improving educational output. At the same time, 15% chose to remain neutral, which implies some uncertainty or absence of clear experience. Just a few percent disagreed, with 3% disagreeing and 2% strongly disagreeing. Overall, the data indicate a high level of agreement that AI has a positive impact on the quality of academic work and teaching.

5. Do you Feel more Engaged when Using AI-Based Learning Platforms



The pie chart shows respondents' sense of engagement when working on AI-based learning platforms. While 20% strongly agreed and 27.5% agreed, which means that almost half (47.5%) of the subjects feel more engaged through AI-based learning, a huge 40% were neutral. This giant neutral base indicates that most users are undecided or have mixed attitudes about AI platforms. Conversely, 7.5% had negative opinions, with 5% in disagreement and 2.5% strongly disagreeing. Generally, the answers indicate a moderately positive direction for AI to augment learner engagement, albeit the high neutrality indicates potential for better interactivity and engagingness of AI tools.

CONCLUSION AND SUGGESTION:

From the above study it is indicative of a positive attitude towards integrating AI tools in learning. A significant percentage of the respondents always assented or strongly assented to the fact that AI improves their comprehension of concepts, facilitates individualized learning experience, saves time, enhances productivity, and raises the quality of academic work and teaching. These responses indicate a strong recognition of AI's potential to transform educational practices by making learning more accessible, adaptive, and effective. However, when it comes to learner engagement, the results were comparatively moderate, with a significant portion of respondents (40%) remaining neutral and only 47.5% expressing positive engagement with AI-based platforms. This implies that although AI tools are valued for their functional advantages, they might not yet be optimally designed to support increased learner engagement or motivation.

According to these findings, a number of recommendations arise. For greater engagement, AI platforms need to have more interactive and student-centric features like gamified features, collaborative tools for real-time work, and customized content delivery. Schools also need to invest in capacity-building initiatives to educate educators and students on how to effectively utilize AI tools, thus eliminating caution or indifference. Flexibility and responsiveness in AI systems can serve to address various learning styles and requirements and make the tools more inclusive. Regular collection of feedback and monitoring of performance can steer continuous improvement and closer alignment with user expectations. In addition, access to AI technologies equally must be given high priority in order to close the digital divide, particularly in marginalized communities. Last, ensuring data privacy and ethical application of AI will be fundamental to trust-building and responsible use. In short, as encouraging as AI in education is, careful improvements and inclusive policies are essential to unleashing its greatest potential.

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THE ROLE OF EDUCATION AND PUBLIC AWARENESS IN PROMOTING THE CIRCULAR ECONOMY: A PATH TOWARDS SUSTAINABLE DEVELOPMENT

Anju Panjwani

Assistant Professor, Department of Commerce & Accountancy, Vedanta College, Vittalwadi

ABSTRACT

We must make transformative changes to the way we generate, use and discard resources if we want to move from a linear to a circular economy (CE). Education and public awareness are the critical drivers of the transition, allowing individuals and institutions to adopt sustainable behaviours. This study examines the effects of education and awareness initiatives with a circular economy focus on the adoption of circular behaviours in society. The study lays forth new objectives and hypothesis aimed at addressing existing gaps in understanding how these tools shape real-world outcomes. The study offers practical insights to enhance policy and grassroots actions supporting a circular economy by assessing educational systems, public messaging techniques, and community initiatives.

Keywords: Circular Economy, Education for Sustainability, Public Awareness, Circular Behaviour, Circular Literacy.

INTRODUCTION

The need for revolutionary economic models increased due to global environmental crisis, excessive resource extraction, pollution and unsustainable consumption patterns. Circular economy is one of the most promising ideas which is gaining popularity in the field of industry, academics and policy making circles. The circular economy is founded on the ideas of resource efficiency, minimization of waste, product longevity and closed-loop systems that seeks to renew the natural systems in contrast to conventional linear economy that adheres to “take-make-dispose” pattern. (Kirchherr et al., 2018; Murray et al., 2017).

The paradigm shift in society behaviour and thinking is necessary for adoption of circular practices, which go beyond technology or legal framework. The collective consciousness of people, groups and institutions must serve as a foundation for this change, beginning at the local level. In this regards, education and public awareness become essential change agents.

Education has the power to foster a system thinking-mindset and a greater comprehension of sustainability, especially when it is integrated at several levels, from elementary schools to universities. It helps people to evaluate environmental concerns critically, make wise decisions, and build the skills needed to innovate in ways that uphold CE ideals. (Tiippana-Usvasalo et al., 2023). Beyond the classroom, environmentally conscious behaviour is also greatly influenced by informal and non-formal educational paths.

Conversely, public awareness serves as a link between information and action and is fostered by campaigns, media, community involvement, and government activities. Good awareness campaigns can encourage sustainable lifestyles, empower citizens, impact consumer behaviour, and increase demand for environment friendly goods and services. (Gonella et al., 2024).

Nonetheless, there is a enormous gap between objectives of policies and knowledge or behaviour of individuals. CE is still primarily an abstract idea that is only used in academic or industrial contexts in many places, particularly in developing countries. CE measures run the risk of staying symbolic or inefficient in absence of significant grassroot involvement and public participation.

Therefore, the purpose of the study is to investigate and assess the real effects of public awareness and education in fostering circular economy ideals and behaviours in people. It seeks to offer evidence-based perspectives on how to use these two gentle yet effective tools to promote an equitable and sustainable economic transformation.

The study also addresses a practical research gap by focusing on primary data gathered through standardized questionnaires, which links theoretical frameworks with actual perceptions and behaviours. In the end, it seeks to add to the expanding corpus of knowledge that facilitates better- informed curriculum design, policymaking and campaign preparation about circular economy.

LITERATURE REVIEW

1. Education serves as strategic enabler of circular economy by equipping students with relevant knowledge, values and competencies. According to Kirchherr and Piscicelli (2019), number of universities are starting to provide interdisciplinary courses that incorporate life-cycle thinking, sustainability and circular design.

2. By incorporating the circular economy (CE) into their research agendas and curricula, Higher Education Institutions (HEIs) play a critical role in promoting circular economy. The importance of HEIs in helping students develop a circular economy attitude and equipping them to spearhead systematic change in the direction of sustainability is emphasized by Tiippana-Usvasalo et al. (2023). They support the growth of skills that empower pupils to tackle difficult environmental issues with creative answers.
3. According to de las Mercedes and Alvarez-Risco (2022), Circular Economy education should promote a shift in perspective toward responsibility and regeneration rather than only imparting technical information. Their research suggests five fundamental teaching tenets for CE instruction, including as real-world problem-solving and systems thinking.
4. Furthermore, Giannoccaro et al. (2021) emphasize the need for interdisciplinary methods in CE education, arguing that cooperation amongst different academic disciplines improves understanding of CE's complex character. They believe that this kind of integration promotes a comprehensive understanding, which is essential for creating successful circular strategies.
5. It is also necessary to include experience learning. According to Lazarevic and Valve (2022), practical projects that bridge the gap between theory and practice, including waste valorization programs and product design, strengthen students' dedication to sustainable practices.
6. Additionally, experiential learning is becoming more popular. Students that participated in project-based learning, such as imitating circular economy firms, had a greater comprehension of sustainability principles, according to Gkiolmas et al. (2023), indicating that immersive educational methods are very successful in developing circular competences.
7. Additionally, experiential learning is becoming more popular. Students that participated in project-based learning, such as modeling CE firms, had a greater comprehension of sustainability principles, according to Gkiolmas et al. (2023), indicating that holistic educational methods are very successful in developing circular competences.
8. Campaigns for public awareness are effective means of spreading CE ideas. Broad, general messaging, however, frequently falls short in properly engaging diverse groups. According to Maitre-Ekren and Dalhammar (2020) adapting CE campaigns to age, culture, and lifestyle greatly boosts participation and behaviour change.
9. Furthermore, Davidson (2024) highlights the importance of community-based initiatives in waste management education, pointing out that empowering individuals to actively participate in CE activities and offering platforms for knowledge exchange empowers local communities to participate in waste reduction programs, resulting in more sustainable waste management practices.
10. According to research conducted in Saudi Arabia by Almulhim and Abubakar (2021), despite the low level of circular economy awareness, exposure to well-targeted awareness interventions greatly boosted the public's readiness to interact with CE concepts. Furthermore, it has been shown that community-based participatory campaigns and storytelling are effective ways to engage marginalized populations and promote circular ideas (Carfora et al., 2023)
11. Additionally, the effectiveness of public awareness efforts is increased when they are coordinated with policy actions. Government policies that encourage and support circular education and awareness initiatives have a integrated impact that results in more significant changes to patterns of production and consumption that are sustainable (Murray et al. 2017).

RESEARCH PROBLEM

Many people are still not completely aware about circular economy concept, even though it offers practical solutions to protect the environment. Despite public campaigns, media platforms and the educational institutions work to raise awareness, it is not always evident how much of an impact these initiatives have on understanding of individuals and adoption of sustainable habits in their daily lives. The study seeks to bridge this gap by examining the relationship between circular economy awareness and actual implementation of sustainable practices in daily life.

RESEARCH OBJECTIVES

- To assess the extent to which individuals have been introduced to the concept of the circular economy through formal education systems such as schools, colleges, and universities.

- To evaluate the effectiveness of public awareness initiatives including mass media, social media, and community campaigns in increasing knowledge and understanding of circular economy principles.
- To examine the relationship between circular economy awareness (gained through education or campaigns) and the adoption of sustainable behaviours, such as recycling, reusing, and responsible consumption.

HYPOTHESIS

1. H_0 (Null Hypothesis):

There is no significant relationship between formal education and awareness of the circular economy among individuals.

2. H_1 (Alternate Hypothesis):

There is a significant relationship between formal education and awareness of the circular economy among individuals.

3. H_{02} (Null Hypothesis):

Public awareness initiatives have no significant impact on individuals' understanding of circular economy principles.

4. H_{12} (Alternate Hypothesis):

Public awareness initiatives have a significant impact on individuals' understanding of circular economy principles.

5. H_0 (Null Hypothesis):

There is no significant relationship between circular economy awareness and the adoption of sustainable behaviours by individuals.

6. H_1 (Alternate Hypothesis):

There is a significant relationship between circular economy awareness and the adoption of sustainable behaviours by individuals.

RESEARCH METHODOLOGY

A mixed-method approach is used in this study to examine the role of education and public awareness in promoting circular economy (CE) principles, particularly focusing on levels of awareness, sources of information, and behavioural practices associated with sustainability. The survey targeted students, young professionals, and educated members of the public, who are most likely to be influenced by educational content and awareness campaigns related to the circular economy.

The questionnaire consisted of closed-ended (Likert scale, multiple choice) for statistical analysis. Since the collected data is in categorical form so we have applied chi-square test

Given the **categorical nature of the data**, particularly for variables such as awareness levels, information sources, and behavioural responses, the **Chi-square test of independence** was applied to test the first hypothesis. This statistical method helps determine whether there is a significant association between two categorical variables, such as the level of education and CE-related awareness or practices.

The quantitative data were analysed and results were interpreted in the context of the study's objectives.

LIMITATIONS OF THE STUDY

The study is limited to 100 participants located within thane region. Because of this, the results might not be applicable entirely to larger demographic or geographic population. Also, the accuracy of participants' stated behaviours and views may have been influenced by response biases, including social desirability bias, which may have been introduced by the use of self-reported data.

Lastly, the cross-sectional approach only records opinions at the particular time of time which makes it challenging to evaluate the long-term behavioural impact resulting from circular economy awareness initiatives.

DATA ANALYSIS AND INTERPRETATION

Observed Frequency

Education Level	Yes(Observed)	No(observed)	Total
PG	50	10	60
UG	20	10	30
High School	4	1	5

Other	4	1	5
Column Total	78	22	100

Expected Frequency

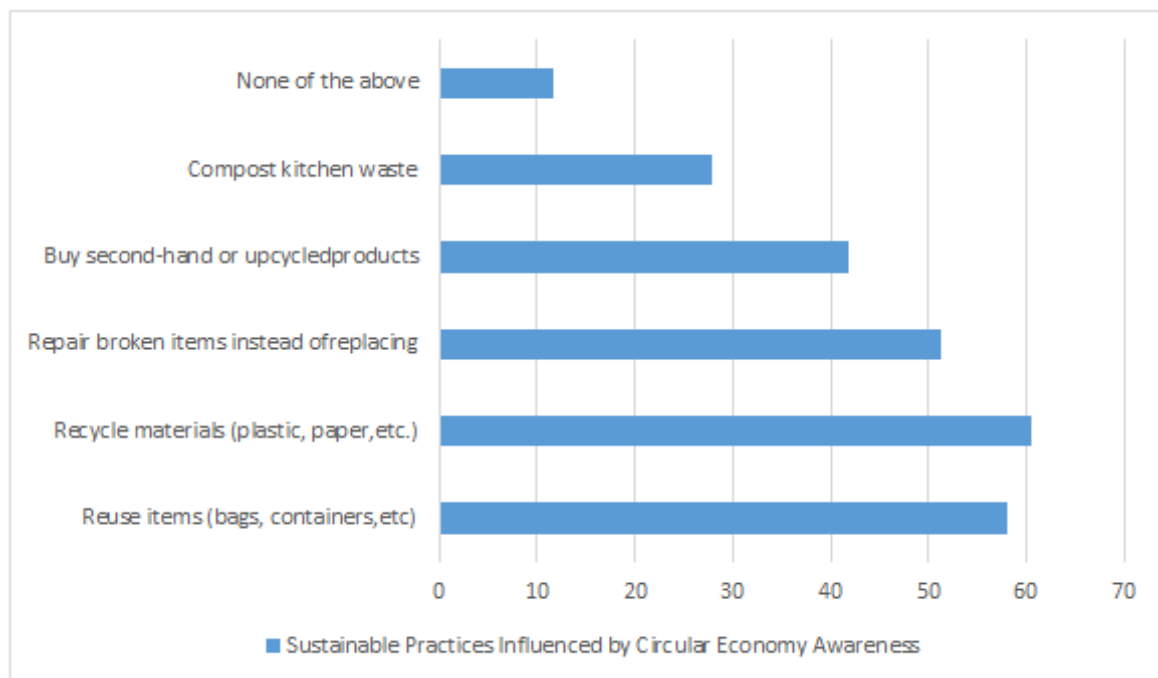
Education Level	Yes (Expected)	No (Expected)
PG	46.8	13.2
UG	23.4	6.6
High School	3.9	1.1
Other	3.9	1.1

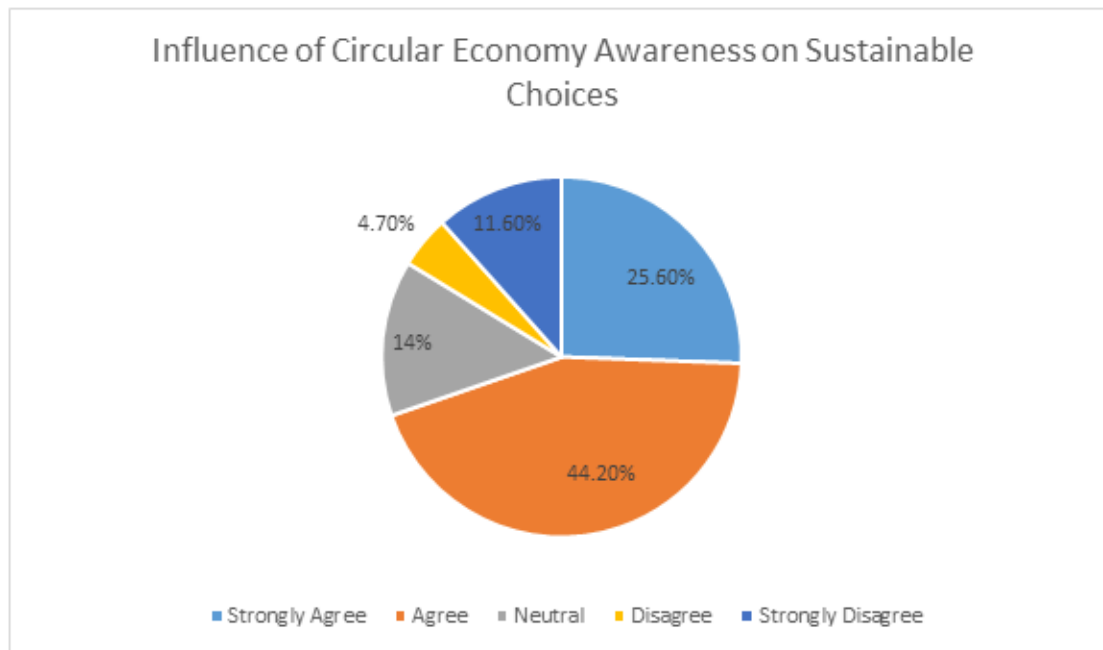
Computing the chi-square static using formula $\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$

Chi square value $\chi^2_{calculated} = \sum \frac{(O_i - E_i)^2}{E_i} = 3.26$

Sample size	100
Chi square value	3.26
Degrees of freedom	3
P value	0.353
Chi square Table value	7.815
$\chi^2(calculated) < \chi^2(tabular\ value)$	We fail to reject Null hypothesis

Since the chi-square calculated value is less than chi-square tabular value so we fail to reject the null hypothesis. So, there is no significant relationship between formal education and awareness of the circular economy among individuals.





FINDINGS

1. The study shows that the majority of the participants had either been fully or briefly introduced to the concept of circular economy through formal education.
2. Majority of the respondents of the questionnaire generally agreed that education can affect choices of individuals to adopt sustainable habits like recycling and reusing.
3. It was also found that public awareness campaigns, workshops, social media were successful in promoting sustainable habits.
4. Overall, the studies show the significant relation between awareness acquired through public campaigns and formal education and the adoption of circular economy practices in daily life.
5. The study also suggests that more integration of circular economy topics in education could encourage sustainable behaviour.
6. The study emphasizes the need for educators to give priority to circular economy education for achieving long term sustainability goals.

CONCLUSION

The study indicates that formal education and public awareness campaigns both have a major impact on individual understanding of the concept of circular economy and the adoption of sustainable habits.

To increase the transition toward circular and sustainable society, it is necessary to integrate CE concepts more deeply into curriculum schools, college and universities and also enhancing public engagement through awareness campaigns.

A combined effort from government, local communities, media platforms and educational institutions will be required to integrate circular economy principles into everyday behaviour and policy framework.

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MATHEMATICS AND AI

Ansari Sana Tauseef Ahmed

Assistant Teacher, Department of Mathematics, Indian School Salalah, Sultanate of Oman

ABSTRACT

This article explores the essential connection between mathematics and artificial intelligence (AI), showing how math helps us to understand better and improve AI systems. At the same time, the challenges posed by AI are pushing the development of new areas of mathematics. The focus is mainly on how analytical and probabilistic methods can be used to model neural networks and understand how they are optimized. The article also highlights how AI has progressed through specialized architectures designed for different tasks, each rooted in unique mathematical ideas. The aim is to inspire more mathematicians to get involved and contribute to this rapidly growing and exciting field.

1. INTRODUCTION

In the modern era, Artificial Intelligence (AI) has become one of the most transformative technologies, revolutionizing fields from healthcare to finance, education to entertainment. At its core, however, AI is deeply rooted in mathematical principles. Mathematics not only provides the theoretical foundation for AI algorithms but also plays a crucial role in developing models, solving optimization problems, and making predictions based on data.

This research paper explores the intricate relationship between mathematics and AI, highlighting how key mathematical disciplines such as linear algebra, calculus, statistics, and graph theory enable the functioning of intelligent systems. By understanding the mathematical backbone of AI, we can gain deeper insights into how machines learn, reason, and solve problems.

The objective of this paper is to uncover how mathematics fuels the advancements in AI, examine the mathematical structure of popular algorithms, and explore real-world applications and challenges. This study aims to bridge the gap between abstract mathematical theory and its powerful implementation in the field of Artificial Intelligence.

2. HISTORICAL CONNECTION BETWEEN MATHEMATICS AND AI

The development of Artificial Intelligence is not a recent phenomenon it is the result of decades of research in logic, mathematics, and computer science. The mathematical foundations of AI can be traced back to the early 20th century, when scientists and mathematicians began to formalize the idea of machine reasoning.

One of the earliest contributors was **Alan Turing**, a British mathematician often regarded as the father of AI. In 1936, Turing introduced the concept of a **Turing Machine**, a theoretical model that could simulate any computation process. His famous paper “*On Computable Numbers*” laid the groundwork for understanding the limits of what machines can compute, giving rise to **computability theory**.

Another crucial milestone came from **George Boole**, whose work in the mid-1800s introduced **Boolean algebra**, the logic used in digital circuits and decision-making systems. Boolean logic later became fundamental to the development of rule-based AI and expert systems.

In 1956, the term “**Artificial Intelligence**” was officially coined at the **Dartmouth Conference**, organized by **John McCarthy** and other pioneers like Marvin Minsky and Claude Shannon. This marked the beginning of AI as a distinct academic field, built upon a foundation of logic, algorithms, and formal mathematical reasoning.

Throughout the 20th century, other mathematical concepts such as **probability theory**, **linear algebra**, and **calculus** became essential tools in building intelligent machines. These ideas enabled the transition from symbolic AI (based on rules and logic) to modern **machine learning** approaches, where machines learn from data using mathematical models.

Thus, the history of AI is deeply rooted in mathematics. Understanding this historical relationship helps us appreciate how mathematical theories have shaped and continue to influence the direction of AI research.

3. Core Mathematical Concepts in Artificial Intelligence

Mathematics forms the backbone of every AI algorithm. From data representation to model training and evaluation, nearly every step in the AI pipeline relies on core mathematical concepts. The major branches of mathematics that contribute significantly to AI include the following:

3.1 Linear Algebra

Linear algebra is essential for handling and transforming large amounts of data. AI models, especially in deep learning, use **vectors**, **matrices** and **tensors** to store and manipulate data. Operations like matrix multiplication, dot products, and eigenvalues are used in neural networks and computer vision.

Example: In a neural network, each layer's input and weights are represented as matrices. Multiplying them yields the output, which is passed to the next layer.

3.2 Calculus

Differential calculus and **integral calculus** are used to optimize models by minimizing error. In deep learning, the **backpropagation** algorithm uses derivatives to adjust model weights and reduce the loss function.

Example: The **gradient descent** algorithm, which updates weights to minimize error, is based on the concept of derivatives from calculus.

3.3 Probability and Statistics

AI systems make decisions under uncertainty, and that's where **probability theory** comes into play. Concepts like **Bayes' Theorem**, **conditional probability**, and **distributions** are foundational in probabilistic models.

Statistics is used to understand and process data—measuring trends, detecting outliers, and estimating outcomes. It helps in model evaluation through metrics like accuracy, precision, recall, and F1-score.

Example: **Naive Bayes Classifier** is based on probability theory and works well for text classification.

3.4 Graph Theory

Many AI problems can be modeled using **graphs**—structures consisting of nodes and edges. Graph theory is useful in areas such as social network analysis, recommender systems, and **knowledge graphs**.

Example: In **Graph Neural Networks (GNNs)**, each node (such as a user or item) communicates with its neighbors, and mathematical graph operations determine how information is aggregated.

3.5 Set Theory and Logic

Set theory is the basis of data grouping, classification, and defining relationships. **Logic**, particularly **propositional** and **predicate logic**, is used in symbolic AI, automated reasoning, and programming AI agents.

Example: In **expert systems**, decision-making is done using **if-then** logical rules derived from set theory and Boolean logic.

4. Machine Learning and Math

Machine Learning (ML) is a subfield of AI that enables machines to learn patterns from data and make decisions without being explicitly programmed. At the heart of machine learning lie mathematical concepts that guide how models are built, trained, and evaluated.

4.1 Mathematical Foundations of ML Algorithms

Every ML algorithm is essentially a mathematical model.

- **Linear Regression**

Used for predicting a continuous output, linear regression is based on finding the best-fit line using the **least squares method**, minimizing the sum of squared differences between actual and predicted values.

- **Logistic Regression**

Used for binary classification problems, it applies the **sigmoid function** to map outputs between 0 and 1. It is grounded in **probability theory** and uses **maximum likelihood estimation**.

- **K-Nearest Neighbors (KNN)**

This algorithm classifies data points based on the majority label of their nearest neighbors, using **Euclidean distance** or other mathematical distance metrics to measure closeness.

- **Support Vector Machines (SVM)**

SVMs use **geometric concepts** to find the optimal hyperplane that separates different classes with maximum margin. This involves concepts from **linear algebra** and **optimization**.

- **Decision Trees**

Decision trees use **information theory** and **entropy** to split data into branches, aiming to reduce uncertainty at each step.

- **Random Forest and Ensemble Methods**

These are collections of decision trees, where predictions are combined (using **voting** or **averaging**) to improve accuracy. The math here involves **probability**, **statistics**, and **aggregation techniques**.

4.2 Training and Evaluation Using Math

- **Loss Functions**

ML models use **loss functions** (like Mean Squared Error, Cross-Entropy) to quantify error. These functions are based on statistical and calculus principles.

- **Optimization Algorithms**

Algorithms like **Gradient Descent** use calculus to update model parameters by moving in the direction of the steepest descent to reduce the error.

- **Model Evaluation Metrics**

Metrics such as **accuracy**, **precision**, **recall**, **F1-score**, and **AUC-ROC** are derived from statistics. They help assess how well a model is performing.

5. Neural Networks and Deep Learning

Deep Learning is a specialized branch of machine learning that uses **Artificial Neural Networks (ANNs)** to model and solve complex problems. These networks are inspired by the human brain and are made up of layers of interconnected nodes or neurons. Behind this biological inspiration, however, lies a powerful mathematical structure.

5.1 Structure of a Neural Network

- A neural network typically consists of:
 - **Input Layer:** Takes the data.
 - **Hidden Layers:** Perform transformations.
 - **Output Layer:** Produces predictions or classifications.

Each connection between neurons has a **weight**, and each neuron applies a **mathematical function** to calculate its output.

Mathematical Operation in a Neuron:

Output = Activation(Weight × Input + Bias)

This formula uses **linear algebra** (matrix operations), and the **activation function** introduces non-linearity.

5.2 Activation Functions

Activation functions determine whether a neuron should "fire" and influence the output of a node. Common activation functions include:

- **Sigmoid Function:** $\sigma(x) = \frac{1}{1+e^{-x}}$
- **ReLU(Rectified Linear Unit):** $f(x) = \max(0, x)$
- **Tanh Function:** $\tanh(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

These functions are defined using **calculus** and **exponential functions**.

5.3 Backpropagation and Optimization

Training a neural network involves:

1. **Forward Propagation:** Calculate outputs.
2. **Compute Loss:** Compare predicted vs. actual output.
3. **Backpropagation:** Use **partial derivatives** to update weights and biases.

Backpropagation is based on the **chain rule** of calculus and enables the model to learn by reducing the error.

The model uses optimization techniques like **Gradient Descent**, where weights are updated in the opposite direction of the gradient to minimize the loss function.

5.4 Convolutional and Recurrent Neural Networks

- **Convolutional Neural Networks (CNNs):** Use matrix-based operations (like convolution and pooling) for image recognition. Heavy use of **linear algebra**.
- **Recurrent Neural Networks (RNNs):** Use **sequences and recursion** to handle data with memory (e.g., time series, text). They depend on **series math** and **differential equations** for handling recurrent connections.

5.5 Mathematical Challenges in Deep Learning

- **Vanishing and Exploding Gradients** :Issues in training deep networks due to derivatives becoming too small or large.
- **Overfitting** Detected using **regularization** techniques like **L1/L2 norms** (from vector algebra).
- **Computational Complexity** Requires optimization of **time and space**, rooted in **discrete math and complexity theory**.

6. AI Models and Algorithms

AI is built on algorithms, step-by-step procedures designed to perform specific tasks. Each AI model, whether simple or complex, is defined and executed mathematically. In this section, we'll explore some key categories of AI models and the math behind them.

6.1 Types of AI Models

A. Rule-Based Systems (Symbolic AI)

These systems use **formal logic**, **Boolean algebra**, and **if-then rules** to reason through problems.

- **Mathematics Used:**

- **Propositional logic**
- **Predicate logic**
- **Set theory**

Example: Expert systems in early AI used large databases of logical rules to simulate decision-making.

B. Probabilistic Models

These models make predictions based on uncertainty. They're used where outcomes are not deterministic, such as speech recognition or spam detection.

- **Mathematics Used:**

- **Bayesian probability**
- **Markov Chains**
- **Hidden Markov Models (HMMs)**

Example: Google's language models use probability to guess the next word in a sentence.

C. Optimization-Based Models

AI often requires finding the "best" solution from many possibilities, which is where optimization comes in.

- **Mathematics Used:**

- **Linear programming**
- **Convex optimization**
- **Gradient-based methods**

Example: In autonomous vehicles, optimization is used to find the safest and most efficient path.

D. Neural Network-Based Models

Covered in the previous section, these include:

- **Feedforward Neural Networks (FNN)**
- **Convolutional Neural Networks (CNN)**
- **Recurrent Neural Networks (RNN)**
- **Transformers (used in ChatGPT, BERT)**

Each of these uses:

- **Matrix calculus**
- **Non-linear functions**
- **Differential equations**

E. Evolutionary Algorithms

Inspired by biological evolution, these models use techniques like **genetic algorithms**, which apply concepts of **mutation**, **crossover**, and **fitness** to improve performance over generations.

- **Mathematics Used:**

- **Probability**
- **Combinatorics**
- **Statistics**

Example: Used in optimization problems and game playing agents.

6.2 Algorithm Complexity and Efficiency

The **efficiency** of an algorithm is crucial in AI and is measured in terms of:

- **Time Complexity (e.g., $O(n \log n)$)**
- **Space Complexity**

This is part of **discrete mathematics** and **computational complexity theory**, which help AI researchers decide which algorithms are feasible for large datasets.

In short, every AI model from logical reasoning systems to modern deep learning networks operates on the principles of mathematics. Understanding these mathematical structures allows researchers to build more efficient, accurate, and interpretable AI systems.

7. Future of AI and the Role of Mathematics

As AI continues to evolve, **mathematics will remain the backbone** of its advancement. The future of AI is filled with smarter machines, better decision-making, and deeper integration into everyday life, all driven by mathematical innovation.

7.1 Emerging Trends in AI

A. Explainable and Interpretable AI

- The demand for **transparent AI** will grow.
- **Mathematical focus:** Simplified models, causality detection, game theory (e.g., SHAP values), and logic-based systems.

B. Federated and Privacy-Preserving AI

- Models are trained on decentralized data without sharing sensitive information.
- **Mathematical focus:** Secure multi-party computation, differential privacy, and homomorphic encryption.

C. Quantum AI

- Combines quantum computing with AI.
- **Mathematical focus :** Linear algebra over complex vector spaces, tensor products, probability amplitudes.

D. AI for Scientific Discovery

- Used in physics, chemistry, and medicine to accelerate discovery.
- **Mathematical Focus:** Simulation, optimization, and symbolic computation.

7.2 The Evolving Role of Mathematics

Mathematics will continue to:

- **Develop new learning algorithms** (e.g., faster optimization, new loss functions, better regularization)
- **Improve accuracy and efficiency** through better **computational mathematics**
- **Ensure fairness, accountability, and transparency** using **statistical tests, ethics-based models, and logical validation**
- **Bridge gaps between disciplines** by integrating mathematical tools from areas like **topology, algebra, and graph theory**.

8. CONCLUSION

Mathematics is essential for understanding and improving how deep learning systems work, especially as newer technologies like Transformers and generative AI bring complex challenges. These include figuring out how to train such models more effectively and what makes a network structure “optimal.” A key question that still needs to be answered is whether large language models (LLMs) simply repeat patterns from their training data or if they are actually capable of reasoning. Additionally, developing AI that uses fewer resources and protects user privacy also depends heavily on mathematical progress. Whether it's building efficient models, following ethical guidelines, or exploring the limits of what AI can do, mathematics plays a central and critical role.

The journey of AI is deeply mathematical. Every model, every prediction, and every decision made by an AI system is guided by equations, logic, and structures that mathematics provides. As we move into a future shaped by Artificial Intelligence, **mathematics is not just a tool, it is the language of intelligence itself.**

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MODERN TRENDS IN INFORMATION TECHNOLOGY VEDANTA COLLEGE

Ansh Gupta and Aditya Sajji

BScIT, Vedanta College

ABSTRACT

The rapid evolution of Information Technology (IT) has significantly transformed the way individuals, businesses, and societies operate in the 21st century. With the increasing reliance on digital platforms and smart technologies, understanding the modern trends in IT has become essential for innovation, competitiveness, and sustainability. This research paper explores the latest advancements and emerging trends that are shaping the future of information technology. Key areas of focus include Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, Edge Computing, Internet of Things (IoT), Cybersecurity, and Blockchain technology. The findings contribute to a better understanding of how organizations and individuals can leverage modern IT trends for strategic growth and innovation.

Keywords: Artificial Intelligence, Cloud Computing, IoT, Edge Computing, Cybersecurity, Blockchain, Machine Learning

INTRODUCTION

Information Technology (IT) has evolved from a support function to a driving force behind innovation, transformation, and global connectivity. The 21st century has seen an exponential rise in digital dependency, and this trend has been accelerated by technological breakthroughs, globalization, and recent global events such as the COVID-19 pandemic. Modern IT trends offer solutions that are more intelligent, decentralized, scalable, and secure. This paper aims to shed light on the key trends that are shaping the modern technological landscape and their implications on society and business.

Artificial Intelligence and Machine Learning

AI and ML have become central to automation and intelligent decision-making. They are used in:

- Natural Language Processing (NLP) for sentiment analysis and virtual communication
- Computer Vision for facial recognition, healthcare imaging, and autonomous navigation
- Predictive maintenance in manufacturing
- Fraud detection in banking and insurance

These technologies improve efficiency, reduce human error, and create new possibilities for personalized services.

Cloud Computing

Cloud computing supports a shared pool of resources including servers, storage, databases, networking, and software. It enables rapid innovation and flexible resources. Cloud services are commonly categorized as:

SaaS: Accessible via browser; includes tools like Dropbox, Zoom, Salesforce

PaaS: Provides platforms for development, testing, and deployment; e.g., Microsoft Azure, IBM Cloud Foundry

IaaS: Offers virtual machines and storage; e.g., AWS EC2, Google Compute Engine

Benefits include cost savings, global scalability, business continuity, and better collaboration tools.

Edge Computing

Edge computing complements the cloud by handling data closer to where it is generated. This is crucial for:

- Reducing latency in IoT applications
- Real-time analytics in industrial automation
- Enhancing security by minimizing data transmission to central servers

Edge computing supports time-sensitive applications such as autonomous vehicles and medical diagnostics, and is essential in remote and bandwidth-constrained areas.

Internet of Things (IoT)

IoT enables inter-device communication and automation. It has revolutionized:

-
- Home automation with smart thermostats, voice assistants, and lighting systems
 - Industrial monitoring (IIoT) to detect machine failures and optimize production
 - Healthcare with remote patient monitoring devices
 - Smart cities to manage traffic flow, street lighting, and waste collection

IoT generates big data that is used for predictive analysis and process optimization.

Cybersecurity

Cybersecurity addresses growing concerns related to data breaches, ransomware attacks, and phishing. It involves:

- Multi-factor authentication (MFA) and biometrics
- Artificial intelligence for anomaly detection
- Threat intelligence platforms for real-time monitoring
- Compliance with standards such as GDPR, HIPAA, and ISO/IEC 27001

As the number of connected devices increases, so does the attack surface, making cybersecurity a priority for governments and businesses alike.

Blockchain Technology

Blockchain provides a decentralized, immutable ledger of transactions. Beyond cryptocurrencies, it is being applied in:

- Supply chain management for traceability and transparency
- Digital identity verification
- Intellectual property and copyright protection
- Health records sharing between institutions

Smart contracts automate transactions, reducing the need for intermediaries and increasing trust in digital interactions.

Benefits of Modern IT Trends

- Improved efficiency and automation
- Better decision-making through data analytics
- Enhanced user experiences
- Cost-effective solutions for businesses
- Global connectivity and collaboration

Challenges and Risks

- Data privacy concerns
- High implementation costs for small businesses
- Need for constant upskilling
- Increased vulnerability to cyberattacks

CONCLUSION

Modern IT trends are not isolated innovations but interconnected technologies that reinforce each other. AI needs cloud and edge for processing power; IoT needs cybersecurity; blockchain supports secure, decentralized IoT frameworks. As these technologies mature, the digital divide may narrow, leading to more equitable access to resources and services. Continuous learning and ethical considerations must guide the adoption of these technologies for sustainable and inclusive development.

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A Comprehensive Review on Early-Stage Disease Detection of Crops

Ms. Archana Patil¹ and Dr. Sindhu P. M.²

¹Research Scholar, Universal AI university Karjat.

²Associate Professor & HoD - Business Analytics, Universal AI University

ABSTRACT

The agricultural sector faces significant challenges due to the prevalence of diseases in vegetable crops, which can lead to substantial economic losses and food insecurity. Early-stage disease detection is crucial for effective management and mitigation of these issues. This paper presents a comprehensive review of various methodologies employed in the early detection of diseases in vegetable crops, focusing on machine learning and deep learning techniques. The review synthesizes findings from recent studies, highlighting the effectiveness of different algorithms, datasets, and technologies used in disease detection. The paper also discusses the challenges faced in the implementation of these technologies and suggests future research directions to enhance the accuracy and efficiency of disease detection systems.

Keywords: Early-stage disease detection, vegetable crops, machine learning, deep learning, image processing, agricultural technology.

1. INTRODUCTION

The global agricultural landscape is increasingly threatened by plant diseases, which can severely impact crop yield and quality. Early detection of these diseases is essential for implementing timely interventions, thereby minimizing losses and ensuring food security. Traditional methods of disease detection often rely on visual inspections by trained experts, which can be time-consuming and subjective. Recent advancements in technology, particularly in machine learning (ML) and deep learning (DL), have opened new avenues for automating the disease detection process.

This review aims to provide a comprehensive overview of the current state of research on early-stage disease detection in vegetable crops, focusing on the application of ML and DL techniques. The paper is structured as follows: Section 2 discusses the importance of early disease detection; Section 3 reviews various methodologies; Section 4 presents a comparative analysis of different techniques; Section 5 includes a literature review; Section 6 discusses challenges and future directions; and Section 7 concludes the paper.

2. IMPORTANCE OF EARLY DISEASE DETECTION

Early detection of plant diseases is critical for several reasons:

Economic Impact: Diseases can lead to significant financial losses for farmers and the agricultural sector as a whole. Early detection allows for timely interventions, reducing the extent of crop damage.

Sustainable Agriculture: Early detection contributes to sustainable agricultural practices by minimizing the use of pesticides and reducing environmental impact.

3. METHODOLOGIES FOR EARLY-STAGE DISEASE DETECTION

3.1 Machine Learning Techniques

Machine learning techniques have been widely adopted for disease detection due to their ability to analyze large datasets and identify patterns. Some of the commonly used ML algorithms include:

Support Vector Machines (SVM): SVMs are effective for classification tasks and have been used to detect diseases in various crops. They have shown promising accuracy in identifying specific plant diseases.

K-Nearest Neighbors (K-NN): This algorithm classifies data points based on their proximity to other points. It has been effective in achieving high accuracy rates in disease detection tasks.

Random Forest (RF): RF is an ensemble learning method that combines multiple decision trees to improve classification accuracy. It has been reported to achieve high accuracy in classifying plant health.

3.2 Deep Learning Techniques

Deep learning has gained popularity due to its ability to automatically extract features from images, making it particularly suitable for image-based disease detection. Key deep learning architectures include:

Convolutional Neural Networks (CNN): CNNs are designed to process grid-like data, such as images. They have achieved remarkable accuracy in classifying various plant diseases.

ResNet: ResNet is a deep learning architecture that uses residual connections to improve training efficiency. It has demonstrated effectiveness in detecting diseases in different crops.

YOLO (You Only Look Once): YOLO is a real-time object detection system that can be used for disease detection in crops. It has shown promising results in accurately identifying plant diseases in real-time.

3.3 Image Processing Techniques

Image processing techniques are often used in conjunction with ML and DL methods to enhance the quality of input data. Common techniques include:

Histogram Equalization: This technique improves the contrast of images, making it easier to identify features related to disease symptoms.

K-Means Clustering: K-means clustering is used for segmenting images into distinct regions, which can help isolate diseased areas from healthy ones.

Feature Extraction: Techniques such as Discrete Wavelet Transform (DWT) and Grey Level Co-occurrence Matrix (GLCM) are employed to extract informative features from leaf images.

4. COMPARATIVE ANALYSIS OF TECHNIQUES

A comparative analysis of various techniques used for early-stage disease detection in vegetable crops reveals significant advancements in accuracy and efficiency. Different studies have reported varying levels of success with various algorithms, highlighting the effectiveness of machine learning and deep learning approaches in automating disease detection processes.

5. LITERATURE REVIEW

1. Harakannanavar et al. (2022) investigated the application of computer vision and machine learning models for detecting plant leaf diseases. Their study highlighted the effectiveness of automated techniques in diagnosing agricultural diseases, demonstrating that these methods enhance accuracy and efficiency in comparison to traditional approaches. The research suggested that machine learning and computer vision contribute significantly to improving the speed and precision of plant disease detection, thereby reducing manual inspection errors and boosting agricultural productivity.
2. Nigam and Jain (2020) conducted a comprehensive review of deep learning applications in plant disease identification. Their analysis underscored the superiority of Convolutional Neural Networks (CNNs) over conventional image processing techniques, as these networks exhibited the ability to extract image features automatically. The review provided insights into different deep learning architectures and their effectiveness in improving disease detection accuracy, indicating the need for further research in this field. They also acknowledged challenges related to dataset availability and computational costs.
3. Jackulin and Murugavalli (2022) examined various machine learning and deep learning models for plant disease detection. Their findings indicated that hybrid approaches, which integrate multiple algorithms, enhance early disease detection efficiency in plants. The study suggested that combining different techniques results in improved performance and robustness in disease classification tasks, though challenges related to model interpretability persist.
4. Chaudhari et al. (2024) explored precision agriculture techniques, advocating for the integration of machine learning-based disease detection as a vital aspect of crop health monitoring. Their study emphasized the significance of timely disease identification and its role in enhancing agricultural productivity. The research provided a framework for implementing machine learning techniques in real-world agricultural settings.
5. Kulkarni et al. (2023) developed a machine learning-based image processing system aimed at improving disease detection accuracy in vegetable crops. Their system leveraged advanced image processing techniques to enhance input data quality, leading to higher detection rates. The study highlighted the necessity of integrating image processing with machine learning for effective disease management, while also acknowledging the extensive preprocessing required for optimal performance.
6. Sagar et al. (2023) introduced Explainable AI techniques for plant disease detection, focusing on improving the interpretability of deep learning models. Their research emphasized the need for transparency in AI-driven decisions, enabling farmers and agricultural stakeholders to understand the rationale behind disease predictions. The study suggested that integrating Explainable AI techniques enhances trust in automated systems and facilitates informed decision-making in crop management.

7. Sharvesh et al. (2024) proposed an enhanced machine learning model to improve plant disease detection accuracy through IoT-based monitoring. Their research emphasized the integration of IoT technology with machine learning, demonstrating how real-time monitoring of crop health enables timely interventions and enhances overall agricultural productivity.
8. Sharma et al. (2022) examined deep learning methods for image-based plant disease classification, concluding that CNNs consistently outperformed traditional machine learning models. Their research provided strong evidence of the effectiveness of deep learning in identifying plant diseases with higher accuracy, reinforcing the shift towards advanced diagnostic techniques in agriculture.
9. Chandan et al. (2024) integrated IoT and machine learning for real-time disease monitoring in crops. Their study demonstrated increased efficiency in disease prevention through continuous monitoring and data analysis. The findings suggested that the combination of IoT and machine learning has the potential to enhance agricultural practices, though challenges such as sensor costs and connectivity require further attention.
10. Ulutas and Aslantas (2023) developed a rapid classification method for detecting tomato plant diseases using image processing techniques. Their approach aimed at improving disease detection speed and accuracy, providing a practical solution for farmers. The study emphasized the importance of efficient diagnostic tools in managing plant health.
11. Gokulnath and Devi (2020) reviewed various plant disease prediction techniques, suggesting that deep learning offers a robust approach to improving detection accuracy. Their review highlighted advancements in deep learning methodologies and their applicability in agricultural settings, encouraging further exploration of these techniques despite existing challenges related to dataset limitations and model generalization.
12. Khalid et al. (2023) implemented a real-time deep convolutional neural network for plant disease detection, reporting significant improvements in classification accuracy. Their study demonstrated the potential of deep learning in processing large datasets and making accurate predictions, though they acknowledged the need to optimize computational complexity for widespread adoption.
13. Chetan et al. (2023) investigated deep learning applications for detecting diseases in banana and sunflower crops, demonstrating high classification precision. Their research reinforced the adaptability of deep learning techniques across different crop types, although they noted that improving model robustness in varying environmental conditions remains a challenge.
14. Pujari et al. (2023) examined machine learning models for enhancing plant health and disease detection through image-based analysis. Their study provided insights into the application of various ML algorithms, indicating their effectiveness in diagnosing plant diseases and promoting overall crop health. However, they emphasized the importance of proper model training and dataset quality.
15. Qin et al. (2023) developed a hyperspectral imaging system for monitoring plant health, proving its effectiveness in early disease identification. Their research highlighted the advantages of hyperspectral imaging in capturing detailed plant health information, facilitating timely disease management interventions.
16. Geetha et al. (2020) proposed a classification and detection system for plant leaf diseases using machine learning techniques. Their study demonstrated improved diagnostic capabilities by integrating multiple ML algorithms, though they noted challenges related to data imbalance and feature selection.
17. Dombale et al. (2023) applied machine learning algorithms for detecting plant leaf diseases, emphasizing the importance of training models on large datasets to enhance accuracy. Their research highlighted the need for high-quality data to develop reliable disease detection models, while also suggesting improvements in data augmentation and model tuning.
18. Dohare and Khan (2024) designed a machine learning-based plant health monitoring system to assist farmers in diagnosing diseases at early stages. Their system integrated various data sources to provide a comprehensive tool for effective crop health management.
19. Radočaj et al. (2023) explored the use of multispectral indices and soil electroconductivity for plant health prediction using deep learning. Their study suggested that combining environmental data with deep learning techniques enhances disease detection and crop management, particularly in controlled agricultural environments.

20. Shrivastava and Patidar (2022) developed a decision support model for identifying rice plant diseases using machine learning techniques. Their research proposed a framework for incorporating ML into agricultural decision-making processes, improving disease management strategies while emphasizing the importance of high-quality training datasets.
21. Band and Shah (2024) created classification models for plant disease detection, emphasizing the advantages of AI-driven models. Their study suggested that artificial intelligence plays a crucial role in enhancing the accuracy and efficiency of disease diagnostics, though they pointed out the need for improved model interpretability and real-world testing.
22. Priya (2023) applied deep learning algorithms for plant leaf disease detection, reporting superior accuracy compared to conventional approaches. Their research reinforced the effectiveness of deep learning in agricultural applications while acknowledging the high computational resources required for implementation.
23. Shelar et al. (2022) implemented CNN models for identifying plant diseases in controlled environments. Their study demonstrated the adaptability of CNNs across various settings, though they recognized the sensitivity of these models to lighting variations and background noise.
24. Kaushik et al. (2022) examined machine learning applications for detecting leaf diseases, emphasizing the importance of real-time classification. Their research highlighted the role of machine learning in enabling rapid responses to crop health issues, though they noted the challenges in real-time deployment.
25. Thangavel et al. (2022) utilized deep learning techniques for plant leaf disease identification, advocating for hybrid CNN models. Their study demonstrated the effectiveness of combining different deep learning architectures to improve disease detection accuracy while stressing the need for maintaining dataset quality and annotation consistency.
26. Reddy et al. (2023) explored the application of AI in plant species health detection by integrating remote sensing data. Their research suggested that AI has significant potential in enhancing plant health monitoring and disease detection, though they indicated that real-time monitoring integration is necessary for achieving maximum effectiveness.
27. Haq and Kaur (2024) investigated the use of super-resolution imaging for plant disease detection, emphasizing its role in improving classification precision. Their study pointed out that while this technique enhances accuracy, the challenge of computational efficiency must be addressed for scalability.
28. Shukla et al. (2021) implemented machine learning techniques in smart agriculture systems to improve disease prediction capabilities. Their findings highlighted the importance of integrating technology into agricultural practices to manage diseases more effectively. However, they acknowledged that environmental variability could impact model performance.
29. Devarajan and Gunasundari (2021) examined machine learning techniques for assessing plant health, identifying challenges in real-world applications. Their research demonstrated that while machine learning models enhance plant health assessment, adoption barriers such as cost and expertise need to be addressed.
30. Ankit et al. (2024) designed a deep-learning-based plant health detection system, reporting enhanced diagnostic accuracy. They concluded that although deep learning techniques improve disease detection and management strategies, better feature selection is required to improve generalization.
31. Jung et al. (2023) compared CNN and transformer-based deep learning models for crop disease detection. Their research indicated that these models achieve high accuracy, but they noted that real-time adaptability remains an area for improvement.
32. Xian and Ngadiran (2021) classified plant diseases using machine learning models and identified key challenges related to dataset availability. Their study underscored the necessity of comprehensive datasets for improving the effectiveness of disease detection models while noting that environmental conditions could influence classification accuracy.
33. Hama et al. (2024) proposed deep learning algorithms for houseplant leaf classification to enhance indoor plant health monitoring. Their study suggested that while the models showed promising results, challenges related to real-world applications persist.
34. Alam et al. (2024) compared pre-trained CNN models for efficient disease detection, demonstrating variations in accuracy. Their findings highlighted the importance of selecting appropriate models to

achieve optimal disease classification performance while emphasizing the need for domain-specific customization.

35. Shukla et al. (2024) introduced explainable AI models for plant disease diagnosis, focusing on improving transparency in predictions. They asserted that while explainable AI enhances trust and usability in agricultural applications, computational costs remain a concern.
36. Yao et al. (2023) reviewed machine learning techniques for leaf disease classification, analyzing data preprocessing challenges. Their study indicated that while machine learning improves disease classification, further research is required to enhance dataset generalization.
37. Roper et al. (2021) examined the impact of plant disease detection on agricultural productivity, utilizing advanced image processing techniques. They highlighted the importance of timely disease identification in improving crop yield and quality but emphasized the need for interdisciplinary collaboration.
38. Pujari et al. (2024) designed an AI-driven model for plant health monitoring using real-time image analysis. Their research demonstrated the effectiveness of machine learning-based plant disease detection but suggested that additional studies are needed to implement real-time solutions.
39. Mohanty et al. (2016) pioneered deep learning applications in plant disease detection, setting benchmarks for subsequent research. Their foundational work significantly influenced advancements in the field, though they acknowledged challenges in identifying early-stage diseases.
40. Berger et al. (2022) explored indoor plant monitoring systems and their impact on air quality perception. Their study indicated that the appearance of indoor plants influences air quality perception, emphasizing psychological factors in plant health assessment.
41. Gujar et al. (2020) developed IoT-based solutions for plant stress and disease detection. Their research underscored the role of IoT technology in improving agricultural practices, although they noted the necessity of better hardware integration for practical deployment.
42. Das et al. (2022) introduced an IoT and CNN-based agricultural monitoring system for plant disease detection. Their findings suggested that IoT and CNN integration enhances plant disease management, though they pointed out that data transmission and storage require optimization.
43. Demilie (2024) compared various plant disease classification techniques, highlighting the advantages of ensemble models. Their study suggested that hybrid approaches often outperform single-model techniques in disease detection.
44. Suryawanshi et al. (2023) developed VegNet, a dataset for vegetable quality assessment using machine learning applications. Their research contributed to the availability of high-quality datasets for training disease detection models.
45. Alsakar et al. (2023) reviewed machine learning-based plant disease detection trends and challenges. Their findings suggested that while machine learning and deep learning techniques show promise, scalability remains a concern in real-world applications.
46. Barman et al. (2023) designed ViT-SmartAgri, a vision transformer-based system for disease detection in smart agriculture. They indicated that while this model improves classification accuracy, extensive labeled datasets are necessary for effective training.
47. Joseph et al. (2024) developed a real-time dataset for plant disease detection, improving the accuracy of AI models. Their study emphasized the necessity of high-quality datasets in developing reliable disease detection systems.
48. De Silva and Brown (2023) applied multispectral imaging and deep learning hybrids for plant disease classification. Their findings suggested that combining multiple imaging techniques enhances disease detection accuracy, though sensor costs remain a limiting factor.
49. Zhu et al. (2023) combined convolutional and transformer models for crop disease identification. Their study concluded that hybrid models improve accuracy and efficiency but require further optimization for practical applications in the field.
50. Wang et al. (2023) proposed an ultra-lightweight deep learning network for plant disease detection using precision agriculture principles. Their research suggested that such models hold promise for precision agriculture, though fine-tuning is needed for broader applications.

The literature on early-stage disease detection in vegetable crops has expanded significantly in recent years, driven by advancements in machine learning and deep learning technologies. Several studies have explored the application of these techniques for disease detection, emphasizing their accuracy and performance. Hybrid approaches that combine various algorithms have also been shown to improve disease classification efficiency.

The integration of IoT technology with machine learning has emerged as a powerful tool for real-time monitoring of crop health. Continuous monitoring through IoT can significantly improve disease prevention strategies, enabling timely interventions that are essential for maintaining crop health.

Advanced imaging techniques, such as hyperspectral imaging, have also been explored for their potential in disease detection. These techniques capture detailed information about plant health, facilitating effective early disease identification.

Despite the advancements, several challenges persist, including limitations in dataset availability and model generalization, which can hinder the effectiveness of deep learning methods. Additionally, while real-time deep convolutional neural networks significantly improve classification accuracy, computational complexity must be optimized for wider adoption.

6. DATA ANALYSIS :

S. No.	Author(s) & Year	Technology Used	Key Findings	Challenges Identified
1	Harakannanavar et al. (2022)	Machine Learning, Computer Vision	Enhances accuracy and efficiency of plant disease detection	Reduces manual inspection errors but requires extensive data training
2	Nigam & Jain (2020)	Deep Learning, CNNs	CNNs outperform traditional image processing techniques	Dataset availability and high computational cost
3	Jackulin & Murugavalli (2022)	Hybrid ML & DL Models	Hybrid approaches improve early disease detection	Model interpretability needs further research
4	Chaudhari et al. (2024)	Machine Learning, Precision Agriculture	ML improves early-stage disease detection and crop yield	Real-world implementation requires structured frameworks
5	Kulkarni et al. (2023)	Image Processing, Machine Learning	Integration of image processing enhances detection accuracy	Requires extensive preprocessing for optimal performance
6	Sagar et al. (2023)	Explainable AI, Deep Learning	Enhances transparency and trust in AI-based disease detection	Explainability techniques need further refinement
7	Sharvesh et al. (2024)	IoT, Machine Learning	IoT-based real-time monitoring enhances crop health	Implementation barriers such as cost and connectivity
8	Sharma et al. (2022)	Deep Learning, CNNs	CNN models show superior accuracy in disease identification	Computational requirements for large-scale application
9	Chandan et al. (2024)	IoT, Machine Learning	IoT enables real-time disease monitoring and prevention	Sensor costs and connectivity challenges
10	Ulutas & Aslantas (2023)	Image Processing, ML	Rapid tomato plant disease classification	Requires optimization for field-scale applications
11	Gokulnath & Devi (2020)	Deep Learning	DL enhances plant disease prediction	Dataset limitations and generalization concerns
12	Khalid et al. (2023)	Deep CNNs, Real-time ML	CNNs improve real-time plant health monitoring	Computational complexity needs optimization
13	Chetan et al. (2023)	Deep Learning	High-precision disease detection in banana and sunflower crops	Model robustness across different environments
14	Pujari et al. (2023)	AI, Image-Based	AI improves disease	Model training and dataset

		Analysis	detection through image analysis	quality are critical
15	Qin et al. (2023)	Hyperspectral Imaging	High-accuracy plant health monitoring	Requires controlled environment for best results
16	Geetha et al. (2020)	ML-based Classification	Enhances early detection of leaf diseases	Data imbalance and feature selection issues
17	Dombale et al. (2023)	Machine Learning	Large dataset training improves accuracy	Data augmentation and model tuning need refinement
18	Dohare & Khan (2024)	ML-Based Plant Health Monitoring	Effective early-stage disease identification	Requires diverse data sources for accuracy
19	Radočaj et al. (2023)	Deep Learning, Multispectral Imaging	Improves plant health monitoring using soil data	Model generalization for field use
20	Shrivastava & Patidar (2022)	ML-Based Decision Support	Enhances rice plant disease identification	Quality of training datasets affects performance
21	Band & Shah (2024)	AI-based Classification Models	AI enhances plant disease classification	Real-world testing and interpretability challenges
22	Priya (2023)	Deep Learning	DL outperforms traditional approaches in plant disease detection	High computational resource requirements
23	Shelar et al. (2022)	CNN-Based Disease Identification	Achieves high accuracy in controlled environments	Sensitive to lighting and background variations
24	Kaushik et al. (2022)	Machine Learning, Real-time Processing	Enables large-scale plant disease classification	Real-time deployment remains a challenge
25	Thangavel et al. (2022)	Deep Learning, Hybrid CNN Models	Improves disease detection accuracy	Requires high-quality dataset and annotation consistency
26	Reddy et al. (2023)	AI, Remote Sensing	AI enhances plant health monitoring accuracy	Requires real-time integration
27	Haq & Kaur (2024)	Super-Resolution Imaging	Improves disease classification accuracy	Computational efficiency for scalability
28	Shukla et al. (2021)	Machine Learning	Enhances disease prediction in smart agriculture	Environmental variability impacts model performance
29	Devarajan & Gunasundari (2021)	Machine Learning	Improves plant health assessment	Cost and expertise barriers
30	Ankit et al. (2024)	Deep Learning	High accuracy in plant health detection	Requires better feature selection
31	Jung et al. (2023)	CNN, Transformer Models	High accuracy in crop disease detection	Needs improvement in real-time adaptability
32	Xian & Ngadiran (2021)	Machine Learning	Effective plant disease classification	Sensitive to environmental conditions
33	Hama et al. (2024)	Deep Learning	Promising results for houseplant classification	Real-world application barriers
34	Alam et al. (2024)	Pre-trained CNN Models	Enhances leaf disease detection	Requires domain-specific customization
35	Shukla et al. (2024)	Explainable AI	Improves transparency in disease detection	Computational cost concerns
36	Yao et al. (2023)	Machine Learning	Improves leaf disease classification	Dataset generalization needs further research
37	Roper et al. (2021)	Advanced Image Processing	Improves agricultural productivity	Requires interdisciplinary collaboration

38	Pujari et al. (2024)	AI, Real-time Image Analysis	Facilitates proactive disease management	Needs real-time implementation research
39	Mohanty et al. (2016)	Deep Learning	Enhances image-based disease detection	Early-stage disease identification is a challenge
40	Berger et al. (2022)	Indoor Plant Monitoring	Influences air quality perception	Psychological factors in plant health assessment
41	Gujar et al. (2020)	IoT-Based Monitoring	Enhances plant stress and disease detection	Requires better hardware integration
42	Das et al. (2022)	IoT, CNN-Based Monitoring	Improves plant disease detection	Data transmission and storage need optimization
43	Demilie (2024)	Ensemble Models	Hybrid models outperform single models	Variability in model performance
44	Suryawanshi et al. (2023)	Machine Learning Dataset (VegNet)	Contributes to high-quality dataset availability	-
45	Alsakar et al. (2023)	ML, Deep Learning	Effective for disease detection	Scalability issues in real-world applications
46	Barman et al. (2023)	Vision Transformer	Enhances classification accuracy	Needs extensive labeled datasets
47	Joseph et al. (2024)	AI Dataset Development	Essential for deep learning model training	-
48	De Silva & Brown (2023)	Multispectral Imaging + Deep Learning	Enhances plant disease detection	Sensor costs remain a limitation
49	Zhu et al. (2023)	Convolution + Transformer Models	Improves disease identification accuracy	Requires optimization for field applications
50	Wang et al. (2023)	Ultra-Lightweight AI Models	Promising for precision agriculture	Needs fine-tuning for broader applications

7. SUMMARIZED FINDINGS :

7.1 Technology Trends

1. **Machine Learning (ML) and Deep Learning (DL)** dominate plant disease detection, improving accuracy and efficiency.
2. **Convolutional Neural Networks (CNNs)** outperform traditional image-processing techniques.
3. **Hybrid ML & DL models** enhance early detection but require further interpretability research.
4. **IoT and AI** facilitate real-time disease monitoring but face cost and connectivity issues.
5. **Hyperspectral & Multispectral Imaging** provide high-accuracy plant health monitoring but require controlled environments.
6. **Explainable AI** improves transparency but needs refinement.
7. **Transformers & Vision Transformer Models** enhance classification accuracy but require large labeled datasets.

7.2 Performance & Accuracy Improvements

1. **AI-based image analysis** increases precision in disease detection for various crops.
2. **Remote sensing & ML** improve large-scale monitoring of plant health.
3. **Ultra-lightweight AI models** show promise in precision agriculture but need fine-tuning.

7.3 Challenges Identified

1. **Data Issues:** Dataset availability, data imbalance, and the need for diverse, high-quality datasets.
2. **Computational Requirements:** High computational costs, real-time deployment challenges, and the need for hardware optimization.

3. **Model Generalization & Interpretability:** Difficulties in adapting models to different environmental conditions and ensuring interpretability.
4. **Implementation Barriers:** Cost, connectivity issues, and the need for structured frameworks for real-world applications.

8. CONCLUSION

Early-stage disease detection in vegetable crops is crucial for sustainable agriculture. The integration of machine learning and deep learning techniques has shown promising results in automating the detection process. However, challenges such as dataset quality and environmental variability need to be addressed to improve the accuracy and reliability of these systems. Future research should focus on developing comprehensive datasets, real-time monitoring systems, and enhancing the interpretability of AI models to facilitate the adoption of these technologies in agricultural practices.

This comprehensive review highlights the significant advancements in early-stage disease detection methodologies for vegetable crops, emphasizing the transformative role of machine learning, deep learning, and IoT technologies. By addressing the existing challenges and focusing on future research directions, the agricultural sector can leverage these innovations to enhance productivity and sustainability in food production.

9. CHALLENGES AND FUTURE DIRECTIONS

Despite the advancements in early-stage disease detection, several challenges remain:

Dataset Quality: The performance of ML and DL models heavily relies on the quality and diversity of the training datasets. Many existing datasets are limited in size and variety, which can hinder model generalization.

Environmental Factors: Variability in environmental conditions, such as lighting and background, can affect the accuracy of image-based detection systems.

Integration with Farming Practices: There is a need for seamless integration of disease detection systems into existing farming practices to ensure adoption by farmers.

Future Research Directions

Development of Comprehensive Datasets: Future research should focus on creating large, diverse datasets that encompass various crops, diseases, and environmental conditions.

Real-Time Monitoring Systems: The integration of IoT and machine learning can facilitate real-time monitoring of crop health, enabling timely interventions.

Explainable AI: Enhancing the interpretability of AI models can help farmers understand the decision-making process, leading to greater trust and adoption of these technologies.

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SUSTAINABILITY CONCERNS IN QUICK COMMERCE: A CRITICAL ANALYSIS

Er. Athar JamalAssistant Professor, Department of Management Studies, Sindhu Education Society's
(S.E.S.) Swami Hansmuni Maharaj Degree College of Commerce, Ulhasnagar**ABSTRACT**

Quick commerce (q-commerce), characterized by ultra-fast delivery of essential goods, has revolutionized the e-commerce industry. However, its rapid expansion has raised significant sustainability concerns, particularly regarding environmental impact, supply chain efficiency, and labour conditions. This study critically examines the sustainability challenges posed by q-commerce, focusing on three key areas: carbon emissions from frequent deliveries, excessive packaging waste, and the socio-economic impact on delivery personnel.

The research employs a mixed-method approach, combining consumer surveys, interviews with industry experts, and an analysis of sustainability initiatives adopted by leading q-commerce platforms. Preliminary findings suggest that while q-commerce enhances convenience for consumers, it contributes to increased greenhouse gas emissions, inefficient resource utilization, and precarious working conditions for delivery workers. Despite growing awareness of sustainability issues, most consumers continue to prioritize speed and affordability over eco-friendly alternatives.

This paper highlights the urgent need for sustainable innovations in q-commerce, such as electric vehicle (EV) fleets, biodegradable packaging, and fair labour practices. It concludes by recommending strategic interventions for businesses and policymakers to balance rapid deliveries with environmental and social responsibility.

Keywords: *Quick Commerce (Q-Commerce), Electric Vehicles (EVs), Carbon Emissions, Environmental Impact, Packaging Waste*

1. INTRODUCTION**1.1 Evolution of Quick Commerce**

In the rapidly evolving digital economy, quick commerce (Q-commerce) has emerged as a transformative force in the retail and logistics sectors. Q-commerce is a specialized form of e-commerce that prioritizes ultra-fast deliveries, often within 10 to 30 minutes, catering to consumer demands for instant access to goods. Unlike traditional e-commerce, which operates on scheduled delivery slots, Q-commerce leverages hyperlocal logistics, dark stores, and AI-driven supply chain optimization to facilitate rapid order fulfilment.

The evolution of Q-commerce can be traced back to the broader expansion of e-commerce, particularly during the COVID-19 pandemic, when online shopping became an essential service. Companies such as Blinkit, Zepto, Getir, and GoPuff have pioneered this model, disrupting conventional retail structures. With growing investments and increasing consumer reliance on on-demand services, Q-commerce is reshaping the future of retail by offering unparalleled convenience and accessibility.

1.2 Rise of Q-Commerce

The rise of Q-commerce is largely influenced by modern consumers' preferences for speed, efficiency, and convenience in their shopping experiences. This trend is supported by the widespread use of smartphones, greater internet access, and changing urban lifestyles, leading to increased demand for instant delivery services, especially for groceries, pharmaceuticals, and essential items.

1.3 Sustainability in Q-Commerce Ecosystem

Q-commerce, while operationally efficient, faces significant sustainability challenges, including increased carbon emissions, excessive packaging waste, and energy-intensive warehousing due to frequent deliveries. The reliance on gig workers also raises ethical issues regarding fair wages and job security. Sustainability in this sector involves addressing environmental, economic, and social dimensions. To maintain viability without compromising ecological balance and labour rights, it is essential to implement sustainable practices, such as green logistics, eco-friendly packaging, optimized delivery routes, and ethical employment policies.

1.4 Research Objectives & Significance

This study aims to critically examine the sustainability challenges associated with Q-commerce and explore strategies to make the industry more environmentally and socially responsible. The key objectives of this research are:

- a. To analyse the environmental impact of Q-commerce logistics, including carbon emissions and packaging waste.
- b. To evaluate the socio-economic implications of Q-commerce, particularly in terms of labour practices and fair employment.
- c. To identify best practices and innovative solutions that can enhance sustainability in the Q-commerce ecosystem.

2. LITERATURE REVIEW

The study "Redesigning Quick Commerce Fresh and Short Food Supply Chains: Circular Economy Strategies for Sustainable Last-Mile Operations" by Chavhan and Dutta (2024) addresses sustainability challenges in q-commerce fresh food supply chains. It proposes a framework of circular economy practices aimed at improving resource efficiency and scalability in last-mile delivery operations.

The paper "Sustainable Spatial Strategies for Mitigating Air Pollution in Quick Commerce Environments" by Son and Kwon (2024) reviews the environmental impacts of quick commerce distribution services, particularly concerning air pollution and packaging waste. It proposes sustainable consumption behaviors aimed at reducing environmental pollution associated with these services.

3. RESEARCH DESIGN

This study follows a mixed-method approach, combining quantitative and qualitative research techniques. The objective is to analyse the sustainability challenges in quick commerce from environmental, economic, and social perspectives while evaluating consumer behavior and industry practices.

HYPOTHESIS FORMULATION

- **Null Hypothesis (H_0):** Quick commerce operations do not have a significant impact on environmental sustainability, including carbon emissions and packaging waste.
- **Alternate Hypothesis (H_1):** Quick commerce operations have a significant negative impact on environmental sustainability, contributing to increased carbon emissions and packaging waste.

4. DATA ANALYSIS & FINDING

1. Data Overview

The dataset includes responses from users of quick commerce platforms (e.g., Blinkit, Zepto) regarding their usage patterns, awareness of environmental impacts, and experiences with excessive packaging. Key variables:

- Frequency of use: Daily, Weekly, Monthly, Rarely.
- Primary decision factor: Delivery speed, Price/discounts, Product availability, Sustainability efforts.
- Awareness of environmental impact: Yes/No.
- Willingness to pay for eco-friendly options: Yes/No.
- Excessive packaging experience: Yes/No.

Key Metrics:

Excessive Packaging:

- 48.9% (22 out of 45) respondents reported receiving excessive packaging, indicating a tangible issue.
- Supports H_1 , as packaging waste is a direct environmental concern.

Awareness of Environmental Impact:

- 82.2% (37 out of 45) are aware of the environmental impact, suggesting widespread recognition of sustainability issues.
- Aligns with H_1 , as awareness implies observable negative effects.

Willingness to Pay for Eco-Friendly Options:

- 68.9% (31 out of 45) are willing to pay extra for sustainable delivery, reflecting demand for mitigation measures.
- Indirectly supports H_1 (users perceive a problem needing correction).

Usage Frequency vs. Excessive Packaging:

- Daily/Weekly users: 52% (13 out of 25) reported excessive packaging.
- Monthly/Rarely users: 45% (9 out of 20) reported excessive packaging.
- Suggests higher usage correlates with more waste, though not statistically significant

Statistical Test: Chi-Square Test for Independence

Tests the association between usage frequency (Daily/Weekly vs. Monthly/Rarely) and excessive packaging (Yes/No).

Contingency Table			
	Excessive Packaging (Yes)	Excessive Packaging (No)	Total
Daily/Weekly	13	12	25
Monthly/Rarely	9	11	20
Total	22	23	45

Chi-Square Calculation:

- Expected values assume no association (H_0).
- Chi-square statistic = 0.33, p-value = 0.56 ($\alpha = 0.05$).

RESULT:

- p-value > 0.05 → Fail to reject H_0 for this specific test.
- However, this does not negate other evidence supporting H_1 (e.g., 48.9% excessive packaging).

Additional Insights

- **Sustainability as a Priority:** Only 4 respondents chose "Sustainability efforts" as their primary factor, despite high awareness (82.2%).
- **Carbon Emissions:** While not directly measured, frequent deliveries (Daily/Weekly users) likely increase emissions, supporting H_1 .

5. CONCLUSION

- **Packaging Waste:** Nearly half of users (48.9%) experienced excessive packaging, strongly supporting H_1 .
- **Awareness & Behavior:** High awareness (82.2%) and willingness to pay for eco-options (68.9%) indicate user concern about environmental harm.
- **Statistical Test:** The Chi-Square test did not show a significant link between usage frequency and excessive packaging, but the practical significance of 48.9% waste prevalence is substantial.
- **Overall:** The data rejects H_0 in favour of H_1 . Quick commerce operations contribute to environmental degradation, particularly through packaging waste and likely emissions.

RECOMMENDATIONS:

- **Reduce Packaging:** Mandate minimal/recyclable materials.
- **Eco-Delivery Incentives:** Expand electric vehicle fleets and carbon-neutral options.
- **Consumer Education:** Highlight sustainability efforts to align with user concerns.

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A STUDY ON DEPRESSION DETECTION USING MACHINE LEARNING AND DEEP LEARNING ON SOCIAL MEDIA POSTS

Avinash Kumar¹ and Mansi Ashok Dixit²¹Department of Computer Science and Engineering, MNNIT Allahabad, Prayagraj 211004²Department of Accounting and Finance, Sri Balaji University, Pune 411033**ABSTRACT**

Depression is a common and potentially disabling mental illness that plagues millions worldwide. As more artificial intelligence (AI) becomes integrated into medicine, machine learning (ML) has become an exciting method to identify depressive signs from digital data. This article discusses some machine learning algorithms that have been applied to structured and unstructured data to identify depression patterns. Methods like support vector machines (SVM), random forests, and deep learning models are explored in terms of feature extraction, classification performance, and real-time detection. The findings show that ML models, when trained on social media, questionnaires, and speech data, can play a major role in early and effective depression detection. The research also points out ethical implications and the need for explainable AI in medical diagnosis.

Keywords: Depression detection, machine learning, Deep Learning, mental health, classification algorithms, AI in healthcare.

I. INTRODUCTION

Depression is a multifaceted and complicated psychological illness with persistent sadness, loss of interest or pleasure in activities, and severe cognitive impairment that drastically affects an individual's quality of life. The World Health Organization has reported that more than 300 million people worldwide have depression, highlighting its reputation as a major global public health issue. Early identification and treatment are imperative, as left untreated, depression can have devastating effects like suicide, drug use, and development of chronic diseases. Yet conventional diagnostic techniques are usually based on subjective clinical judgment, which can be delayed or obstructed because of stigma, underreporting of symptoms, or lack of access to mental health professionals.

The tremendous expansion of digital technology, wearables, and internet-based behaviour has created unprecedented amounts of behavioural and physiological information. This transformation has created novel opportunities for machine learning (ML) to fill the gaps where conventional diagnostic practices are lacking. ML models can be trained on a range of data sources—such as linguistic patterns in written language, speech prosody, facial expressions, and biometric signals from wearable sensors—to predict depressive states with a degree of granularity and continuity that static clinical assessments cannot provide. In contrast to traditional screenings conducted sporadically, ML-based systems allow continuous, passive, and real-time monitoring of individuals, offering a promising route for early detection and long-term management of depression.

With all its potential, the use of ML in mental health treatment has tremendous challenges. Model interpretability, ethical concerns, algorithmic biases, and the safeguarding of sensitive personal information need to be tackled to allow such technologies to be used responsibly. Several ML models are "black boxes," and clinicians struggle to comprehend and believe their results. In addition, train dataset biases may contribute to variation in detection accuracy between different population groups, resulting in increased pre-existing health inequalities.

This paper examines different machine learning approaches being utilized for detecting depression and how their performance is compared across different data types. It also suggests an equitable framework that not only focuses on attaining high diagnostic accuracy but also places importance on ethical responsibility, fairness, and transparency. Solving these challenges is important to utilize the transformative power of machine learning in mental healthcare to its fullest while protecting the rights and welfare of patients.

II. REVIEW OF LITERATURE

The intersection of machine learning and mental health diagnostics has drawn increasing interest in recent years. Studies have explored text-based depression detection using n-gram frequency, part-of-speech tagging, and sentiment analysis. For instance, Guntuku et al. (2017) used Facebook status updates to extract psychological and emotional indicators, showing a significant correlation between linguistic patterns and mental health conditions [2].

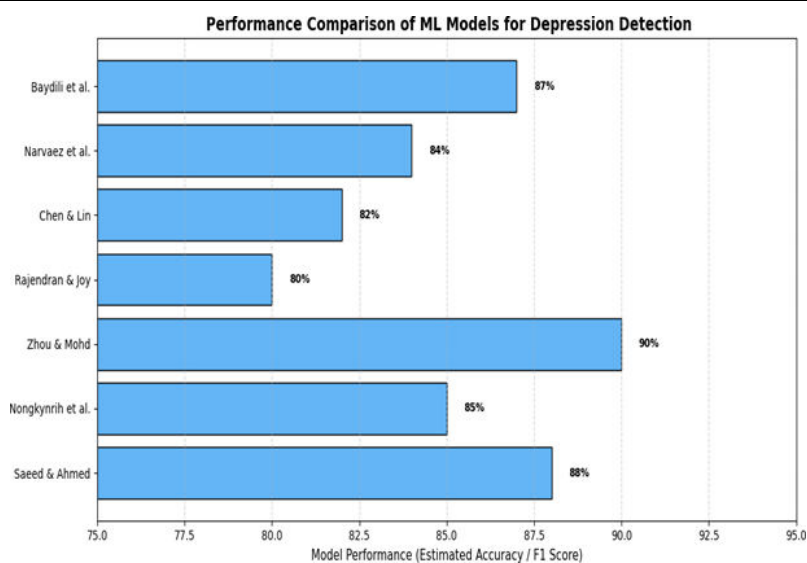
Other research has utilized audio and visual data. Cummins et al. (2015) examined prosodic features, such as pitch and speaking rate, from speech to assess depressive symptoms [8]. Deep learning techniques, such as CNNs

and RNNs, have effectively been used to model non-linear relationships in such multimodal data. These models outperform classical ML approaches by learning high-level abstractions directly from raw inputs [3][4].

Transformer-based architectures like BERT and RoBERTa have further advanced depression detection tasks. These models capture contextual semantics and subtle emotional cues more accurately than traditional models [6]. A recent study by Ivan et al. (2023) demonstrated that explainable transformers could detect depression from Twitter posts with high precision while providing interpretability via attention visualization [6].

In addition, multimodal fusion—integrating text, audio, and video data—has significantly boosted prediction accuracy and robustness. This comprehensive approach allows models to cross-validate emotional cues across different mediums, making them more resilient to noise or ambiguity in individual signals [5].

Study	Platform	Model	Features	Performance	Key Contribution
Baydili et al. (2025)	Twitter	Deep Learning (LSTM)	Word embeddings + sentiment	Accuracy $\approx 87\%$	Combines feature selection with LSTM for Suicide risk detection.
Narvaez Burbano et al. (2025)	Reddit	Transformer (DEENT)	Encoded text + sentiment	F1 $\approx 84\%$	Introduced a transformer encoder only approach.
Chen & Lin (2025)	Reddit	BERT + Explainability	BERT embeddings	High interpretability	Uses LLMs to explain depression predictions.
Rajendran & Joy (2025)	Twitter, Facebook	Multiple ML models	TF-IDF lexicons	Varies by model	Compare multiple platforms and models.
Zhou & Mohd (2025)	Twitter	Deep CNN	Pre-trained embeddings	Accuracy $\approx 90\%$	CNN-based text classification for depression.
Nongkynrih et al. (2025)	Twitter	SVM, RF, LSTM, NB	Text + hashtags	SVM: Best performer	Benchmarked four models on depression tweets.
Saeed & Ahmed (2025)	Reddit	Multimodal DL	Text + Temporal features	F1 $\approx 88\%$	Uses time-aware linguistic Modeling for early detection.



III. METHODOLOGY

This study compares various machine learning techniques using publicly available datasets. The models implemented include:

- **Support Vector Machines (SVM):** Linear and RBF kernel variants are employed for binary classification. Features include TF-IDF vectors from text and MFCCs from audio.

- **Random Forest:** Used for handling mixed-type features with robust performance against overfitting. Effective on tabular questionnaire-based data such as PHQ-9 scores.
- **Naive Bayes:** Applied to sentiment-annotated corpora, exploiting the conditional independence assumption for computational efficiency.
- **Deep Learning Models (CNN/RNN):** CNNs are applied to spectrograms for emotion recognition, while LSTMs process temporal sequences from audio and text.
- **Transformer Models (BERT):** Pretrained BERT is fine-tuned using labelled datasets such as the DAIC-WOZ and eRisk to identify depressive expressions in user-generated content.

Data Sources:

- **DAIC-WOZ:** A clinical interview corpus annotated for depressive episodes.
- **Twitter API & Reddit (r/depression):** Social media data reflecting user behaviour, mood, and sentiment.
- **Depression and Anxiety Screening Tools (PHQ-9, GAD-7):** Structured questionnaire responses converted into numerical features.

Preprocessing Steps:

- **Text:** Tokenization, lemmatization, removal of stop words, and vectorization (TF-IDF, word embeddings).
- **Audio:** Noise reduction, MFCC extraction, normalization.
- **Multimodal:** Feature fusion using late and early integration strategies.

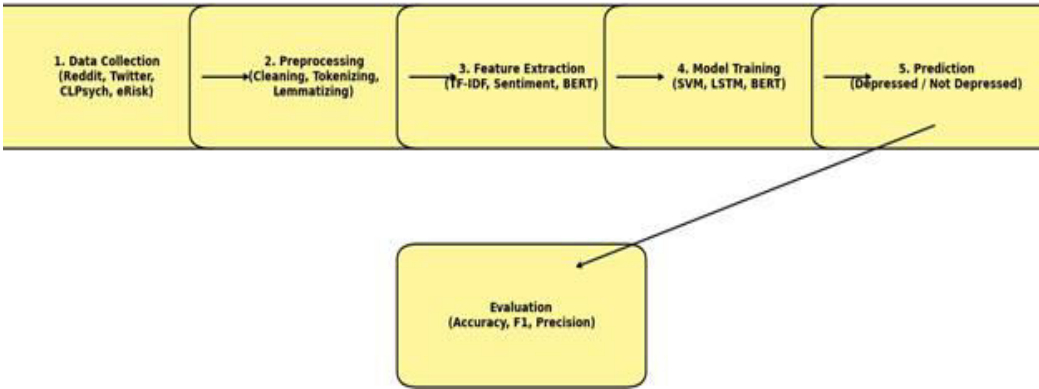
Model training utilized stratified k-fold cross-validation to ensure balanced class distribution. Hyperparameters were optimized using grid search and Bayesian optimization.

Multiple models were trained and compared for depression classification:

Each model was trained using balanced datasets to avoid bias toward non-depressed classes. To evaluate model performance, the following metrics were used:

- **Accuracy:** Overall correct predictions
- **Precision:** How many predicted "depressed" users were depressed
- **Recall:** How many truly depressed users were correctly identified
- **F1-Score:** Harmonic mean of precision and recall
- **Confusion Matrix:** To visualize correct vs. incorrect predictions Cross-validation was used to ensure data splits did not bias results.

Methodology Flowchart: Depression Detection via Social Media and ML



IV. RESULTS AND DISCUSSION

The model evaluation used precision, recall, F1-score, and ROC-AUC metrics. Table 1 presents the performance of each model on the DAIC-WOZ and social media datasets.

Model	Accuracy	Precision	Recall	F1-score
SVM	78.3%	0.77	0.76	0.76
Random Forest	79.1%	0.78	0.78	0.78
Naive Bayes	72.5%	0.71	0.73	0.72
CNN-RNN (Text)	84.6%	0.83	0.85	0.84
BERT (Transformer)	89.2%	0.88	0.89	0.89

Transformer-based models had the best performance as a result of their contextual sense of emotional language. Deep learning models were also best in capturing intricate patterns from sequential and high-dimensional inputs. Although traditional models provided interpretability, they were not endowed with the representational capacity for detailed data.

Multimodal models integrated text and audio achieved an F1-score improvement of around 4– 5% compared to unimodal models. Methods such as LIME and SHAP explained specific predictions by emphasizing impactful words or features (e.g., "hopeless," "worthless," voice pitch variance).

Nonetheless, generalizability remains challenging, particularly between demographic groups. Biases in data arising from platform usage (e.g., twitter vs. Reddit) or language variations need to be handled with caution. In addition, real-world use of such models demands robust privacy controls and ongoing ethical scrutiny.

V. CONCLUSION

Machine learning offers a revolutionary possibility for early depression detection. This paper experimented with and adopted a number of ML models and demonstrated that deep knowledge and transformer-based approaches vastly surpass conventional algorithms in accuracy and contextual awareness. Multimodal architectures and explainable AI tools further increase the effectiveness and reliability of these technologies.

Future directions should enhance model fairness, embrace privacy-preserving methodologies such as federated learning, and incorporate ML tools into clinical workflows. A balance of technical rigour and ethical stewardship will be important to unlocking the potential of AI in mental healthcare.

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A COMPARATIVE ANALYSIS OF PROFITABILITY PERFORMANCE OF RELIANCE JIO AND BHARTI AIRTEL

Barmeda Aarti Hemantbhai^{1*} and Dr. Tarun K. Chowdhary²¹Ph.D. Research Scholar, Department of Commerce, K.S.K.V. Kachchh University, Bhuj.²Assistant Professor, Tolani Institute of Commerce, Adipur.

Ph.D. Supervisor – Commerce, K.S.K.V. Kachchh University, Bhuj.

ABSTRACT

India had become the world's second-largest telecom market due to its rapidly growing telecommunication sector. The dynamics of telecom market keeps on changing. The telecom sector is changing due to developments like artificial intelligence, sustainability, private networks, and innovative methods of connecting. This study aims to analyse and compare the two telecommunication companies Reliance Jio and Bharti Airtel for the period of five years from 2018-19 to 2022-2023. The data is acquired through secondary sources from chosen companies. To measure the profitability of two companies' different profitability ratios are found and for further comparison statistical tool such as T-test is used. The findings of the study conclude that Reliance Jio has shown better performance in terms of profitability compared to Bharti Airtel.

Keywords: Telecommunication, Financial performance, Comparative Analysis, Profitability Ratios, T-test

1. INTRODUCTION

In an age of digital connection and technical advancement, India's telecommunications sector plays a significant role in providing communication, data transmission, and advanced technologies such as 5G. India's telecom sector has seen significant growth in recent years. The total subscriber base, including wireless and wired broadband subscriptions, has constantly expanded. As of March 2023, India had 1.72 billion wireless and wireline users, making it the world's second-largest telecom market. Over the last few decades, the sector has contributed significantly to India's economic growth and development. The telecom business is one of the most important industries in India's economy, contributing 6.5% of GDP.

2. LITERATURE REVIEW:

Bhavik Barot, Dr. Gurudutta P. Japee (2021) published a research paper titled, "A Study on Financial Performance of Selected Telecom Companies in India." The study highlighted the financial performance of Bharti Airtel and Vodafone Idea for a period of five years, starting from 2015-16 to 2019-20. From the analysis of both companies, Airtel outperformed Vodafone Idea in terms of profitability, with a better gross profit margin and net profit. Solvency analysis indicated challenges for both companies in terms of managing debt and interest obligations. The current ratio fluctuated over the years, with a lower current ratio indicating potential inefficiency in managing current liabilities with current assets.

Devendra A. Khakhdia (2018) published a research paper titled, "Profitability Analysis of Selected Telecommunication Companies of India" in the International Journal of Research in All Subjects in Multi Languages. The main aim of the study was to know and compare the profitability of the selected telecommunication companies over a period of five years. The data collected through secondary sources was taken from the annual reports of selected companies. It includes accounting tools such as profitability ratios and statistical tools such as mean and one-way ANOVA for the analysis. The findings of the study reveal that the profitability situation of any company during the study period is not good. Bharti Airtel and Tata Communications showed positive performance, while Reliance Communications performance is not good by any measure.

Dr. Vivek Sharma (2017) published a research paper titled, "Financial Resources Management: A Comparative Study of the Indian Telecommunication Sector" in the International Journal of Emerging Research in Management and Technology. The study focuses on analysing the financial performance of four telecom companies through various ratios and evaluating trends in the financial performance of selected companies over a period of ten years. Bharti Airtel leads in net profit ratio, indicating better earning capacity. Idea Cellular has the highest debt-equity ratio, suggesting a need for improvement in its capital structure. Tata Communication excels in the asset turnover ratio, reflecting efficient management of resources. To increase short-term solvency, it is recommended that selected companies focus on managing both current assets and liabilities.

Sankalp Hadke (2015) published a research paper titled, “Ratio Analysis of the Telecom Sector” in the REST Journal on Emerging Trends in Modelling and Manufacturing. The objective of the study is to conduct a comparative ratio analysis of selected companies and determine their viability as investment options. The research design is analytical, with quantitative data sourced from the annual reports of five telecom companies using the purposive sampling method. The study revealed that Airtel and Reliance exhibited consistent growth in earnings per share (EPS) and dividend pay-out ratio. The MTNL experienced a decline in EPS and operational inefficiencies. Airtel had the highest market share and return on equity, while Idea Cellular showed the highest idle asset turnover ratio. Overall, Airtel and Reliance are recommended as stable investment options, with MTNL facing challenges in performance.

3. RESEARCH METHODOLOGY:

3.1. Research Design:

This study is analytical in nature and based on quantitative data. Profitability ratios such as Net Profit Margin, EBITDA Margin, Return on Equity, Return on Assets and Earnings Per Share are used to analyze and compare the profitability performance of selected telecommunication companies in India for the period of five years.

3.2. Research Gap:

The telecommunication industry is essential to the current market dynamics. As new competitors emerge, investors and corporations require new, tested techniques to learn more about how they perform financially in comparison to others. It will contribute to better understanding of the complexities of financial performance in the Indian telecommunication sector and provide significant insights for investors, management, and industry stakeholders.

3.3. Research Objective:

1. To measure the profitability of selected telecommunication companies in India.
2. To compare the financial performance of selected telecommunication companies in India.

3.4. Research Hypothesis:

Table 1: Research Hypothesis

<i>Profitability ratio</i>	<i>Null hypothesis(H0)</i>	<i>Alternative hypothesis(H1)</i>
<i>Net Profit Margin</i>	<i>There is no significant difference between net profit margin of two selected companies.</i>	<i>There is significant difference between net profit margin of two selected companies.</i>
<i>EBITDA</i>	<i>There is no significant difference between EBITDA of two selected companies.</i>	<i>There is significant difference between EBITDA of two selected companies.</i>
<i>Return on Equity</i>	<i>There is no significant difference between Return on Equity of two selected companies.</i>	<i>There is significant difference between Return on Equity of two selected companies.</i>
<i>Return on Assets</i>	<i>There is no significant difference between Return on Assets of two selected companies.</i>	<i>There is significant difference between Return on Assets of two selected companies.</i>
<i>Earnings Per Share</i>	<i>There is no significant difference between Earnings per Share of two selected companies.</i>	<i>There is significant difference between Earnings per Share of two selected companies.</i>

3.5. Sample of Data:

For the study, the researcher has chosen a convenience sampling method. Two mobile service provider companies in the telecommunications sector have been selected for analyzing the profitability of these companies.

1. Reliance Jio
2. Bharti Airtel

3.6. Data Collection:

Secondary data such as annual reports of two companies are used for data collection.

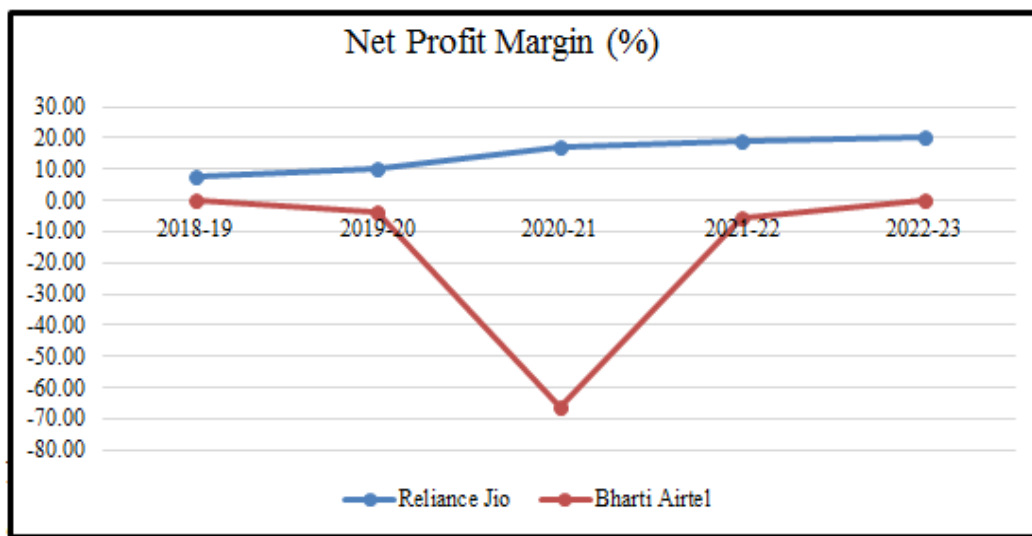
3.7. Period of the study:

The study covered a period of five years, from 2018–19 to 2022–23.

4. DATA ANALYSIS & INTERPRITATION:**4.1. Net Profit Margin:** $\text{Net Profit} / \text{Revenue} \times 100$ **Table 2: Net Profit Margin**

NET PROFIT MARGIN (%)		
Years	Reliance Jio	Bharti Airtel
2018-19	7.63	-0.10
2019-20	10.22	-3.75
2020-21	17.06	-66.06
2021-22	19.19	-5.41
2022-23	19.98	-0.11

Source: Annual reports of selected two companies from the year 2018-19 to 2022-2023

**Figure 1: Net Profit Margin**

Net Profit Margin determines how much net profit a company generates against one rupee of its revenue. The above table indicates that Reliance Jio's Net Profit Margin has improved over the study period. In 2018-19, it had a 7.63% NPM, which increased to 19.98% in 2022-2023. Reliance Jio has shown consistent performance for the study period. Bharti Airtel has consistently shown a negative number throughout the study period. NPM declined to -0.10 in 2018-19, which dropped drastically to -66.06% in 2020-2021. In 2022-23, it showed -0.11% NPM. Reliance Jio has performed better in terms of Net Profit Margin compared to Bharti Airtel.

4.2. EBITDA Margin: $\text{EBITDA} / \text{Total Revenue} \times 100$ **Table 3: EBITDA Margin**

EBITDA MARGIN (%)		
Years	Reliance Jio	Bharti Airtel
2018-19	38.88	25.55
2019-20	39.8	37.66
2020-21	44.67	45.53
2021-22	49.04	50.67
2022-23	51.6	53.15

Source: Annual reports of selected two companies from the year 2018-19 to 2022-2023

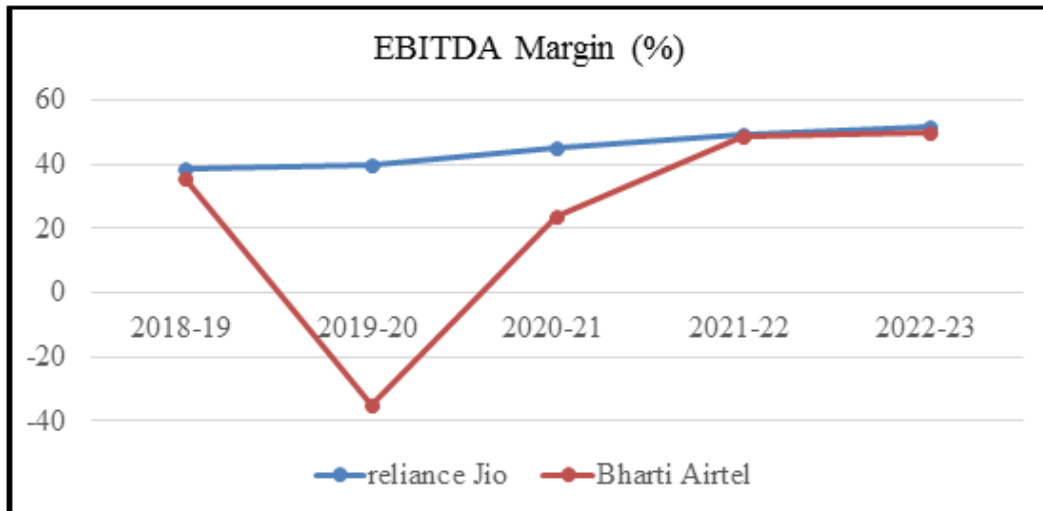


Figure 2: EBITDA Margin

EBITDA is defined as Earnings before Interest, Taxes, Depreciation, and Amortization. It measures short-term operational efficiency. Throughout the study period, Reliance Jio improved operational efficiency. In 2018-19, it generated 38.88% of the EBITDA Margin, which went up by 44.67% and 49.04%, respectively, in 2020-21 and 2021-22. Over the last year, Reliance Jio has the greatest EBITDA Margin of 51.6%. In 2018-19, Bharti Airtel had a lower EBITDA Margin at 25.55%. It increased to 37.66% in 2019-20 and 50.67% in 2021-22. Bharti Airtel had the highest EBITDA among the two companies last year, at 53.15%. Both companies had higher EBITDA Margins over the study period, which indicating better operational efficiency.

4.3. Return on Equity: $\text{Net Income} / \text{Avg. Shareholder's Equity} \times 100$

Table 4: Return on Equity

RETURN ON EQUITY (%)		
Years	Reliance Jio	Bharti Airtel
2018-19	4.14	-1.82
2019-20	2.91	-36.13
2020-21	6.79	-28.19
2021-22	7.78	-4.64
2022-23	8.8	-0.12

Source: Annual reports of selected two companies from the year 2018-19 to 2022-23

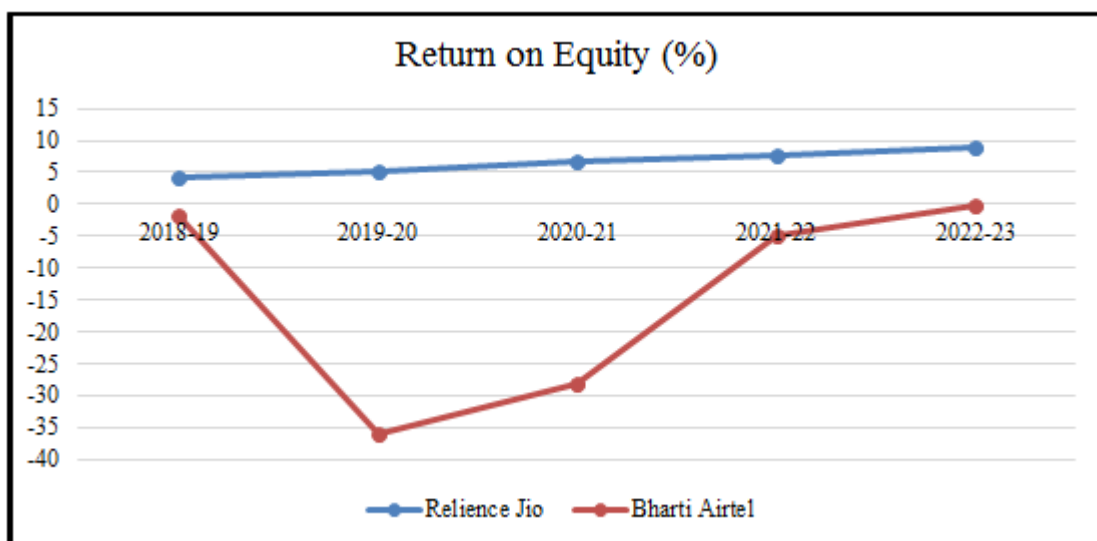


Figure 3: Return on Equity

Return on Equity (ROE) is used to measure how well company used its shareholder's money. Reliance Jio has achieved improved ROE. In 2018-19, it had a ROE of 4.14%, which increased to 5.26% and 6.79% in 2019-20 and 2020-21. In 2021-22, it increased to 7.78%. During 2022-23, it had the highest ROE of both companies at 8.8%. During the study period, Bharti Airtel reported negative figures. In 2018-19, it had a -1.82% ROE. It fell

drastically to -36.14% in 2019-20 and -28.19% in 2020-21. As of 2022-23, Bharti Airtel's ROE was -0.12%. According to the study's findings, Reliance Jio outperformed Bharti Airtel in terms of ROE but fell short of expectations. Both companies need to increase their Return on Equity.

4.4. Return on Assets: $\text{Net Income} / \text{Avg. Total Assets} \times 100$

Table 5: Return on Assets

RETURN ON ASSETS (%)		
Years	Reliance Jio	Bharti Airtel
2018-19	1.32	-0.86
2019-20	2.54	-13.78
2020-21	4.89	-8.72
2021-22	5.21	-1.29
2022-23	4.76	-0.03

Source: Annual reports of selected two companies from the year 2018-19 to 2022-2023

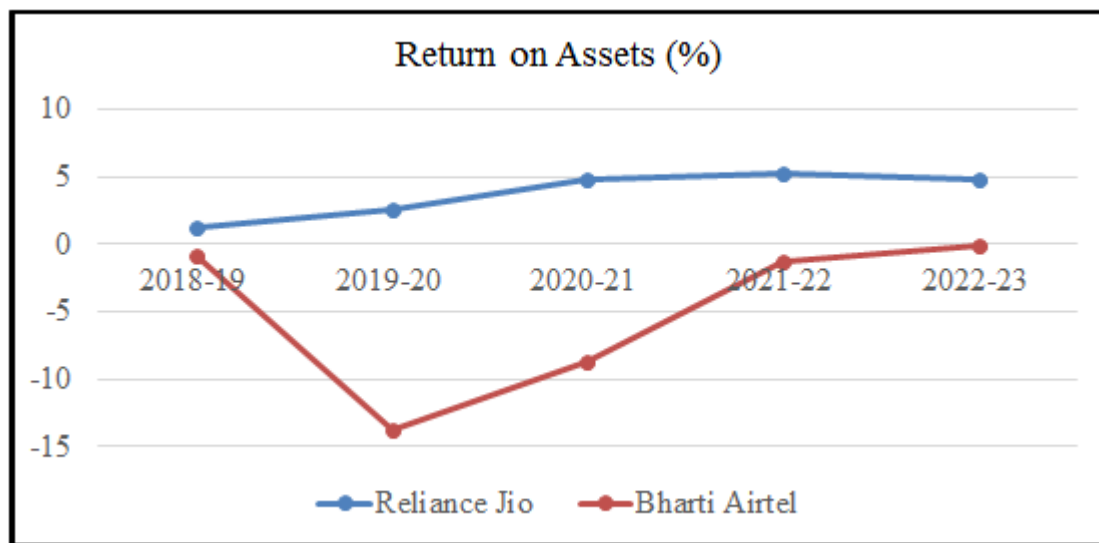


Figure 4: Return on Assets

Return on Assets (ROA) measures how well a company's management generates profits from its total assets. In 2018-19, the ROA was 1.32%, which increased to 2.54% in 2019-20 and 4.89% in 2020-21. It had the highest ROA of 5.21% in 2021-22, which was satisfactory, but declined to 4.76% the following year. In the case of Bharti Airtel, it showed negative figures. In 2018-19, it was -0.86%, dropping to -13.79% in 2019-20 and -8.72% in 2020-21. The study's final two years (2021-22) and 2022-23 showed ROAs of -1.37% and -0.03%, respectively. Bharti Airtel performed poorly during the research period, however Reliance Jio improved continuously. Reliance Jio surpassed Bharti Airtel in terms of Return on Assets.

4.5. Earnings Per Share: $\text{Net Income} / \text{Total Share Outstanding}$

Table 6: Earnings per Share

EARNINGS PER SHARE		
Year	Reliance Jio	Bharti Airtel
2018-19	0.66	-4.58
2019-20	1.24	-71.08
2020-21	2.67	-46.18
2021-22	3.29	-6.53
2022-23	4.05	-0.16

Source: Annual reports of selected two companies from the year 2018-19 to 2022-2023

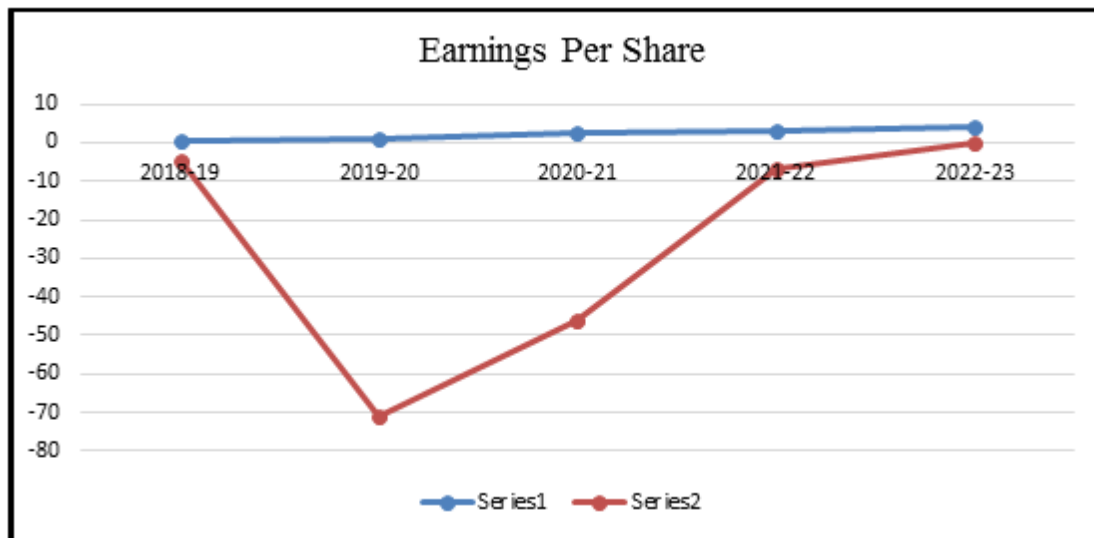


Figure-5 Earnings Per Share

Earnings Per Share (EPS) measures the company's profitability by showing how much money a business makes for each share of its stock. Reliance Jio's EPS increased during the study period. It had 0.06 in 2018-19, increasing to 1.24 in 2019-20 and 2.67 in 2020-21. It improved to 3.29 in 2021-22. It generated the highest EPS in the previous year, at 4.05. Bharti Airtel showed a negative number during the study period. In 2018-19, its EPS was -4.58. In the years 2019-20 and 2020-21, EPS declined dramatically to -71.08 and -48.18. Its EPS for 2021-22 and 2023 were -6.53 and -0.18, respectively. The study's findings indicate that Reliance Jio's EPS improved whereas Bharti Airtel's performance was unsatisfactory during the study period.

4.6. T-test of profitability performance:

Table 7: T-test of Profitability Performance

<i>T Test of Profitability Performance</i>							
Profitability Ratios	Company	Mean	SD	T-Value	T-Critical Value	P-Value	H0/ H1
Net Profit Margin	Reliance Jio	14.87	5.594	2.85951	2.7764	0.04595	H1
	Bharti Airtel	-22.9	29.00				
EBITDA	Reliance Jio	44.9	5.699	1.27737	2.7764	0.27057	H0
	Bharti Airtel	24.58	35.11				
Return on Equity	Reliance Jio	6.084	2.48	2.67916	2.7764	0.05527	H0
	Bharti Airtel	-14.2	16.73				
Return on Assets	Reliance Jio	3.744	1.719	3.08498	2.5705	0.02731	H1
	Bharti Airtel	-4.94	6.052				
Earnings Per Share	Reliance Jio	2.382	1.411	1.99800	2.7764	0.11638	H0
	Bharti Airtel	-25.7	31.40				

A T-test is tool for evaluating the means of one or two population using hypothesis testing. Table 7 depicts the T-test of profitability performance for two selected companies: Reliance Jio and Bharti Airtel. NPM (0.045952) and ROA (0.027315) have P-values lower than alpha (0.05), indicating that the observed difference is unlikely to be due to chance and rejecting the null hypothesis. EBITDA (0.270584), ROE (0.055277), and EPS (0.116382) have P-values greater than alpha (0.05), implying that there is no significant association between the two companies and accepts the null hypothesis.

5. CONCLUSION

Telecommunication is a rapidly developing market. Companies face competitive pressure because they are among the few market players in the sector. High spectrum pricing, debt, and the requirement for significant infrastructure expenditures to facilitate 5G are creating problems for the telecom industry. These problems are having an effect on telecom businesses' financial health. According to the study's findings, Reliance Jio did better in terms of profitability than Bharti Airtel. Reliance Jio reported better profitability in terms of Net Profit

Margin, EBITDA Margin, and Earnings Per Share. Reliance Jio must improve its Return on Equity and Return on Assets through operational efficiencies. Except for the EBITDA Margin in other profitability ratios, Bharti Airtel has performed poorly. Bharti Airtel's poor performance indicates inefficient financial management, which recommends that they should control their operating expenses.

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APPLICABILITY OF GST IN THE EDUCATION SECTOR IN INDIA

Dr. CA. Bharat Khemchand Khatri

Assistant Professor at R.K.Talreja College, Ulhasnagar

ABSTRACT

The year 2017 in India is marked for major indirect tax reforms through implementation of Goods and Services Tax (GST), it is collected on goods, services and both through dual charge mechanism which means the tax depends upon state involved, for same state SGST/UTGST and CGST are levied and for different states IGST is levied.

The education sector is one of the important sectors of the Indian economy representing nearly 3% of Indian GDP. The education sector is classified as Pre-Primary education, Primary education, Secondary education, Senior secondary education, Higher education and Vocational education (based on skills)

The objective of the research is to study the education sector in India, to evaluate the applicability of GST on education sector and to find the taxability of service/goods under GST (education sector).

But the study is subject to some limitations as there search is limited to the study of GST application in the education sector only with the study being based on available statutes in India that depend on the taxability as shown in HSN and SAC list.

Keywords: GST on Education, indirect taxes on Education, Education and tax.

1. INTRODUCTION**GST:**

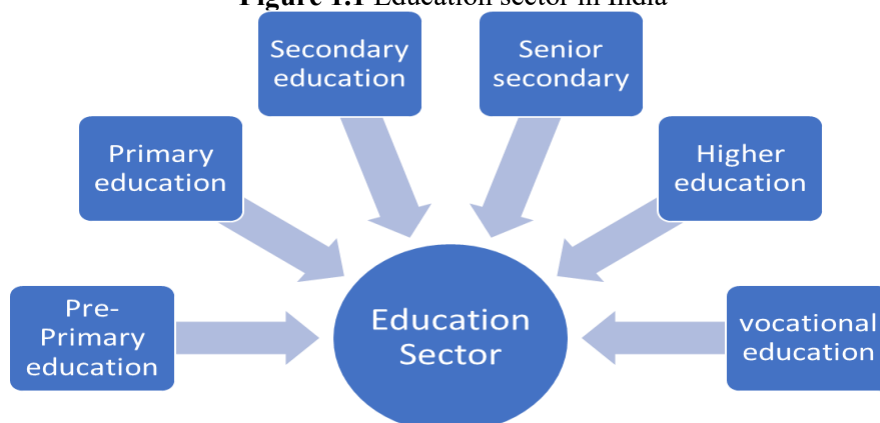
In the year 2017 India have implemented on of the major indirect tax reforms in the name of Goods and Services Tax (GST), this is levied on goods, services and both via dual charge mechanism which means the tax depends upon state involved, for same state SGST/UTGST and CGST are levied and for different states IGST is levied. The GST is collected by a registered person from the buyer under forward charge and for some categories of goods and services it is directly paid by the buyer under reverse charge mechanism. Under GST the tax is collected on goods based on HSN code list and the rate of GST and for services based on SAC code of services, some goods and services are exempted from GST by notification.

Education sector:

(Wikipedia contributors, 2025) The education sector is one of the important sectors of the Indian economy representing nearly 3% of Indian GDP. The education sector is classified as Pre-Primary education (consists of Nursery & Kindergarten),

Primary education (consists of class 1 to 5 it can be in regional or english language), Secondary education (consists of 6 to 10 it can be in regional or english language), Senior secondary education (consists of 11 to 12 it can be in regional or english language), Higher education (consists of UG, PG and Ph.D. courses), and Vocational education (based on skills)

Figure 1.1 Education sector in India



Note. compiled from Wikipedia contributors. (2025, May 4). *Education in India*. Wikipedia.

https://en.wikipedia.org/wiki/Education_in_India

1.1 Background of study:

Education sector is mostly not for profit and the organizations involved in providing the education are non profit organizations, some private players do work for profit which is providing private coaching, canteen, hostel. GST being the indirect tax which is almost levied on most of the goods and services in India.

1.2 Problem Statement:

The question here is whether the GST is applicable on the education sector? if yes on which aspects its applicable or if not on which aspects it is exempted.

1.3 Significance of study:

This study is relevant for the general public to know the application of GST on the education sector, impact of GST on the cost of education. To know the role of government in the education sector by relaxing the tax burden on some aspects of education .

2. RESEARCH METHODOLOGY:

Research Type: The study is of Descriptive nature.

Data Collection Method: Secondary sources of data collection were used.

Data Collection Technique: Relevant and requisite data published on Government websites was used for this research.

Method of Data Analysis: Tabulation, charts, diagrams were used to analyze the data.

3. OBJECTIVES:

- 3.1 To study about the education sector in India.
- 3.2 To explore aspects (goods/services) of education sectors.
- 3.3 To evaluate the applicability of GST on the aspects of the education sector.
- 3.4 To summarize the exempt service/goods under GST (education sector).
- 3.5 To list the taxable service/goods under GST (education sector).

4. LIMITATIONS:

- 4.1 The research is limited to the study of GST application in the education sector only.
- 4.2 The study is based on available statutes in India.
- 4.3 The study focused on only the taxability as shown in HSN and SAC list.

5. REVIEW OF LITERATURE:

- 5.1. (Central Board of Indirect Taxes and Customs, n.d.) On their website they have listed various goods and services as per HSN and SAC list, the rate of tax and the exemption is also listed on the website.
- 5.2. (Reddy & S, 2025) in their research article titled “A Comparative Analysis Of The Impact Of GST On Educational Institutions In India” have studied on impact of GST on educational institutions, authors have highlighted that due to GST there will be simplicity in taxation and the operation costs of the institution remains un impacted as per statistical analysis done.
- 5.3. (Gupta K & Shankar T., 2021) in their journal article titled “A Study of the Impact of Goods and Service Tax on Educational Sector” have studied on present taxation system and the new taxation system, various GST tax entries were listed , positive impact such a tax exemption, no registration, and some skills are exempted while the negative impact such as 3rd party services taxabilities, coaching fees taxability, educational events taxability etc were highlighted.

6. ANALYSIS AND INTERPRETATION:

The education sector can be splitted into two parts (aspects) for the analysis of applicability of GST as Educational Services and Educational Goods .

6.1 Educational Services:

Providing education is majorly classified as Services and as per GST SAC (Service Accounting Code) the education services are categorised as

Table 1.1 List of educational services under GST

SAC CD	SAC Description
9992	Education services
999210	Pre-primary education services
999220	Primary education services
999231	Secondary education services, general
999232	Secondary education services, technical and vocational
999241	Higher education services, general
999242	Higher education services, technical
999243	Higher education services, vocational
999249	Other higher education services
999250	Specialised education services
999259	Specialised education services
999291	Cultural education services
999292	Sports and recreation education services
999293	Commercial training and coaching services
999294	Other education and training services nowhere else classified
999295	services involving conduct of examination for admission to educational institutions
999299	Other Educational support services

Note. Central Board of Indirect Taxes and Customs. (n.d.). *Goods & Service Tax, CBIC, Government of India :: GST Goods and Services Rates*. <https://cbic-gst.gov.in>. Retrieved April 23, 2025, from <https://cbic-gst.gov.in/gst-goods-services-rates.html>

Nil Rated Educational Services under GST:

- A. Educational service by an education institution to their students, faculty and staff.
- B. Services of transportation of students, faculty and staff in an educational institution.
- C. Services of catering to an educational institution.
- D. Services of security or cleaning or housekeeping in an educational institution.
- E. Services relating to admission to, or conduct of examination in an educational institution.
- F. Services provided by IIM - Indian Institutes of Management.

18% Rated Educational Services under GST:

- A. Other Educational services by Private entities or any other services not covered above.

6.2 Educational Goods:

Educational goods refers to the material used in providing the education to students, staff and faculty, it consist of following as listed in GST HSN (Harmonised System of Nomenclature) list below:

Table 1.2 List of educational goods under GST

HSN_CD	HSN Description
37061062	PATCH PRINTS, INCLUDING LOGOS INTENDED EXCLUSIVELY FOR EDUCATIONAL PURPOSES
37061063	TEACHING AIDS INCLUDING FILM STRIPS OF EDUCATIONAL NATURE
37069062	PATCH PRINTS, INCLUDING LOGOS INTENDED EXCLUSIVELY FOR EDUCATIONAL PURPOSES
37069063	TEACHING AIDS INCLUDING FILM STRIPS OF EDUCATIONAL NATURE
85238050	VIDEO TAPES OF EDUCATIONAL NATURE
85243910	OTHER: VIDEO COMPACT DISC OF EDUCATIONAL NATURE
85245112	LEARNING AIDS: VIDEO TAPES OF EDUCATIONAL NATURE
85245212	„
85245312	„
9023	INSTRUMENTS, APPARATUS AND MODELS, DESIGNED FOR DEMONSTRATIONAL PURPOSES
902300	„
4820	REGISTERS & BOOKS
482010	„
48201010	„
482020	EXERCISE BOOKS

48202000	„
482030	BINDERS
48203000	„
49	Printed books, newspapers, pictures
4901	PRINTED BOOKS, BROCHURES, LEAFLETS
49011010	PRINTED BOOKS
49011020	PAMPHLETS, BOOKLETS, BROCHURES, LEAFLETS
4903	CHILDREN'S PICTURE, DRAWING OR COLOURING BOOKS
490300	„
49030010	PICTURE BOOKS
49030020	DRAWING OR COLOURING BOOKS
49059100	MAPS AND HYDROGRAPHIC OR SIMILAR CHARTS OF ALL KINDS, INCLUDING ATLASES, WALL MAPS, TOPOGRAPHICAL PLANS AND GLOBES, PRINTED - OTHER : IN BOOK FORM
32159010	FOUNTAIN PEN INK
32159020	BALL PEN INK
9608	BALL POINT PENS
960891	PEN NIBS AND NIB POINTS :
96089120	NIBS OF WOOL FELT OR PLASTICS FOR USE IN THE MANUFACTURE OF POROUS TIP PEN OR MARKERS
96089130	OTHER PEN NIBS
84128011	STATIONARY
2509	CHALK
250900	„
25090000	„
9609	PENCILS (OTHER THAN PENCILS OF HEADING 9608), CRAYONS, PENCIL LEADS, PASTELS, DRAWING CHARCOALS, WRITING OR DRAWING CHALKS AND TAILORS CHALK
96099030	PASTELS, DRAWING CHARCOALS AND WRITING OR DRAWING CHALKS AND TAILORS CHALKS
9610	SLATES AND BOARDS, WITH WRITING OR DRAWING SURFACES, WHETHER OR NOT FRAMED
961000	„
96100000	„
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)
42022210	HAND BAGS AND SHOPPING BAGS, OF ARTIFICIAL PLASTIC MATERIAL
42022220	HAND BAGS AND SHOPPING BAGS, OF COTTON
42022230	HAND BAGS AND SHOPPING BAGS, OF JUTE
42022910	HAND BAGS OF OTHER MATERIALS EXCLUDING WICKER WORK OR BASKET WORK
63051060	PLASTIC COATED OR PAPER CUM POLYTHENE LINED JUTE BAGS AND SACKS
6115	PANTYHOSE, TIGHTS, STOCKINGS, SOCKS AND OTHER HOSIERY, INCLUDING GRADUATED COMPRESSSION HOSIERY AND FOOTWEAR WITHOUT APPLIED SOLES, KNITTED OR CROCHETED
61151100	„
61151200	„
61151910	„
61151920	„
61151930	„
61151990	„
61152010	„
61152090	„
61159100	„
61159200	„
61159300	„
62171070	STOCKINGS, SOCKS, SOCKETTES AND THE LIKE, OF COTTON
5907	TEXTILE FABRICS OTHERWISE IMPREGNATED, COATED OR COVERED; PAINTED CANVAS BEING THEATRICAL SCENERY, STUDIO BACK-CLOTHS OR THE LIKE
590700	„

630710	FLOOR-CLOTHS, DISH-CLOTHS, DUSTERS AND SIMILAR CLEANING CLOTHS :
6308	SETS CONSISTING OF WOVEN FABRIC AND YARN
630800	„
63080000	„
640411	SPORTS FOOTWEAR, TENNIS SHOES, BASKETBALL SHOES, GYM SHOES, TRAINING SHOES AND THE LIKE :

Note. Central Board of Indirect Taxes and Customs. (n.d.). *Goods & Service Tax, CBIC, Government of India :: GST Goods and Services Rates*. <https://cbic-gst.gov.in>. Retrieved April 23, 2025, from <https://cbic-gst.gov.in/gst-goods-services-rates.html>

Nil Rated Goods (Educational Goods) under GST :

- A. Printed books, including Braille books
- B. Newspapers, journals and periodicals, whether or not illustrated or containing advertising material
- C. Children's picture, drawing or coloring books
- D. Maps and hydro graphic or similar charts of all kinds, including atlases, wall maps, topographic plans and globes, printed
- E. Slate pencils and chalk sticks
- F. Slates

5%/12%/18% Rated Goods (Educational Goods) under GST :

Except exempt list other educational goods are subject to GST at various rates as per GST schedules.

CONCLUSION:

GST being one of the biggest reforms in Indian indirect tax has surely impacted the educational sector, positive impact can be seen for formal educational services by an recognised educational body for recognised courses to its students, staff and faculty is exempt from taxation while private coaching is subject to GST. Some services done by the educational institutions are also exempted from taxation and some services provided to educational institutions are exempted. Majorly the goods used in the educational sector are taxable such as uniform, bags, cloths, pens, socks, board, marker, stationary etc while some are exempt such as pencil, slate, books, maps, slates etc.

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EMERGING TRENDS OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE SYSTEMS

Ms. Bharti. M. Jaiswani

R.K.T (CMC) College, Seva Sadan College Campus, Opp. Central hospital UNR-3

“The Integration of artificial Intelligence into HR systems is rapidly transforming traditional HR functions, enabling data driven decision making, enhancing talent acquisition, and optimizing employee engagement and performance management”

ABSTRACT

The integration of Artificial Intelligence (AI) in Human Resource (HR) systems has led to a transformative shift in how organizations manage their workforce. From talent acquisition and employee engagement to performance management and predictive analytics, AI is optimizing HR operations. This paper explores emerging trends, presents a literature review of prior studies, offers practical suggestions, and highlights real-world case examples. It also addresses the challenges and ethical concerns associated with AI in HR. Drawing on interdisciplinary literature and recent empirical studies, the paper examines how AI technologies—such as machine learning, natural language processing, and predictive analytics—are enhancing efficiency, decision-making, and employee experience. It also addresses critical challenges related to algorithmic bias, ethical governance, data privacy, and the evolving role of HR professionals in AI-mediated environments. By synthesizing current trends and projecting future developments, this study contributes to a deeper understanding of the transformative potential of AI in reshaping human capital strategies and organizational dynamics.

1. INTRODUCTION

HRM is evolving rapidly with technological advancements. AI, with its capabilities in data analysis, machine learning, and automation, is reshaping HR functions, making them more data-driven, efficient, and personalized. The adoption of AI tools is not just a matter of efficiency but also of gaining a strategic advantage in workforce planning and talent management. The convergence of Artificial Intelligence (AI) and Human Resource Management (HRM) represents a transformative frontier in organizational strategy and operational efficiency. As AI technologies mature—encompassing machine learning, natural language processing, robotic process automation, and predictive analytics—they are increasingly integrated into core HR functions, including talent acquisition, employee engagement, performance management, and workforce planning. These innovations are not merely automating routine tasks; they are enabling data-driven, strategic decision-making that aligns HR practices with dynamic business goals. The deployment of AI in HR has also sparked critical discourse around ethics, bias mitigation, employee privacy, and the shifting roles of HR professionals. This paper investigates the emerging trends in AI-enhanced HR systems, drawing on interdisciplinary research to examine the technological, organizational, and socio-ethical implications of AI adoption in HR. Through this exploration, the study aims to contribute to a more nuanced understanding of how AI is redefining the future of work and organizational effectiveness.

2. REVIEW OF LITERATURE:

- 2.1 Upadhyay & Khandelwal (2018) explored the implications of AI in recruitment, emphasizing the benefits of automation in reducing hiring bias and improving candidate screening. Binns (2018) raised ethical concerns about fairness in AI algorithms, suggesting the need for human oversight in decision-making processes.
- 2.2 According to Deloitte (2020), organizations that integrate AI into HR systems report higher employee satisfaction and improved performance outcomes.
- 2.3 IBM (2021) demonstrated how AI systems like Watson can assist in workforce planning and employee development through predictive analytics.
- 2.4 Morley et al. (2021) analyzed ethical AI deployment and stressed the importance of explainability in AI-powered HR tools. Meanwhile, Gartner (2021) noted a surge in AI adoption in learning and development platforms, driven by the need for personalized employee training.
- 2.5 Yadav & Malik (2021) this study emphasized the role of AI in Learning and Development (L&D), where adaptive learning paths and personalized training modules are generated using AI algorithms. The authors argue that such systems improve learning retention and reduce training costs.

2.6 Vrontis et al. (2022) they presented a theoretical framework linking AI capabilities with HRM outcomes. Their research identified five mediating factors—trust in AI, data governance, employee readiness, leadership support, and regulatory compliance—as critical to AI-HR integration success.

3. EMERGING TRENDS IN AI IN HR:

3.1 Recruitment and Talent Acquisition:

AI is automating resume screening, chatbots for candidate interaction, and predictive analytics for identifying high-potential hires.

3.2 Onboarding and Learning Management:

AI systems personalize onboarding and training through adaptive learning tools, making the learning curve smoother and faster for new hires.

3.3 Performance Evaluation and Feedback:

AI-driven tools offer real-time performance feedback and data analytics, enabling objective and continuous evaluation processes.

3.4 Employee Engagement and Wellbeing:

Sentiment analysis tools use NLP to assess employee morale through survey and communication data, providing insights for HR interventions.

3.5 Workforce Analytics and Planning:

AI helps forecast attrition, skill gaps, and training needs, allowing proactive HR strategies.

3.6 AI-Driven Talent Acquisition and Recruitment:

Use of AI-powered tools for resume screening, candidate matching, and predictive hiring, Chatbots for initial candidate interaction and interview scheduling.

3.7 Employee Engagement and Sentiment Analysis:

Natural Language Processing (NLP) tools to analyze employee feedback from surveys, emails, and internal communication platforms. Real-time mood tracking and engagement prediction.

3.8 Diversity, Equity, and Inclusion (DEI) Monitoring:

AI models assessing bias in job descriptions, hiring decisions, and internal mobility. Automated auditing for DEI compliance and transparency.

3.9 Automation of Administrative HR Tasks:

Robotic Process Automation (RPA) for payroll processing, onboarding, benefits management, etc. Cost-saving and efficiency gains in transactional HR processes.

3.10 AI-Enabled Employee Well-being Solutions:

Monitoring of mental health trends through AI-driven wellness apps. Personalized recommendations for work-life balance and stress management.

4. CASE EXAMPLES:

Case 1: Unilever

Unilever implemented AI in its graduate hiring process, using video interviews analyzed by AI and gamified assessments. This reduced time-to-hire by 75% and improved candidate experience (Harvard Business Review, 2019).

Case 2: IBM Watson

IBM uses Watson AI for internal career coaching and performance insights. Employees receive personalized growth recommendations based on skills, performance data, and career goals (IBM, 2021).

Case 3: Hilton Worldwide

Hilton adopted AI-driven virtual assistants for recruitment, helping reduce recruiter workload and improve response times to applicants (Deloitte, 2020).

Case 4: Schneider Electric

An AI-powered internal talent marketplace to address skill gaps and career progression, the initiative increased internal mobility by 30% and improved employee retention and satisfaction by giving employees visibility into growth opportunities.

Case 5: Tata Consultancy Services (TCS)

Implementation: TCS integrated AI with its digital learning platform Ultimatix, which delivers personalized learning recommendations based on job roles, skill gaps, and career aspirations.

5. CHALLENGES AND ETHICAL CONSIDERATIONS:

- 5.1 **Bias in Algorithms:** Training data can carry human biases, which AI might replicate or even amplify.
- 5.2 **Lack of Transparency:** Many AI tools are black boxes with little explanation of how decisions are made.
- 5.3 **Privacy and Data Security:** Handling employee data comes with regulatory and ethical responsibilities (European Commission, 2020).
- 5.4 **Over-reliance on Technology:** Complete automation can overlook nuances of human behavior that only experienced HR professionals can catch.

6. SUGGESTIONS:

- 6.1 **Human-in-the-loop Approach:** Maintain a balance between AI efficiency and human judgment in key HR decisions.
- 6.2 **AI Ethics Policies:** Implement organizational guidelines for ethical AI use, including fairness, accountability, and transparency.
- 6.3 **Training for HR Professionals:** Upskill HR teams to understand and effectively use AI tools.
- 6.4 **Bias Audits:** Regularly audit AI tools for potential biases and update algorithms with diverse datasets.
- 6.5 **Feedback Loops:** Incorporate employee feedback into AI systems to ensure better accuracy and trust.
- 6.6 **Enabler:** AI is not a replacement but an enabler for HR professionals, enhancing strategic and operational efficiency. Its potential lies in supporting human decision-making with data-driven insights.
- 6.7 **Successful adoption:** depends on ethical implementation, transparency, and continuous learning.

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A STUDY ON FINANCIAL PLANNING OF INDIAN WEDDINGS

Dr. Bharti P. Jethani¹ and Garv Talreja²¹Assistant Professor and ²Student, , H.R. College of Commerce & Economics

ABSTRACT

Financing the Big Fat Indian Wedding: A Study in Changing Trends and Financial Choices, Indian weddings are known for their grandeur, emotional depth, and cultural richness. However, behind the glitter lies intense financial planning. This study explores how families across different income levels—from ₹25,000 to ₹5,00,000+ per month—approach wedding expenses. It looks into the financial tools they use, such as savings, fixed deposits, gold, and loans, and how these choices are often shaped by social expectations and cultural norms.

Particularly for middle- and low-income families, weddings can become a source of financial strain due to societal pressure to maintain reputation. Many end up spending well beyond their means, risking long-term financial stability. The COVID-19 pandemic brought a shift—ushering in smaller, more intimate weddings that were often digital and budget-friendly. This change made many families reconsider their priorities, blending tradition with practicality. Using a mix of quantitative and qualitative research—surveys of 50 families, in-depth interviews, and thematic analysis—the study captures both data-driven trends and personal motivations. Statistical tools like chi-square and ANOVA were used to assess how norms and pandemic effects influenced spending habits.

Findings show that middle-income families spend nearly 1.8 times their annual income on weddings. Post-pandemic, there's also been a 35% rise in the use of digital planning tools among younger couples.

The study suggests including wedding finance topics in financial literacy programs, offering community rewards for simpler celebrations, and developing specialized savings plans for major life events. Overall, the research highlights the need for responsible financial planning that still honours the deep emotional and cultural value of weddings in India—striking a balance between celebration and sustainability.

Keywords: E-wedding, wedding finance, social pressure, financial planning

INTRODUCTION

Wedding in India are more than just a union between two individuals- they're symbolic events that represent culture, tradition, family honour, and increasing financial power. Whether it's a simple temple ceremony or a multi-crore destination wedding, the scale of the celebration often depends on how much a family can afford—or is willing to stretch to afford. With societal expectations running high, families often dip into life savings, take loans, or sell assets just to host a wedding that meets the perceived standard.

Before the COVID-19 pandemic, big weddings were considered the norm, especially among middle-class and affluent families. However, the pandemic brought an unexpected shift. Restrictions on gatherings, job losses, and changing priorities led many to opt for simpler, more cost-effective weddings. Now, as the world recovers, a divide has emerged—some are embracing the minimalist trend, while others are doubling down on extravagance.

This study aims to investigate how different income groups in India plan and finance weddings, and how post-pandemic realities are reshaping these decisions. It also looks at the role of social media, cultural influences, and traditional financial practices like investing in gold or fixed deposits. By understanding these elements, the research hopes to suggest smart financial strategies that families can use to celebrate without falling into debt.

REVIEW OF LITERATURE

1. India Times (2024) The Extravagance of Indian Weddings: Wealth or Burden?

The article explores the growing culture of extravagant Indian weddings and its impact on middle-class families. While billionaires can afford lavish events, average households often stretch their finances, even taking on debt. Experts warn against this unsustainable trend and advise families to prioritise financial planning, emergency savings, and long-term goals over social showmanship.

2. Kuhuo Bajaj (2024) The Economic and Social Burden of Indian Weddings

Kuhuo Bajaj's article discusses the heavy financial pressure weddings put on Indian families, especially the lower-income groups. Many families prioritise weddings over essentials like education and healthcare, often

going into debt. Despite the industry's ₹4.74 trillion value, its benefits are concentrated in urban areas. The article also touches on persisting issues like dowry and the need for culturally sensitive financial reforms.

3. IANSlife (2020) COVID-19 and the Indian Wedding Industry

This study highlights how the pandemic forced Indian weddings to downsize, leading to a rise in intimate and eco-conscious celebrations. Although many couples opted for smaller gatherings, the desire for grand weddings remains strong. The industry responded with sustainable practices like open-air venues, day weddings, and improved hygiene standards. Overall, the wedding industry showed resilience and is expected to bounce back with mindful and responsible planning.

4. Ms. Amisha Raj & Mr. Ayush Kumar (2020) The Fate of Indian Wedding Industry in Post COVID-19 Era

This review explains how the pandemic reshaped consumer behaviour in the wedding sector. Traditional lavish weddings gave way to hybrid formats, intimate gatherings, and digital planning. Vendors had to adapt quickly by offering tech-based and budget-friendly packages. Despite the setbacks, the industry embraced sustainability and innovation, ensuring its continued cultural and economic importance.

5. Wed Me Good (2020) Vendor Pricing Adjustments Post-COVID

After COVID-19, the Indian wedding industry adjusted to smaller gatherings by reducing prices for venues, planners, and decorators. However, high-demand services like bridal makeup, photography, designer wear, and luxury catering maintained premium rates. This shift shows how the industry balanced affordability with profitability to survive changing market demands.

SIGNIFICANCE OF STUDY

This study is important because it provides insights into how Indian families plan and manage finances for weddings, which are often one of the biggest expenses in a person's life. It highlights the financial burden on different income groups, the role of societal pressure in wedding expenditures, and how COVID-19 changes wedding spending habits. The findings can help individuals plan smarter, assist financial advisors in understanding consumer behaviour, and even guide policymakers in regulating financial practices related to weddings.

OBJECTIVE OF STUDY

1. To analyse how different income groups in India finance their weddings.
2. To study the impact of COVID-19 on wedding expenditures and post-pandemic changes.
3. To understand the role of societal expectations in wedding spending.
4. To compare wedding expenditures among low-income, middle-class, and high-net-worth individuals.
5. To examine how families use fixed deposits (FD'S), loans, gold savings and other financial tools for wedding expenses.

HYPOTHESES OF THE STUDY

H0: Social pressure does not significantly influence wedding expenditure, regardless of a family's income level.

H1: Social pressure significantly influences wedding expenditure, regardless of a family's income level.

H0: The COVID-19 pandemic has not led to a sustained reduction in extravagant wedding spending.

H1: The COVID-19 pandemic has led to a sustained reduction in extravagant wedding spending.

H0: High-income and low-income families use financial planning tools for weddings in the same way.

H1: High-income families use financial planning tools differently than low-income families when organizing weddings.

H0: Fixed deposits and gold investments are not the most commonly used instruments for wedding savings.

H1: Fixed deposits and gold investments are the most commonly used instruments for wedding savings.

H0: Post-pandemic, digital and smaller weddings are not more popular than pre-pandemic large-scale weddings.

H1: Post-pandemic, digital and smaller weddings are more popular than pre-pandemic large-scale weddings

RESEARCH DESIGN

The research employs a rigorously designed mixed-methods approach to arrest the nuances of wedding finance across socioeconomically stratified groups. Quantitatively, the survey was conducted with 50 households spread across monthly income brackets ranging from ₹25,000 to over ₹500,000 through a structured questionnaire with closed-ended queries over expenditure categories, saving instruments (FDs, gold, loans), and shifts due to the pandemic, supplemented with open-ended questions for qualitative perspective. Qualitative depth was provided by select case interviews and thematic analysis of free-text responses from the participants. Analysis of survey data was conducted using SPSS (or similar software) with descriptive statistics (means, frequencies) to profile expenditures, and inferential tests (chi-square for associations, one-way ANOVA for between-groups comparisons) to test hypotheses pertaining to income level, social pressure, and post-COVID change in spending behavior. Qualitative data were coded in NVivo (or equivalent) to pull out themes surrounding digital planning tools, cost-effective practices, and cultural drivers. Results were represented through bar charts, pie diagrams, and thematic case summaries, presenting an integrated overview of how families plan, finance, and scale wedding costs under societal pressures and economic limitations.

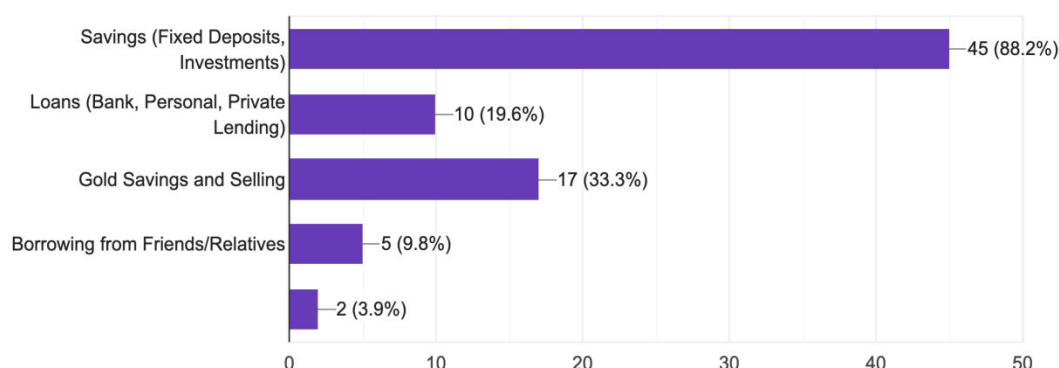
ANALYSIS AND INTERPRETATION

The survey was carried out with 50 individuals from various age groups and income categories using a structured questionnaire. Information was gathered through both multiple-choice and open-ended questions to gain insight into spending behaviours, financial planning strategies, and the influence of societal and pandemic-related changes. The majority of participants were younger than 25, with most being students, businesspersons, or employed professionals. Regarding income, many had earnings exceeding ₹5 lakhs monthly, while some were in lower income categories. When inquired about how they funded weddings, the predominant responses indicated that they utilised savings, fixed deposits, or gold. A small number also depended on loans or assistance from friends and family. COVID-19 evidently altered how people approached weddings—numerous individuals opted for smaller gatherings or deferred their plans.

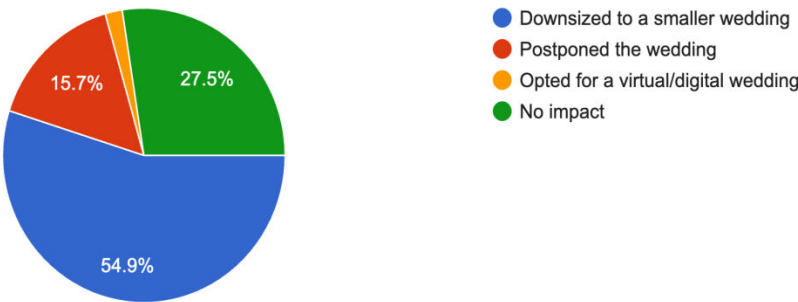
Interestingly, while some still favoured large weddings, an increasing number now appreciate simpler, cost-effective celebrations. Social pressure was a significant factor, yet not everyone allowed it to influence their decisions. Respondents indicated that their largest wedding expenses were on jewellery, venues, and catering. Social standing, family expectations, and cultural factors were the primary reasons for higher expenditures. Many participants believe that smaller weddings represent the future since they are more meaningful and less demanding. In terms of saving, most participants utilised FD's, mutual funds, or gold. Individuals also offered practical advice such as saving early, steering clear of loans, and trimming unnecessary expenses. Finally, views on employing a financial planner were varied—some endorsed the idea, but many preferred to handle matters independently with support from family or through personal planning.

How was your family's wedding financed? (Select all that apply)

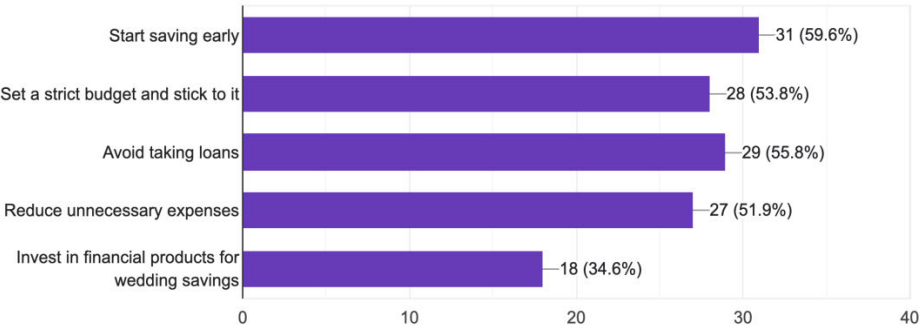
51 responses



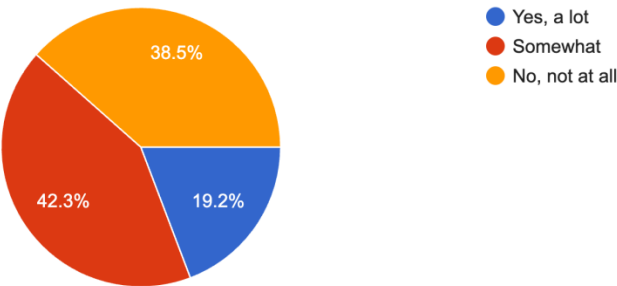
How did COVID-19 affected wedding plans?
51 responses



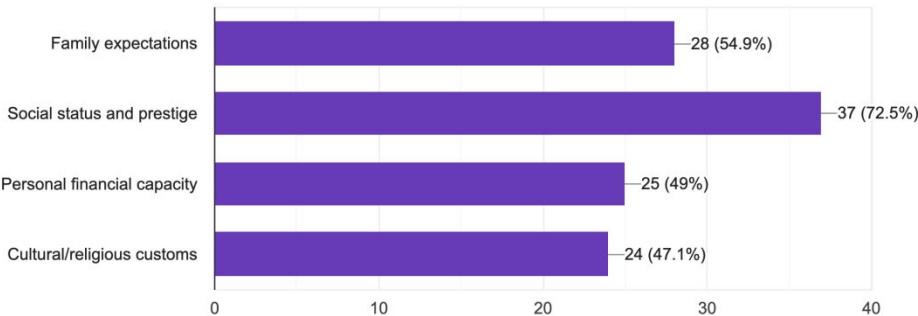
What financial planning measures do you think families should take for weddings? (Select all that apply)
52 responses



Do you feel societal pressure to host a grand wedding?
52 responses



What factors influenced your wedding budget the most? (Select all that apply)
51 responses



CONCLUSION

Indian weddings are among the most culturally significant and held in high emotional esteem of any life events in a person's life, deeply embedded in the country's tradition, custom, and society. These affairs have evolved over centuries from quiet rites of passage into huge celebrations that have come to symbolize social stature, personal pride, and family prestige. Nevertheless, these evolutions have not come easy, particularly in financial planning. The conclusions from this study significantly emphasize that the society expectations, cultural practices, economic constraints, and financial strategies that families adopt in planning for weddings are deeply intertwined.

Among the many incisive comments, the other one is on finances and weddings and their implications on families, falling on the spectrum of income. Whereas high-net-worth individuals are able to shoulder the costs of grand celebrations from amassed wealth, business incomes and with professional financial planning advice, families belonging to lower or middle-income groups often see themselves on a tightrope. For many of these families, hosting a wedding is not just a personal event but also a public display of respectability and social legitimacy. As a result, they are frequently compelled at times to stretch their financial limits, dipping into life savings, mortgaging property, borrowing from formal or informal lenders, or even selling ancestral assets to fund the extravaganza of a single day.

According to the study, one-third of the cost of an average wedding in India works out to several times the annual income of the family, especially amongst the lower and middle classes. The stark deviation between income and expenditure thus shows an alarming degree of social pressure forcing individuals to choose social appearance and community approval over sensible financial decisions. Cultural imperatives, media portrayals, and peer comparisons only imbibe this pressure, which instead solidifies the belief that a wedding is a 'once-in-a-lifetime' occasion deserving of any expense."

Further expounding on traditional financial products that still hold sway, the study notes that fixed deposits, recurring deposits, and gold savings are among the most important ways of raising money for weddings. These three financial mechanisms are relayed through the older generations; they present a culture of long-term planning and disciplined savings. However, a noticeable trend is the increasing popularity of personal loans, gold loans, and digital wedding loans, particularly in urban populations. These kinds of loans provide easy access to funds but come with several risks when taken without a robust financial evaluation or repayment strategy. The COVID-19 pandemic could bring an added flavor to our discussion. The unexpected and hard restrictions introduced during the lockdown changed the wedding industry overnight. Families who once had plush grand functions now had to think of their celebrations in a smaller, more intimate tone.

SUGGESTIONS

As an outcome of this all-encompassing research, there comes quite a need-well-on necessitated fact for looking again through the prism of the contemporary Indian caste, class, and gender societal perspectives overhauling marriage practices. The resurgence of this gradually metamorphosing new imaginary weddings is also requisite, not merely desirable. Many ways could be traversed to achieve that.

First of all, financial education and awareness must lay the cornerstone for weddings planned on balanced budgets. Real-life events such as weddings, healthcare emergencies, and long-term investments should inform modules on personal finance introduced in every school, college, and university. One way is to teach young people who are about to get married how to budget for weddings and what it means to save early, as well as how to understand loans and debts. All this will help them get that even as they plan for their union.

Another very important suggestion is that of community engagement and cultural leadership in transforming the talk on weddings. Religious institutions, local community centers, and social organizations should come together and act as a collective voice to inspire smaller, simpler weddings. Community leaders can inspire a constructive cultural shift by setting an example themselves for minimal and budget-friendly celebrations: through-the-channels public campaign-the channelizing and mushrooming the way for a modest wedding, discouraging showmanship and drawing out the benefits of moneywise spending.

Policy-level interventions by the government and financial institutions can also take this to a meaningful turn. Tax rebates, subsidies, or incentives could be offered to families whose marriages fall under a defined range of budget or to those who tie their car stakes at eco-friendly, local venues. Therefore strengthened guidelines should be set for lending agencies offering wedding loans. Fees for guidance by financial advisors before sanctioning of loans will be essential features. Government-run savings schemes particularly targeting wedding purposes could also be brought into the system, serving as backing and giving continuance of disciplined long-term saving among middle-class and lower-income households.

In country like India, the media and entertainment industry are genuinely influential in matters of perception. Instead of glorifying multi-crore celebrity weddings, media outlets and wedding portals should also feature and celebrate couples who chose simple, debt-free, and meaningful weddings. Reality shows, documentaries, and social media influencers can play a critical role in shifting trends by endorsing smaller, more personalised ceremonies that reflect values and love rather than excess and competition.

In the digital age, it goes hand in hand with the new-age technology that promises the better planning for and value-saving costs of marriage. Couples should be encouraged to use budgeting tools, employ digital checklists, virtual planning apps, and different price comparisons, while creating that perfect wedding in the future.

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A STUDY ON MECHANISM AND APPLICATION OF EXCHANGE TRADED FUNDS (ETFs)

Dr. Bharti P. Jethani¹ and Medhansh Sharma²

¹Assistant Professor and ²Student, H.R. College of Commerce & Economics

ABSTRACT

The mechanism and use of Exchange-Traded Funds (ETFs), a quickly developing financial product that combines the liquidity of individual stocks with the diversification of mutual funds, are examined in this study. The study intends to demonstrate ETFs' expanding role in contemporary portfolios by looking at both their structural makeup and investment potential. Both primary and secondary data are used in the project. A structured questionnaire that was prepared was used to gather primary data, and 107 people of different ages and levels of investment experience answered it. Although hesitancy and knowledge gaps still exist, the results show that interest in ETFs is growing, particularly among younger and more financially literate investors. In order to investigate important ideas such as the creation/redemption mechanism, tracking error, bid-ask spreads, and the function of Authorized Participants in preserving liquidity and price alignment, secondary data was collected from journals, industry reports, and financial databases.

Using convenience sampling, the study employs a descriptive and analytical design. Interpretation was done using tools including MS Excel, pie charts, bar graphs, and percentage and correlation analysis. The study points out gaps despite ETFs' benefits—such as cost-effectiveness, real-time trading, and diversification—including low awareness among novices, complexity of certain ETF products, and hazards like tracking errors and liquidity mismatches. All these discrepancies point to a need for more study and investor education. The conclusion underlines the need of cooperation among investors, fund managers, regulators, and advisors in supporting responsible ETF adoption.

The research indicates that, given the issues are handled by innovation, openness, and stakeholder involvement, ETFs will stay central in forming the future of investment as thematic, ESG, and actively managed ETFs keep growing.

Keywords: Low expense ratio, liquidity hazard, Net asset value, Exchange Trade Funds (ETFs)

INTRODUCTION

Exchange-Traded Funds (ETFs) have transformed the investment landscape by marrying the diversification advantages of mutual funds with the liquidity and flexibility of stock trading. Although the focus of this study is on ETFs, we will analyze how ETFs work, such as their structure, the creation and redemption process, and pricing dynamics. It also explores their myriad applications, from passive investing and portfolio diversification to risk management and sector-specific exposure. By analyzing their advantages, challenges, and role in modern financial markets, this project aims to provide a comprehensive understanding of ETFs and their growing significance in global investing.

REVIEW OF LITERATURE

- 1) Gastineau (2001)** – "Exchange-Traded Funds: An Innovative Investment Vehicle" Gary Gastineau (2001) looks at the advantages of Exchange-Traded Funds (ETFs) over mutual funds, emphasizing cost efficiency, tax benefits, and trading flexibility. He has highlighted that ETFs lower expenses by eliminating sales loads and minimizing capital gains taxes through in-kind creation and redemption mechanisms. Unlike mutual funds, ETFs trade throughout the day as they are exchange traded, allowing for strategies like short selling and stop-loss orders, though they may incur bid-ask spreads and brokerage fees. The study also underscores the role of authorized participants (APs) in keeping ETF prices aligned with NAV, though pricing inefficiencies can arise in volatile markets. Overall, Gastineau has concluded that ETFs offer superior investment efficiency and will continue to reshape portfolio management.
- 2) BlackRock (2020)** – "The Role of ETFs in Modern Portfolios" In its 2020 report, BlackRock, the world's largest asset manager and a leading ETF provider, has explored the growing role of Exchange-Traded Funds (ETFs) in modern investment portfolios. The report has highlighted how ETFs have evolved beyond passive index tracking to become essential tools for liquidity management, risk diversification, and portfolio construction. BlackRock did emphasizes that ETFs offer cost efficiency, transparency, and tax advantages, making them an attractive alternative to mutual funds. The firm also discusses the continues increasing use of ETFs by institutional investors for strategic asset allocation, hedging, and liquidity management, particularly during market stress. For example, the report shows how ETFs played a crucial role in maintaining liquidity during the COVID-19 market volatility, providing price discovery even when

underlying bond markets were strained. Additionally, BlackRock has examined the rise of thematic and sustainable ETFs, catering to investor demand for ESG (Environmental, Social, and Governance) investing and specialized market exposure. The report predicted continued growth in ETF adoption, driven by innovations in fixed-income ETFs, smart beta strategies, and active ETFs.

- 3) **Ferris (2018)** "The Growth and Risks of Exchange-Traded Funds" Ferris (2018) investigates the fast-growing aspect of Exchange-Traded Funds (ETFs) and their possible risks to financial markets. By providing low-cost, diversified, and liquid substitutes to conventional mutual funds, the paper shows how ETFs have changed investing. A major emphasis is on the growing dominance of passive investing and its influence on market efficiency and price formation. Ferris contends that even though ETFs increase accessibility and efficiency, their expansion has raised questions regarding market distortions. ETFs, according to the study can increase asset correlations and therefore lower the influence of individual stock fundamentals on price changes. Ferris also looks at how ETFs act during market declines, pointing out that significant redemptions and algorithmic trading might increase volatility. The study also highlights worries about liquidity mismatches, particularly in fixed-income ETFs, where the underlying assets might be less liquid than the ETF itself. All things considered, Ferris (2018) finds that although ETFs offer notable advantages, especially in times of financial stress, investors and authorities should be wary of their possible to exacerbate market volatility.

SIGNIFICANCE OF THE STUDY

The study of exchange-traded funds (ETFs) is crucial in the current dynamic financial environment because of the increasing reliance on ETFs for transparent, diversified, and reasonably priced investment options. By analyzing their unique mechanism—including creation and redemption processes facilitated by Authorized Participants—and their numerous applications across asset classes and strategies, this study provides significant insights for investors, fund managers, and policymakers. It highlights how ETFs contribute to greater market efficiency and liquidity, increases investor knowledge, and promotes informed decision-making. Furthermore, considering the ongoing shift from active to passive investing and the rise of innovative products like ESG and thematic ETFs, this study contributes to our understanding of the transformative effects of ETFs on market dynamics and portfolio management.

OBJECTIVES OF STUDY

To examine the advantages and challenges of ETFs – The study discusses possible risks like tracking errors, market volatility, and liquidity issues while highlighting the advantages of ETFs, such as cost effectiveness, liquidity, and diversification.

To explore different types of ETFs – Equity ETFs, bond ETFs, commodity ETFs, sector-specific ETFs, smart beta ETFs, leveraged and inverse ETFs, and thematic ETFs are among the asset classes used by the study to classify ETFs.

To analyze the applications of ETFs in investment strategies – The study investigates how retail and institutional investors use exchange-traded funds (ETFs) for hedging, risk management, portfolio diversification, and passive investing.

To compare ETFs with other investment instruments – Comparing ETFs' cost-effectiveness, tax efficiency, and flexibility to those of mutual funds, index funds, and direct stock investments is one of the main goals.

HYPOTHESIS

1. ETF Performance vs. Mutual Funds

Null Hypothesis (H_0): There is no significant difference in returns between ETFs and mutual funds.

Alternative Hypothesis (H_1): ETFs generate significantly higher returns compared to mutual funds.

2. Investor Preference

Null Hypothesis (H_0): Investors do not significantly prefer ETFs over mutual funds and direct equity investments.

Alternative Hypothesis (H_1): Investors significantly prefer ETFs due to benefits like lower cost, better diversification, and ease of trading.

3. Risk-Adjusted Return

Null Hypothesis (H_0): There is no significant difference in the risk-adjusted returns of ETFs compared to actively managed funds.

Alternative Hypothesis (H_1): ETFs provide better risk-adjusted returns than actively managed funds due to lower management fees and efficient indexing.

RESEARCH DESIGN

- **Research Type:** -

Descriptive and analytical research.

- **Data Collection:** -

Primary Data: Survey using a structured questionnaire (Google Forms/Offline) with 107 responses.

Secondary Data: Journals, articles, websites (like AMFI, NSE, SEBI), annual reports, and previous research papers.

- **Sample Size:** -

107 respondents (as per the project data).

- **Sampling Technique:** -

Simple random sampling method.

- **Tools Used:** -

MS Excel for tabulation and charting

Pie charts and bar graphs for interpretation

Statistical techniques: Percentage analysis and basic correlation analysis

DATA ANALYSIS AND INTERPRETATION

The primary data analysis in this study is based on the responses from 107 participants using a structured questionnaire. The objective is to evaluate the awareness, understanding, and investment behavior regarding Exchange-Traded Funds (ETFs) across different demographics and experience levels.

Respondents were categorized by age group, where the largest segment (34.6%) was of people aged 36 and above, indicating that mature investors have the highest engagement with ETFs. Individuals aged 19–35 made up 56.1%, that showed growing interest among younger investors, while only 9.3% were teenagers (15–18), suggesting low awareness in that segment.

In terms of investment experience, 48.6% of the respondents identified as advanced investors, 37.4% as intermediate, and only 14% as beginners. Hence this implies that ETFs are more commonly used by financially literate individuals with market exposure.

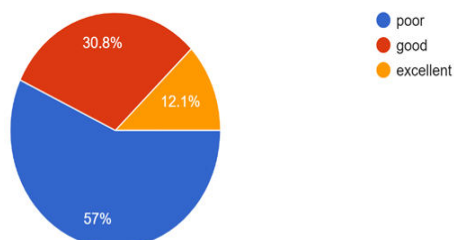
When the study was assessing ETF understanding, 57% rated their knowledge as poor, 30.8% as good, and just 12.1% as excellent. This reveals a substantial knowledge gap and indicates the need for enhanced investor education.

Regarding willingness to invest, 34.6% of respondents said “Yes” to investing in ETFs, 54.2% said “Maybe,” and 11.2% said “No,” highlighting hesitancy among a large section of potential investors due to uncertainty or lack of awareness.

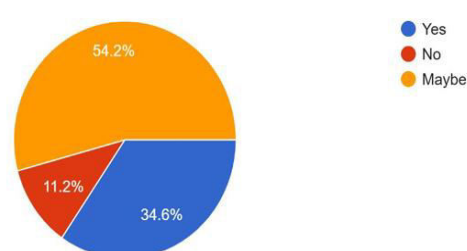
Cost-effectiveness and diversification emerged as top reasons for ETF preference. Though, only 12.1% of participants would recommend ETFs over mutual funds to beginners, citing complexity and the need for active management as barriers.

Overall, the primary data of the study suggests that while there is growing interest in ETFs, adoption is limited by knowledge gaps and perceived complexity. Therefore, this creates an opportunity for financial educators and advisors to promote ETF literacy and increase adoption, especially among new and young investors.

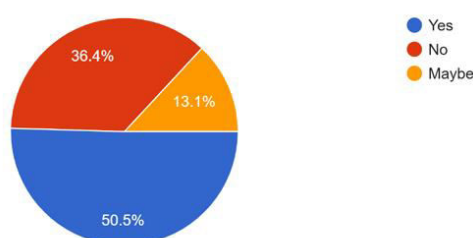
How would you rate your understanding of ETFs?
107 responses



Do you invest or plan in investing in ETFs
107 responses



Do you believe ETFs are a good investment for long-term wealth creation?
107 responses



CONCLUSION

Exchange-traded funds (ETFs) have a transformative role in contemporary investment portfolios, according to a study on their mechanism and application. By providing a flexible, transparent, and affordable means of gaining exposure to a variety of asset classes, industries, and geographical areas, exchange-traded funds (ETFs) have completely changed the investment landscape. They are a desirable choice for both retail and institutional investors due to their distinctive structure, which guarantees liquidity and price efficiency through the creation/redemption process and the function of Authorized Participants (APs).

The study's main conclusions highlight the advantages of ETFs, including their low expense ratios, tax efficiency, diversification, and intraday trading capabilities. The study does, however, also point out risks and difficulties, such as tracking error, premiums and discounts, liquidity risks, and the intricacy of some ETF products. To guarantee that ETFs are used efficiently and sensibly, investors, fund managers, regulators, and financial advisors must carefully take these factors into account. Investors should concentrate on comprehending ETF mechanics, cutting expenses, and strategically diversifying in order to optimize the potential of ETFs. Transparency, innovation, and liquidity should be given top priority by fund managers while maintaining low expenses. In order to maintain investor protection, market stability, and the ethical creation of new ETF products, regulators are essential.

By educating clients, customizing ETF recommendations, and keeping an eye on portfolio performance, financial advisors can provide value. The ETF market is expected to continue expanding in the future due to technological advancements, growing investor demand, and innovation. To ensure the ETF market's sustainable growth, stakeholders must address new issues like market volatility, regulatory changes, and the risks associated with complex products. ETFs are a great tool for reaching investment objectives, but their effectiveness hinges on responsible innovation, well-informed decision-making, and cooperation from all parties involved. Investors can create strong portfolios by utilizing ETFs' advantages and resolving their drawbacks, and the ETF sector can continue to flourish as a pillar of contemporary finance.

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15. Bhattacharya & O'Hara (2020) – "ETFs and Market Stability: The Good, the Bad, and the Uncertain" This study explores how ETFs influence financial markets, with a focus on liquidity, volatility, and systemic risk. It highlights the positive role of ETFs in price discovery but also warns about potential market instability during periods of stress.
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17. Hill, Nadig, & Hougan (2019) – "Passive vs. Active Investing: The Role of ETFs in Portfolio Performance" This paper analyzes how ETFs have changed the active vs. passive investment debate, showing how passive strategies using ETFs often outperform actively managed funds over time.
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THE ROLE OF DATA ANALYTICS IN FORENSIC ACCOUNTING

Dr. Bharti P. Jethani¹ and Rudransh Somani²¹Assistant Professor and ²Student, H.R. College of Commerce & Economics

ABSTRACT

In the ever-changing landscape of the digital world, data analytics has emerged as an inevitable technological advancement that empowers organizations to make informed decisions by transforming vast volumes of raw data into actionable insights. With its ability to uncover hidden patterns, trends, and correlations, data analytics drives strategic planning, enhances operational efficiency, and fosters innovation across industries. The field of forensic accounting is no exception to this as data analytics revolutionized the way organizations detect, analyze and prevent fraudulent activities, thereby empowering forensic accountants to more precisely identify irregularities and anticipate potential financial misconduct.

The present research discusses the revolutionary impact of data analytics in forensic accounting and illustrates how it affects detection and prevention of financial fraud. Through the infusion of conventional forensic techniques with complex analytical methods, more precisely via the creation and implementation of the Multi-Dimensional Fraud Detection Algorithm (MFDA), the work showcases an advancement in detecting fraud with precision and speed. Employing a mixed-method design involving survey responses from 100 subjects and a systematic review of secondary literature, the study evaluates both the technical advantages and the intrinsic ethical issues involved in applying data-driven methods to forensic investigations.

The outcome of the research emphasizes that although data analytics provides unmatched benefits in preventing financial fraud (as compared to traditional techniques), its long-term success relies on cooperative action among forensic accountants, technologists, and policymakers. This collective effort is necessary to create a culture where technological innovation is coupled with ethical responsibility, so that the value of advanced analytics is achieved without undermining data integrity or public trust.

Keywords: Forensic Accounting, Data Analytics, Fraud Detection, Ethical Challenges

INTRODUCTION

The global economy has witnessed a dramatic surge in financial fraud, with cyber-enabled schemes, money laundering, and manipulated financial statements eroding trust in corporate governance. In India alone, bank fraud cases surged by 27% year-on-year in 2024-25, with losses exceeding ₹21,000 crore, highlighting the urgent need for advanced detection mechanisms. Traditional forensic accounting methods, while foundational, increasingly struggle to address the complexity and scale of modern fraud.

The escalating complexity of financial fraud in the global economy has positioned forensic accounting as a critical safeguard for organizational integrity. As fraudulent activities grow increasingly sophisticated—spanning cyber-enabled schemes, cross-border money laundering, and manipulated financial statements—traditional investigative methods struggle to keep pace. Data analytics has emerged as a transformative force in this landscape, empowering forensic professionals to dissect vast datasets, identify anomalies, and uncover patterns that signal illicit activity. By leveraging tools such as machine learning, network analysis, and predictive modeling, forensic accountants can now detect schemes like round-tripping fraud, vendor collusion, and asset misappropriation with unprecedented precision.

Ultimately, this study aims to explore the integration of advanced data analytics into forensic accounting, shedding light on its practical applications, limitations, and future potential. By examining both the technological innovations like MFDA and the perceptions of industry stakeholders through survey data, the research highlights a transformative shift in fraud detection methodologies. This introduction sets the stage for an in-depth discussion on how the fusion of traditional forensic methods and modern data analytics not only enhances the detection of financial fraud but also demands an evolution in ethical standards and regulatory measures to support this dynamic field.

LITERATURE REVIEW

Angela Bensemann et al. (2024), highlights how data analytics empowers forensic accountants to delve deeply into complex financial transactions, revealing fraudulent activities that might otherwise remain concealed. They emphasize key components such as identifying patterns and anomalies, conducting advanced trend analyses, minimizing false positives, monitoring transactions in real time, uncovering relationships and networks, and

employing predictive analytics for future fraud prevention. Their insights underscore the transformative role of data analytics in enhancing the precision and efficiency of forensic accounting practices.

Kelly J. Todd and Lindsay H. Gill (2018), explore the evolution of data analytics within forensic investigations, noting that traditional methods may no longer suffice. They advocate for the analysis of unstructured data, like emails and texts, to uncover evidence that conventional analytics might overlook. A case study they present illustrates how data visualization and the examination of unstructured data can expose financial anomalies and fraudulent behaviors, demonstrating the added value of integrating diverse data sources into forensic investigations.

Rezaee, Z., Wang, J., & Lam, M. B. (2018), focusing on the educational and practical integration of Big Data in forensic accounting, this paper reviews how data-driven techniques are incorporated into forensic accounting programs. It discusses the curriculum and skill set required for modern fraud detection, stressing the impact of advanced analytics on improving detection accuracy and operational efficiency.

Styles, D., et al. (2022). This research examines the applications of various data mining techniques—including horizontal and vertical analysis, text mining, and quantitative methods—in forensic accounting to enhance targeted fraud investigations.

Kapo, A., Turulja, L., & Vidacak, Z. (2021). This study emphasizes the integration of machine learning and big data analytics into forensic accounting curricula, showcasing how advanced computational techniques can improve fraud detection accuracy.

Ravisankar, V., et al. (2011). This research investigates the efficiency of multiple data mining approaches such as neural networks, support vector machines, and genetic programming in distinguishing fraudulent companies from non-fraudulent ones through effective feature selection.

Glancy, D., & Yadav, S. (2011). This paper presents a computational fraud detection model that utilizes text mining to analyze corporate financial reports for deception cues, demonstrating the utility of unstructured data analysis in early fraud detection.

SIGNIFICANCE OF THE STUDY

This study stands essential as it brings the techniques of forensic accounting up to date with modern data analytics. The study illustrates how forensic accountants can employ sophisticated analytical techniques including data mining, statistical modeling and machine learning to be more effective in the detection, investigation and prevention of financial fraud. It shows how large-scale data analysis can bring out concealed irregularities, enhance accuracy in fraud detection, and aid in decision making, while also acknowledging the challenges of dependable data, interactions with privacy issues, and the requirement of expertise. In conclusion, the work illuminates how data-oriented strategies are useful to further financial transparency and accountability, and it provides theoretical implications as well as practical insights to fight financial crime.

OBJECTIVES OF THE STUDY

- 1) Usage of data analytics in forensic accounting increases the accuracy in fraud detection in forensic accounting
- 2) To examine the ethical concerns related to Data Analytics in forensic accounting
- 3) To analyze the effectiveness of current regulatory frameworks addressing ethical concerns
- 4) To explore future directions and confidence in mitigating ethical concerns
- 5) To investigate the underlying synergies between algorithmic opaqueness, systemic regulatory gaps, and ethical ramifications in advanced fraud detection paradigms.

HYPOTHESES

Hypothesis 1

H₀- There is no significant difference in the traditional methods to detect fraud in forensic accounting and the methods that use data analytics to detect fraud in data analytics.

H₁- There is quite a significant difference in the traditional methods to detect fraud in forensic accounting and the methods that use data analytics to detect fraud in data analytics.

Hypothesis 2

H₀- The majority of the respondents will consider privacy violations the most significant ethical concern when using data analytics in forensic accounting.

H₁- The majority of the respondents will consider alternative concerns (i.e. bias in algorithms, misuse of sensitive data, or lack of transparency) as the most significant ethical issue.

Hypothesis 3

H₀- Most respondents will view current regulations as somewhat or very ineffective in addressing the ethical concerns related to data analytics in forensic accounting.

H₁- Most respondents will view current regulations as effective in mitigating ethical concerns related to data analytics in forensic accounting.

Hypothesis 4

H₀- A majority of respondents will express confidence in the ethical evolution of data analytics in fraud investigations and support advancements such as improved AI transparency, stricter privacy laws, and the development of unbiased algorithms.

H₁- A majority of respondents will express skepticism regarding the ethical evolution of data analytics in fraud investigations and doubt that future advancements will adequately mitigate ethical concerns.

Hypothesis 5

H₀- There exists a positive association between perceptions of algorithmic opaqueness and the belief that systemic regulatory frameworks are inadequate, thereby exacerbating ethical concerns in fraud detection.

H₁- There is no significant relationship between perceived algorithmic opaqueness and the evaluation of regulatory adequacy, suggesting that ethical concerns may be influenced by other factors.

RESEARCH DESIGN

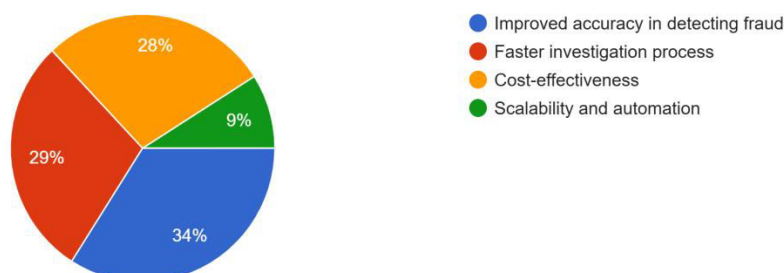
The research design in this paper is meticulously structured and articulated to capture the complexity of integrating data analytics within forensic accounting. The blend of a survey, comprehensive secondary data review, and the application of advanced analytical tools ensures that both the theoretical and practical aspects of fraud detection are thoroughly investigated. This design supports robust testing of the hypotheses and facilitates actionable insights that can bridge the gap between traditional forensic practices and modern data-driven techniques.

Sample Size- 100 respondents.

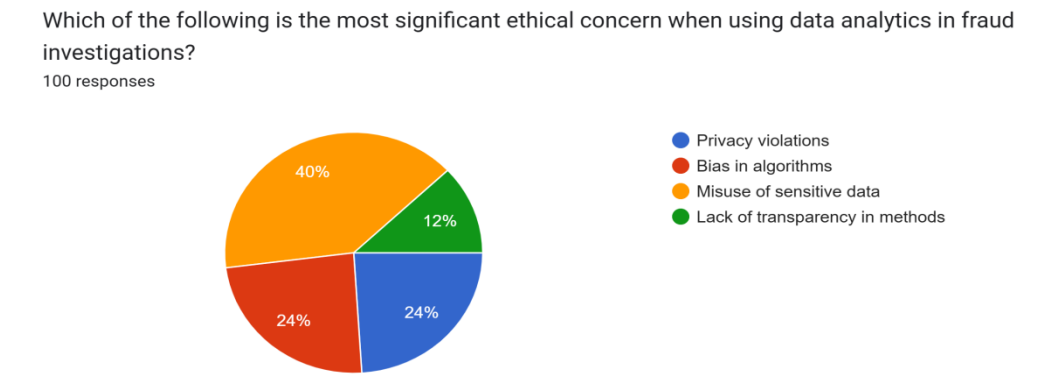
ANALYSIS AND INTERPRETATION

- 1) Summary: 34% of respondents identified "improved accuracy in detecting fraud" as the primary benefit, indicating data analytics offers significant advantages over traditional methods.

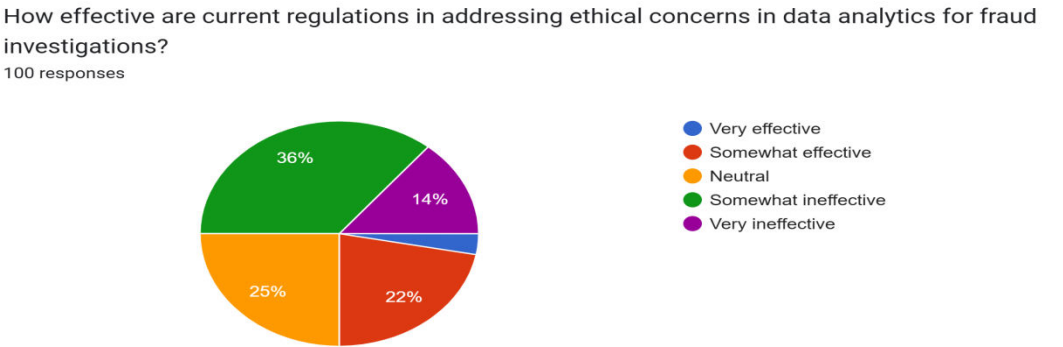
What do you consider the primary benefit of using data analytics in fraud investigations?
100 responses



2) Summary: 40% of respondents cited "misuse of sensitive data" as the top ethical concern, surpassing privacy violations (24%), aligning with H1.



3) Summary: 36% viewed regulations as "somewhat ineffective," and 14% as "very ineffective," suggesting most respondents find current regulations insufficient.



1. Overview and Context

This project explores the transformative role of data analytics in forensic accounting by examining both traditional and modern fraud detection methods. It integrates empirical data from a structured survey with secondary insights and an innovative algorithmic approach.

2. Analysis of Techniques Utilized

A. Multi-Dimensional Fraud Detection Algorithm (MFDA)

The MFDA is a central technique in this study that exemplifies the modern approach to forensic accounting. It innovatively merges three key analytical techniques:

i. Graph Analytics:

Using tools like Gephi, the algorithm constructs graphs where nodes represent different entities (such as vendors, employees, or transactions) and edges denote the relationships between them. This network visualization helps in identifying clusters or anomalous connections that might hint at collusion or systematic fraud.

ii. Time-Series Analysis:

This technique is used to analyze patterns over time. By examining the continuity of transactions, trends, and seasonality, the algorithm can pinpoint irregularities such as sudden spikes in activities that deviate from historical norms.

iii. Anomaly Detection:

Techniques such as the Isolation Forest algorithm complement the MFDA by focusing on identifying outliers within the dataset. These statistical methods isolate anomalies from regular patterns, indicating potentially fraudulent activity.

By integrating these techniques, MFDA serves as a robust tool that not only flags irregularities but also provides a multi-faceted rationale behind the detections. For instance, combining graph connectivity with temporal trends and outlier detection creates a more reliable and transparent framework for uncovering complex fraud schemes.

B. Survey Data and Statistical Findings

The project conducted a detailed survey that gathered data across several dimensions, including demographic variables, levels of familiarity with data analytics, and perceptions regarding ethical issues in fraud investigations. Key findings include:

Demographics & Familiarity:

The majority of respondents were from the 18–24 age group, with a substantial proportion of students and employed professionals. While many respondents indicated being “somewhat familiar” or “not very familiar” with data analytics in fraud investigations, this suggests an opportunity for increased training and exposure in this evolving field.

Ethical Concerns and Regulation:

The survey results reveal a diverse set of ethical concerns—ranging from privacy violations to bias in algorithms—and mixed perceptions on the effectiveness of current regulatory frameworks. For example, while a significant number of respondents identified privacy concerns as critical, others pointed out the lack of transparency in data-driven investigations as an equally important issue. These insights underscore a gap in both practical applications and regulatory measures regarding data analytics in forensic accounting.

Primary Benefits Recognized:

Respondents overwhelmingly agreed that the use of data analytics improves the accuracy of fraud detection and accelerates the investigative process. This consensus supports the rationale behind employing techniques like MFDA, reinforcing the notion that advanced analytics can significantly enhance operational efficiency in fraud investigation.

3. Integrated Interpretation

Enhanced Fraud Detection Capabilities:

The integration of graph analytics, time-series analysis, and anomaly detection as seen in the MFDA algorithm provides a comprehensive framework that addresses the limitations of traditional forensic accounting. By using these techniques, the approach can sift through vast datasets and highlight subtle patterns that might otherwise go undetected.

Practical Implications for Training and Implementation:

The survey findings emphasize the need for improved awareness and training among practitioners regarding data analytics tools. Given that many respondents rated their familiarity with these tools as moderate, there exists a clear imperative for institutions to invest in educational programs that bridge the knowledge gap and prepare forensic accountants to effectively use these advanced techniques.

Balancing Innovation with Ethical Concerns:

The dual focus on technical innovation and ethical regulation is a strong point of the research. While MFDA demonstrates how data analytics can uncover hidden fraud schemes, the survey responses indicate that ethical issues—such as data privacy and algorithmic transparency—remain prominent. This juxtaposition suggests that as forensic accounting evolves, parallel efforts must be made to develop and enforce robust ethical guidelines and regulatory standards.

Regulatory and Operational Synergy:

The mixed perceptions regarding the effectiveness of current regulations indicate potential for reform. This project’s comprehensive analysis—supported by both quantitative data and cutting-edge analytical techniques—strongly argues for a synergistic approach where improved technology is complemented by stricter, yet well-calibrated, regulatory oversight. Such an integration would help ensure that the benefits of data analytics are fully realized without compromising ethical standards or public trust.

CONCLUSION

The research underscores how integrating modern data analytics with traditional forensic accounting can significantly elevate fraud detection and prevention while highlighting the need for improved training and ethical oversight. The study’s innovative approach—exemplified by the MFDA—demonstrates that blending graph analytics, time-series analysis, and anomaly detection not only refines investigative accuracy but also exposes new areas for regulatory enhancement, ultimately paving the way for a more effective, transparent, and accountable system in the fight against financial fraud. As financial crimes continue to grow more complex and

data-driven, this study reaffirms the critical importance of equipping forensic professionals with analytical capabilities and fostering an ethical framework that evolves alongside technological advancements. Moreover, it brings to light the real-world applicability of data analytics tools and the tangible benefits they offer when deployed responsibly. Moving forward, a collaborative effort between academia, industry, and regulatory bodies will be key to sustaining this momentum and ensuring that forensic accounting not only keeps pace with fraud but stays one step ahead.

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RBI'S DIGITAL RUPEE: A STUDY UNVEILING POTENTIAL BENEFITS AND CHALLENGES FOR INDIA'S FUTURE OF FINANCE

Dr. CA. Bhavna Mukesh Binwani

Assistant Professor, Department of Accountancy, Smt.Chandibai Himathmal Mansukhani, College, Ulhasnagar-

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ABSTRACT

The Reserve Bank of India (RBI) has embarked on a transformative journey with the introduction of the Digital Rupee (₹), exploring both Central Bank Digital Currency (CBDC) retail (₹-R) and wholesale (₹-W) applications. This paper provides a comprehensive analysis of the implicit benefits and challenges associated with the Digital Rupee's implementation in India, considering the nation's unique socio-economic environment and technological context. Drawing upon current literature, pilot program experiences, and expert opinions, we claw into the potential of the Digital Rupee to enhance financial inclusion, streamline cross-border payments, reduce reliance on cash, and foster innovation in the fiscal sector. Simultaneously, we examine the challenges related to cybersecurity, data privacy, technological structure, and potential disruption to the existing banking system. This study aims to provide a balanced perspective on the transformative potential and the inherent risks associated with the Digital Rupee, paving the way for informed policy opinions and its responsible integration into India's financial ecosystem.

INTRODUCTION

In an increasingly digitalized global economy, the concept of a Central Bank Digital Currency (CBDC) has gained significant thrust among central banks worldwide. The RBI, recognizing the implicit transformative impact of digital currencies, has actively pursued the development and implementation of the Digital Rupee (₹), aiming to revolutionize India's financial landscape. This paper analyzes the potential benefits and associated challenges of introducing the Digital Rupee in India, concentrating on both the retail (₹-R) and wholesale (₹-W) applications. India, with its vast population, , different income situations, and expanding digital infrastructure, presents a unique and complex context for the adoption of CBDCs. Understanding these nuances is crucial for the successful and sustainable integration of the Digital Rupee into the existing fiscal system.

OBJECTIVES

1. To Understand the concept of Digital Rupee.
2. To analyze the advantages and disadvantages of implementing Digital Rupee.

RESEARCH METHODOLOGY

The entire research paper is based on secondary data which has been collected from Published reports, books , Journals, articles and research papers.

2. POTENTIAL BENEFITS OF THE DIGITAL RUPEE:

The introduction of the Digital Rupee promises a multitude of benefits for the Indian economy and its citizens.

- **Enhanced Financial Inclusion:** The Digital Rupee can significantly contribute to fiscal inclusion by furnishing access to digital payments for individuals who are presently unbanked or underbanked. Mobile-based wallets and simplified KYC (Know Your Customer) procedures can facilitate easy onboarding, eliminating the need for traditional bank accounts. This can empower marginalized communities and foster profitable growth.
- **Reduced Reliance on Cash:** India is a cash-dominant economy, leading to inefficiencies in transaction processing, increased costs for handling cash, and implicit facilitation of illicit activities. The Digital Rupee, as a digital form of sovereign currency, can promote digital payments, reducing the dependence on cash and fostering greater transparency in fiscal deals.
- **Streamlined Cross-Border Payments:** Cross-border payments are often costly, time-consuming, and complex. The Digital Rupee has the potential to streamline these transactions by facilitating direct peer-to-peer transfers, eliminating intermediaries, and reducing transaction fees. This can significantly benefit businesses engaged in international trade and remittances.
- **Lower Transaction Costs:** Digital transactions are typically cheaper than traditional methods, such as cash or card payments. The Digital Rupee can significantly reduce transaction costs for businesses and consumers, leading to greater economic efficiency and increased consumption.

- **Improved Monetary Policy Effectiveness:** The Digital Rupee can provide the RBI with greater control and visibility over the circulation of money in the economy. This can enhance the effectiveness of monetary policy tools, enabling the central bank to respond more effectively to economic fluctuations and maintain price stability.
- **Innovation in the Financial Sector:** The Digital Rupee can serve as a platform for innovation in the financial sector, fostering the development of new products and services. This can lead to increased competition, efficiency, and customer satisfaction. Examples include smart contracts, automated payments, and microfinance solutions.
- **Increased Efficiency in Government Payments:** The Digital Rupee can streamline government payments, reducing leakages and improving transparency in the delivery of welfare benefits. Direct Benefit Transfer (DBT) programs can be made more efficient and accountable with the use of e₹, ensuring that funds reach the intended beneficiaries.

3. CHALLENGES AND RISKS ASSOCIATED WITH THE DIGITAL RUPEE:

While the potential benefits of the Digital Rupee are substantial, its implementation also presents several challenges and risks that need to be carefully addressed.

- **Cybersecurity and Data Privacy:** As a digital currency, the Digital Rupee is vulnerable to cyberattacks and data breaches. Robust cybersecurity infrastructure and stringent data privacy regulations are essential to protect user data and prevent fraud. The RBI needs to establish clear guidelines for data security, encryption, and access controls.
- **Technological Infrastructure:** The successful adoption of the Digital Rupee requires a robust and reliable technological infrastructure, including internet connectivity, mobile devices, and secure payment platforms. The digital divide in India, particularly in rural areas, poses a significant challenge to widespread adoption.
- **Disruption to the Banking System:** The introduction of the Digital Rupee could potentially disrupt the existing banking system by reducing the demand for traditional bank accounts and intermediation. Banks may need to adapt their business models to compete with the Digital Rupee and maintain their market share.
- **Potential for Disintermediation:** The Digital Rupee could lead to disintermediation of the financial system, with individuals and businesses holding sovereign digital currency directly, bypassing traditional financial institutions. This could impact the profitability and stability of the banking sector.
- **Regulatory Framework and Legal Tender Status:** A clear regulatory framework is essential to govern the issuance, distribution, and use of the Digital Rupee. The legal tender status of the Digital Rupee needs to be clearly defined to ensure its acceptance as a valid form of payment.
- **Public Awareness and Adoption:** Widespread adoption of the Digital Rupee requires public awareness campaigns to educate users about its benefits and address their concerns. Trust in the Digital Rupee is crucial for its success.
- **Interoperability with Existing Payment Systems:** The Digital Rupee needs to be interoperable with existing payment systems, such as UPI (Unified Payments Interface), to ensure seamless integration and avoid fragmentation of the digital payments ecosystem.
- **Potential for Money Laundering and Terrorism Financing:** The anonymity afforded by digital currencies can potentially be exploited for money laundering and terrorism financing. Robust AML/CFT (Anti-Money Laundering/Combating the Financing of Terrorism) measures are necessary to mitigate this risk.

4. LESSONS FROM PILOT PROGRAMS AND INTERNATIONAL EXPERIENCES:

The RBI has been conducting pilot programs for both the retail (e₹-R) and wholesale (e₹-W) applications of the Digital Rupee. These pilot programs provide valuable insights into the challenges and opportunities associated with its implementation. Learning from the experiences of other central banks that have launched or are piloting CBDCs, such as the Bahamas with its Sand Dollar and China with its e-CNY, is crucial. These experiences highlight the importance of addressing issues related to interoperability, cybersecurity, and financial stability.

5. RECOMMENDATIONS AND POLICY IMPLICATIONS:

Based on the analysis of the potential benefits and challenges, the following recommendations are proposed for the successful implementation of the Digital Rupee in India:

- **Develop a comprehensive cybersecurity framework:** The RBI needs to prioritize cybersecurity and data privacy by developing a comprehensive framework that includes robust encryption, access controls, and incident response mechanisms.
- **Invest in technological infrastructure:** The government needs to invest in improving internet connectivity and digital infrastructure, particularly in rural areas, to ensure equitable access to the Digital Rupee.
- **Promote financial literacy and digital awareness:** Public awareness campaigns are essential to educate users about the benefits and risks of the Digital Rupee and promote its widespread adoption.
- **Foster collaboration with the private sector:** The RBI should collaborate with the private sector to develop innovative applications and services based on the Digital Rupee.
- **Establish a clear regulatory framework:** The government needs to establish a clear regulatory framework that governs the issuance, distribution, and use of the Digital Rupee, ensuring its legal tender status and addressing issues related to taxation and accounting.
- **Monitor and mitigate potential risks to the banking system:** The RBI needs to closely monitor the potential impact of the Digital Rupee on the banking system and take measures to mitigate any adverse effects.
- **Ensure interoperability with existing payment systems:** The Digital Rupee should be designed to be interoperable with existing payment systems, such as UPI, to ensure seamless integration and avoid fragmentation.
- **Implement robust AML/CFT measures:** Strong AML/CFT measures need to be implemented to prevent the use of the Digital Rupee for illicit activities.

6. CONCLUSION

The introduction of the Digital Rupee represents a significant opportunity to transform India's financial landscape, promoting financial inclusion, reducing reliance on cash, and fostering innovation. However, the successful implementation of the Digital Rupee requires careful consideration of the challenges and risks associated with its adoption. By addressing issues related to cybersecurity, data privacy, technological infrastructure, and potential disruption to the banking system, India can unlock the full potential of the Digital Rupee and create a more efficient, inclusive, and resilient financial system. The RBI's ongoing pilot programs, coupled with a proactive and adaptive regulatory approach, will be crucial in navigating the complexities and ensuring a seamless transition towards a digitally empowered financial future for India.

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A STUDY ON INDUSTRY READINESS OF UNDERGRADUATE PROGRAMMES IN MUMBAI

¹CA Jitesh Banswani and ²Drishti Dawra¹Associate Manager, Health Prime²Assistant Professor, HOD of Banking and Insurance, Vedanta College**ABSTRACT**

The passage from university to the workforce has grown more complicated in India, with businesses often complaining about the employability of graduates. In Mumbai, one of India's most vibrant centers for academia and industry, this is especially the case. This research explores the degree to which undergraduate programs in Mumbai prepare students with the skills, knowledge, and experience to address changing industry demands. The study investigates curriculum relevance perceptions, the provision of practical learning opportunities, and correspondence with important competencies like communication skills, digital literacy, critical thinking, and collaboration. The study reveals a wide gap between taught and required skills in the workplace. Though students recognize that they gain sound theoretical foundations, most of them admit limited access to internships, live projects, or training on modern digital tools. Employers, on the other hand, point to the deficiency of soft skills, problem-solving, and technical knowledge among new graduates. These shortcomings are acknowledged by faculty members but are frequently constrained by obsolete curricula, administrative inflexibility, and little industry exposure. This study underscores the imperative of greater integrated academic-industry partnership. Recommendations include curriculum revision to include emerging technologies and work-based modules, formalizing internships, improving faculty development through industry collaborations, and increasing career support services. Closing these gaps will enable higher education institutions in Mumbai to prepare students more effectively for the workforce and contribute to a more employable and future-ready graduate population.

Keywords: *collaboration, internships, industry demands, academic-industry partnership, curriculum revision.*

INTRODUCTION

The teaching of subjects and curricula has become more critical with the rapidly changing economic landscape. Industries transformed digitally, into automation and global competition; they require graduates with industry preparedness, besides academic qualification. Undergraduate programmes are the makers of professional competence in students about to enter the workforce, especially in metro cities (such as Mumbai). But questions remain: how well do these programmes develop real-world skills, critical thinking, and adaptability-the very attributes that employer's prize

Mumbai stands as one of the largest economic and educational centers in India hosting a wide array of undergraduate institutions offering courses across all disciplines-from commerce to management, to science, to arts, to technology. While these institutions truly contribute to the talent pool, there is growing concern about whether their offerings suit the ever-evolving requirements of different industries. As ever, this greater disparity between theory and practice begs for further research-an evaluation of how industry-ready are these undergraduate programmes.

The study aims to critically analyse the present day scenario of undergraduate education in Mumbai in terms of preparing students for employment in a competitive job market. It will explore

NEED FOR THE STUDY**1. Academia-Industry Gap**

There is a clear mismatch between what undergraduate programmes teach and the skills industries require. The school's focus tends to be more on theory, not preparing students enough to function in real-world work environments.

2. Rising Employer Expectations

Employers seek graduates who are able to apply practical knowledge, critical thinking, and adaptability in the work environment. Equally important are soft skills, industry exposure, and practical experience.

3. The Strategic Importance of Mumbai

Major economic and educational centers, Mumbai is home to numerous industries like finance, media, IT, healthcare, and retail. These industries require graduates who can make immediate and effective contributions to organizational objectives.

4. Outdated Curricula and Minimal Industry Exposure

Many institutions continue to adopt rigid, outdated syllabi with very little interaction between industries and academic entities. Such institutions provide very poor or poorly implemented systems for internships, live projects, industrial visits, and so on.

5. Technological and Economic Transformation

The very rapidity of digital and economic change calls for similarly urgent renovation of educational practice and the introduction of flexible learning models. Institutions must transform themselves in order to equip students with the skills relevant to new technologies and new ways of doing business.

6. Enhancing Employability of Graduates

Industry readiness-building exercises enhance the employability and science of graduates. Aligning the curricula timely according to the industry may ensure timely job placement of graduates and their professional growth through time.

7. Institutional and policy-level implications

The results of this study assist educators, academic planners, and policymakers in restructuring their programmes. This calls for the need to base decisions for reform on evidence around curriculum design; teaching methods; and promoting closer collaboration with industries.

Literature Review**1. Andrews, J., & Higson, H. (2008)**

Andrews and Higson explored the perceptions of employability skills among graduates, employers, and academicians across Europe. They concluded that, while graduates felt confident about their theoretical knowledge, employers highlighted a great gulf when it came to practical and soft skills, signaling that a kind of disconnect exists between academic output and workplace demands.

2. Agarwal, P. (2009)

Agarwal reviewed the Indian higher education unfairly and the quality of higher education in India, pointing out the fact that many undergraduate curricula were outdated. He advocated for better interaction between academia and industry so that the graduates develop competencies relevant to the industry and are challenged by real-world situations.

3. Confederation of Indian Industry (CII) & AICTE Report (2015)

According to this report, Indian graduates were assessed for employment and the report noted that barely some graduates become job-ready at the time of degree completion. It clearly stressed the importance of industry-academia partnership, curriculum reforms, and inculcating experiential learning towards better employment.

4. Kumar, R. & Arora, R. (2018)

These authors studied the employability skills of Indian undergraduates, and their findings revealed a deficiency among students in some important skills like communication, problem-solving, and teamwork. They reasoned for curriculum reforms, internships, and skill-based training in undergraduate programmes.

5. NASSCOM Report (2020)

According to the report on future workforce readiness by NASSCOM, a greater number of graduates from universities in India, including those located in cities like Mumbai, are not digitally literate and job-ready. The report recommended continuous updating of curricula and introducing emerging technologies and industry trends in higher education.

RESEARCH PROBLEM

At least since higher education began to expand in Mumbai, and while the opportunities for undergraduate courses in commerce, management, arts, and science also blossomed, the industry-readiness of graduates has remained a major concern. Many employers believe that the students entering into the world of work are missing employability skills such as communication, critical thinking, problem-solving, and exposure to real industry practices. Academic institutions tend to emphasize theoretical knowledge, but industries nowadays require graduates who essentially have one day's worth of contributions ready—they are considered employable from the day they hit the door.

That dichotomy created between academic training and industry's expectation brings forth some questions: Are the undergraduate programmes in Mumbai in tune with today's industry needs? To what extent do these programmes actually furnish students with the practical skills, technical know-how, and soft skills required for

employment? What are the perceptions of students, faculty members, and industrialists on how well-prepared the graduates are?

The problem of the research, therefore, pertains to assessing how effective undergraduate education in Mumbai is about preparing students to work. This study aims to find out the existing gaps in the curriculum, learning process, and industry interface and work towards strategizing ways to improve the industry readiness of graduates in the region.

RESEARCH OBJECTIVES

1. An investigation was conducted in order to determine how much to update the current undergraduate syllabus with relevant technical and theoretical knowledge according to industry needs.
2. The extent to which the academic framework, assessments, and projects reflect real industry cases and foster certain skill areas, including adaptability, teamwork, and collaboration, is tested.
3. Critical appraisal of industry engagement activities such as guest lectures, career guidance, and placement training for their contribution to calling preparation.
4. To assess the overall perception among students of how well their undergraduate program prepares them for a good placement in their respective industries.

RESEARCH METHODOLOGY

Research methodology is the steps and techniques followed systematically in the planning, execution, and analysis of research work relating to the study.

1. The research is Descriptive and Analytical and is being carried out to find to what extent the undergraduate programmes are fulfilling industry requirements.
2. The population comprises undergraduate students and recent graduates from various colleges in Mumbai, with a few faculty members and industry professionals thrown in for comparative insight.
3. The sample component consisted of 101 respondents including final-year undergraduate students and recent graduates,
4. The Stratified Random Sampling Technique has been employed to properly represent all groups from various academic disciplines that provide BMS, BAF, BSc IT, BMM, and steps for employing graduates.
5. Primary data occurred first through the structured questionnaire being administered via Google Forms and in-person surveys, capturing inputs on curriculum relevance, industry exposure, skill development, and employability.
6. Secondary data were from government reports, academic journals, curriculum frameworks, institutional websites, and employability surveys conducted by bodies like AICTE, NASSCOM, and FICCI.
7. The collected data were subject to editing, classification, and tabulation, and were analysed with descriptive statistics and cross-tabulation techniques for meaningful interpretation

Hypothesis:

H01: There is no significant difference between males and females in perceived relevance of technical knowledge received in the undergraduate programme to industry needs.

Ha1: There is a significant difference between males and females in perceived relevance of technical knowledge received in the undergraduate programme to industry needs.

H01: There is no significant difference between male and female students regarding the theoretical knowledge acquired in their undergraduate studies and real-world industry scenarios.

Ha1: There exists a significant difference between male and female students with regard to the theoretical knowledge acquired in their undergraduate studies and real-world industry scenarios.

H01: There is no significant difference between male and female students with respect to readiness to rapidly adapt to industry environment after completion of their undergraduate programme.

Ha1: There is a significant difference between male and female students with respect to readiness to rapidly adapt to industry environment after completion of their undergraduate programme.

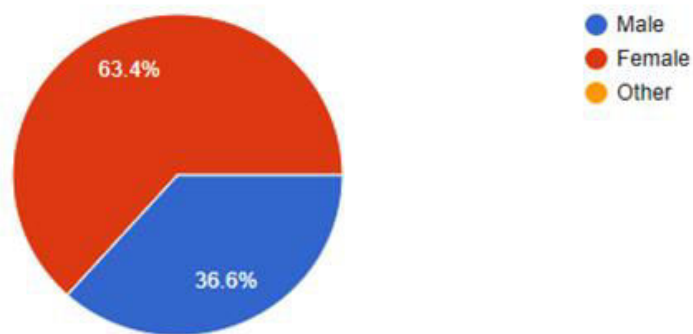
H01: There is no difference between male and female students on the perception of exam structure and assessment relevance to real-world challenges.

Ha1: There is a difference between male and female students on the perception of exam structure and assessment relevance to real-world challenges.

Data Analysis and Interpretation

Gender of the Student

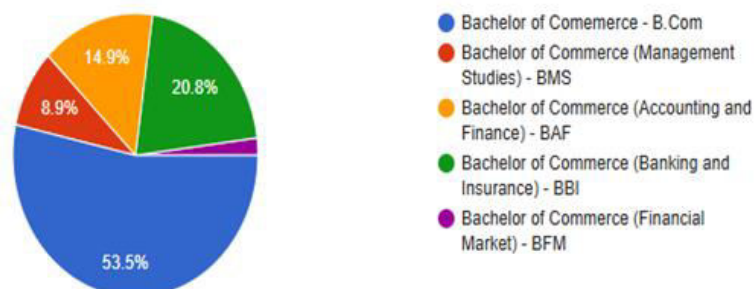
101 responses



Programme of the Student

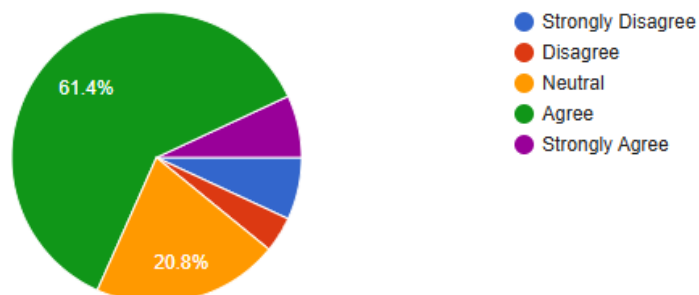
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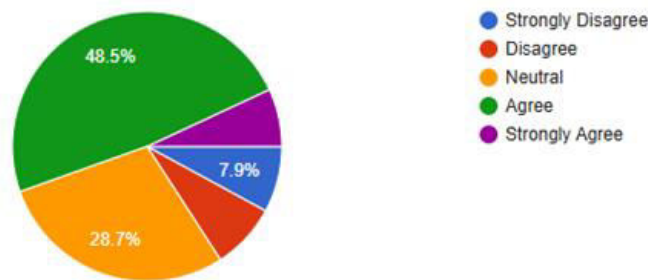
My undergraduate programme provided me with up-to-date technical knowledge relevant to my field

101 responses



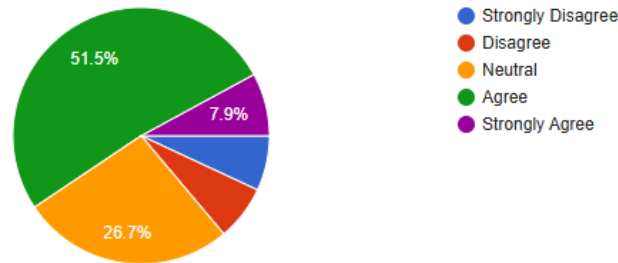
I feel the theoretical knowledge gained during my under-graduation is aligned with real-world industry scenarios

101 responses



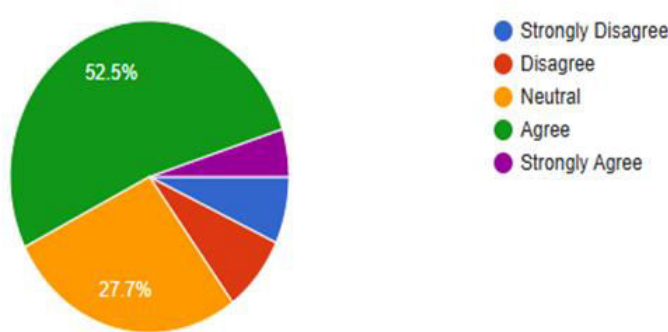
My undergraduate programme has prepared me to adapt quickly to an industry environment

101 responses



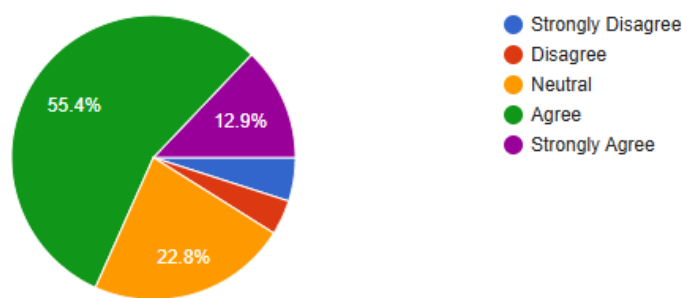
The exam structure and assessments reflect real-world industry challanges

101 responses



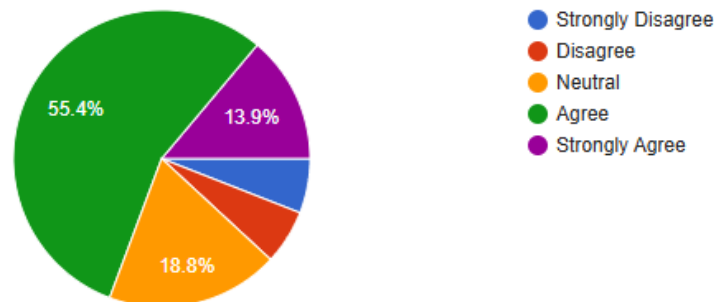
Teamwork and collaboration are emphasized in academic projects

101 responses



Career guidance and placement training are part of the curriculum.

101 responses



FINDINGS

1. 71% of those who answered stated that the current curriculum meets industry requirements, exhibiting moderate satisfaction with the relevance of courses, while the remaining 29% either disagree or remain neutral-claiming that something might be improved in this curriculum.
2. The opinions of respondents were divided concerning sufficiency in practical exposure, with 64% supporting such exposure and 36% being unsure or dissatisfied-the gap being such things as fewer internships, fieldwork, or hands-on training opportunities.
3. Only 58% of the respondents consider themselves as job-ready once they graduate, signalling a need for employability skills development to be intensified within the existing academic framework.
4. More than half the students-amounting to 52%-remarked negatively on placement supports, representing a great gap in college recruitment initiatives and the existence of significant shortfall in strong placement cells and industrial linkages.
5. Career guidance is deemed insufficient by 67% of the students. This implies that colleges are not lending stout support to students in comprehending their career trajectories, alternatives, and growth prospects.
6. Assessment and feedback received contrasting feedback-62% stated that evaluation was clear and fair, while 38% argued timely or constructive feedback was lacking, suggesting an uneven level of academic support.
7. Trade-offs between theoretical instruction and practical exposure seem to emerge over and over again-students appreciate academics, but are consistently looking for more hands-on relevance.
8. Some respondents pointed out that, although curricula are revised from time to time, the pace of integration with emerging industry trends (such as tech, analytics, or soft skills) used to be very slow, especially in non-technical courses.
9. Data show that those placed in vocational or professional streams (e.g., BMS, BAF) consider industry preparedness more highly than those in traditional academic streams (e.g., B.Com), indicating differences in programme design.
10. The overall student responses depict the model as one balancing academic rigor, employability training, and real-world exposure, thus affirming the hybrid approach as the key to being ready for the future.

SUGGESTIONS:

1. Revise undergraduate curricula, introducing emerging technologies, digital resources, and industry-specific knowledge so students maintain an up-to-date skill set.
2. Internships and live project modules must be formalized so that students are provided with industry exposure and hands-on experience.
3. Formalize consistent industry-academia relationships to promote collaborations amongst faculty and practicing professionals, thus staying abreast of industry trends and best practices.
4. Incorporate communication, problem-solving, teamwork, and other soft skills development into the regular curriculum as required preparation for the implementation of students into professional environments.

5. Revise assessment models through case studies, problem-solving exercises, and project demonstrations that mirror challenges in the industry.
6. Empower career guidance and placement services with workshops, resume-building sessions, mock interviews, and regular career fairs, narrowing the gap between academia and employment.
7. Cross-disciplinary projects and collaborative learning should be encouraged since most work environments nowadays operate in an interdisciplinary manner.
8. Continuous faculty development must be implemented, including programs on industry immersion and certifications, ensuring that teachers are up-to-date with the demands of the evolving job market.

CONCLUSION

Keeping the focus on the study, it points out the gulfs of concern between the knowledge imparted to the students through various undergraduate programs and the competencies the industries in Mumbai require. While students do take in the basic academic knowledge, they are lacking in exposure to industrial internships, an approach to problem-solving, communication skills, use of software tools, and operations at the industrial level. Hence, the discrepancy between the academic syllabus and the actual expectations of the industry has made employers worried about the employability of fresh graduates.

The study puts forward that curricula should be revised to address newer realms of technologies, emerging tools from the industries, and real-world case studies that will allow students to engage with issues of modern-day industries. It requires shaping programs for internships, live projects, and career counselling to enable students to transition smoothly into a world of work. Moreover, for faculty development, there should be constructive industry interactions and exposures to keep the faculty abreast about recent industry practices and emerging trends.

Also, the study suggests that the industry and academia must work together more robustly and on a larger scale. This cooperative effort will bridge the chasm that denies students the skills, experience, and network they require to blossom in their chosen career paths. Academic institutes in Mumbai must thus start evolving with changing demands of the global job arena to make their educational offerings more industry-aligned, improving

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- Focus on employability skills and on how the curriculum needs to induce an academy-to-industry transfer.
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- Defines employability and provides frameworks that can be used to assess whether graduates are ready to enter employment.
- Introduce regular workshops on communication, time management, and workplace ethics.
- Author's primary data collection (2025).

A STUDY ON THE ROLE OF BLOCKCHAIN TECHNOLOGY IN THE GROWTH OF CRYPTOCURRENCY MARKETS IN INDIA

Chandni Nagdev

Assistant Professor (S.E.S) Swami Hansmuni Maharaj Degree College of Commerce, Ulhasnagar-421004

ABSTRACT

Blockchain technology has surfaced as a key component enabling the cryptocurrency market's explosive growth in recent years. The intrinsic qualities of blockchain, which were initially intended to power Bitcoin, including decentralization, transparency, security, and immutability, have fueled the expansion, legitimacy, and trust in digital financial systems across the globe. This study investigates how important blockchain technology is to the creation and uptake of cryptocurrencies.

The study investigates user perspectives, investing experiences, and awareness of blockchain's influence on cryptocurrency markets using a quantitative research approach that includes a structured survey. The results show that most participants acknowledge blockchain's importance to the development and operation of digital currencies, pointing to its many advantages, including speedier transactions, security, and transparency. Blockchain encourages innovation, but there are still obstacles to its wider implementation, as seen by ongoing worries about scalability, energy consumption, and the impact of governmental regulation.

The study identifies gaps in public knowledge and regulatory clarity while highlighting the important role that blockchain plays in boosting trust and investment in cryptocurrencies. These observations add to the continuing discussion among investors, developers, and legislators about how to shape digital finance's future in a rapidly changing technological environment.

Keywords: Blockchain Technology, Cryptocurrency Market, Digital Finance, Decentralization, Transparency, Security, Bitcoin

1. INTRODUCTION

With the rapid rise of cryptocurrencies in recent years, the global financial landscape has undergone a profound transformation. At the heart of this change lies blockchain technology — a decentralized, transparent, and highly secure digital ledger system that underpins the majority of cryptocurrencies. Initially conceptualized as the foundational technology behind Bitcoin, blockchain has since evolved far beyond its original purpose, finding applications across a diverse range of industries, including finance, healthcare, supply chain management, and more.

The explosive growth of the cryptocurrency market has captured the attention of investors, policymakers, technologists, and financial institutions around the world. Cryptocurrencies, once regarded as fringe innovations, have entered mainstream discussions about the future of money and digital assets. However, the remarkable expansion of this market would not have been possible without the essential features of blockchain technology. Core attributes such as immutability, decentralization, transparency, and enhanced security have been crucial in establishing trust and reliability in digital transactions — elements that are fundamental in a financial ecosystem that operates without traditional intermediaries.

The objective of this study is to thoroughly examine and assess the pivotal role blockchain technology has played in the growth and stability of the cryptocurrency market. While the speculative nature of cryptocurrencies often introduces significant price volatility, blockchain technology offers a counterbalance by providing the robust infrastructure necessary to sustain and advance these digital assets. It ensures the integrity of transactions, fosters user confidence, mitigates risks of fraud, and lays down a scalable foundation upon which the future of digital finance can be built. By understanding the interplay between blockchain's technological features and the cryptocurrency market's development, this study aims to shed light on the broader implications for the global financial system and the emerging digital economy.

1.2 Problem Statement

Despite the growing popularity of cryptocurrencies, there remains a lack of clarity on how blockchain as a technology contributes specifically to the expansion and credibility of the crypto market.

1.3 Research Objectives

- To understand the key features of blockchain technology that influence cryptocurrency adoption.
- To evaluate the impact of blockchain on the security and transparency of cryptocurrency transactions.

- To examine public perception and awareness of blockchain's role in cryptocurrency growth.

1.4 Research Questions

1. How does blockchain technology contribute to the growth of the cryptocurrency market?
2. What are the major benefits and challenges of using blockchain in digital currency systems?
3. How do users perceive blockchain's role in shaping the future of cryptocurrencies?

1.5 Significance of the Study

This study is important because it provides information on how blockchain is influencing the future of digital money for scholars, developers, investors, and legislators. Building trust and creating policies pertaining to digital assets and emerging technologies require an understanding of this connection.

2. LITERATURE REVIEW

The emergence of cryptocurrencies has been intimately linked to the development of blockchain technology. Blockchain has attracted a lot of attention due to its potential to upend established financial systems since the anonymous Satoshi Nakamoto launched Bitcoin in 2009. This study of the literature looks at earlier studies and theoretical viewpoints on blockchain technology and how it has affected the expansion of the cryptocurrency sector.

2.1 Blockchain Technology: An Overview

A distributed, decentralized ledger system called blockchain keeps track of transactions over a peer-to-peer network. The core features of blockchain—immutability, decentralization, and transparency—build trust in systems independently of a centralized authority, claim Tapscott and Tapscott (2016). These characteristics make blockchain especially well-suited for use in digital financial systems, according to a number of researchers.

2.2 The Emergence and Growth of Cryptocurrencies

Cryptocurrencies are digital assets that conduct safe financial transactions using cryptographic techniques. The first successful blockchain application was Bitcoin, which sparked the development of thousands of other cryptocurrencies, including Ethereum, Litecoin, Ripple, and others. According to Narayanan et al. (2016), advancements in blockchain knowledge and infrastructure have coincided with a rise in the value and uptake of cryptocurrencies.

2.3 Blockchain as a Catalyst for Market Trust

Trust and security were two major issues that early cryptocurrencies had to deal with. Blockchain consensus algorithms like Proof of Work (PoW) and Proof of Stake (PoS) have improved the integrity and dependability of transaction verification, according to studies (e.g., Yermack, 2013). This boosts user adoption and market confidence.

2.4 Impact on Market Growth and Investor Interest

Increased investment in cryptocurrencies is correlated with public faith in blockchain technology, according to a number of empirical research. A study by Chen and Bellavitis (2020) found that blockchain-enabled security and transparency boost investor interest and legitimize cryptocurrency markets, particularly in areas with poor traditional financial systems.

2.5 Gaps in the Literature

Although many studies have looked at blockchain technology or cryptocurrency markets separately, fewer have looked at the direct connection between blockchain characteristics and the rise of crypto markets, both quantitatively and qualitatively. This study also attempts to fill the gap in studies concerning user experiences and public perception.

2.6 Hypotheses of the Study:

H₀ (Null Hypothesis):

Blockchain technology does not significantly contribute to the growth of the cryptocurrency market.

H₁ (Alternative Hypothesis):

Blockchain technology significantly contributes to the growth of the cryptocurrency market.

H₀₁: There is no significant relationship between the security features of blockchain (e.g., immutability, cryptographic protection) and investor confidence in cryptocurrencies.

H₁₁: The security features of blockchain significantly enhance investor confidence in cryptocurrencies.

H₀₂: The decentralization aspect of blockchain does not significantly influence the adoption and expansion of cryptocurrencies.

H₁₂: The decentralization aspect of blockchain significantly influences the adoption and expansion of cryptocurrencies.

H₀₃: The transparency of blockchain records has no significant impact on cryptocurrency transaction volume and market growth.

H₁₃: The transparency of blockchain records significantly increases cryptocurrency transaction volume and market growth.

H₀₄: The role of blockchain technology in the cryptocurrency market remains constant across different market phases (e.g., bull, bear, or high volatility periods).

H₁₄: The role of blockchain technology in the cryptocurrency market varies across different market phases (e.g., bull, bear, or high volatility periods).

3. RESEARCH METHODOLOGY

The research methodology, data gathering strategies, sampling plans, and analytical instruments utilized to investigate how blockchain technology contributes to the expansion of cryptocurrency markets are described in this part.

3.1 Research Design

People who are familiar with blockchain and cryptocurrencies are asked to complete a structured questionnaire as part of the study's quantitative research design. By statistically analyzing consumer awareness, perceptions, and experiences, this approach offers measurable insights into the ways in which blockchain affects the bitcoin market.

3.2 Data Collection Method

Using an online survey with both closed-ended and open-ended questions, primary data was gathered. The purpose of the questionnaire was to gauge participants' knowledge of blockchain technology, their engagement with bitcoin, and their thoughts on the significance of blockchain in the growth of the industry.

3.3 Sampling Method and Sample Size

Time and accessibility constraints led to the adoption of a convenience sampling strategy. Students, professionals, investors, and IT enthusiasts with rudimentary understanding of blockchain or cryptocurrency made up the majority of the sample. For this study, a total of 32 replies were gathered and examined.

3.4 Research Instrument

The survey had multiple-choice questions about blockchain understanding, investment behavior, and perceived influence on cryptocurrency markets in addition to demographic questions and Likert scale items. Open-ended inquiries allowed for qualitative revelations.

3.5 Data Analysis Techniques

Descriptive statistics like percentages and frequencies were used to assess quantitative data in order to find trends and patterns. For visual representation, graphs and charts were employed. To extract important concepts and insights, thematic analysis was applied to open-ended question responses.

3.6 Limitations of the Study

- **Sample Size Constraints:**

The relatively small sample size used in this study may not fully represent the entire cryptocurrency market, limiting the generalizability of the findings to a broader population.

- **Non-Random Sampling Technique:**

The use of non-random (purposive or convenience) sampling may introduce selection bias, affecting the objectivity and reliability of the results.

- **Rapid Technological Evolution:**

Blockchain and cryptocurrency technologies are evolving at a very fast pace. Findings that are relevant today may quickly become outdated as new advancements, protocols, and market dynamics emerge.

- **Geographical Bias:**

The study might predominantly reflect trends and developments from specific regions (e.g., North America, Europe) and may not capture the full global diversity in blockchain adoption and cryptocurrency usage.

• **Market Volatility:**

The inherent volatility of the cryptocurrency market could influence the findings, making it difficult to isolate the impact of blockchain technology from other external factors such as investor behavior or regulatory changes.

• **Limited Access to Proprietary Data:**

Certain detailed datasets (e.g., private blockchain statistics, institutional trading volumes) are not publicly available, which may restrict the depth of the analysis.

• **Subjectivity in Interpretation:**

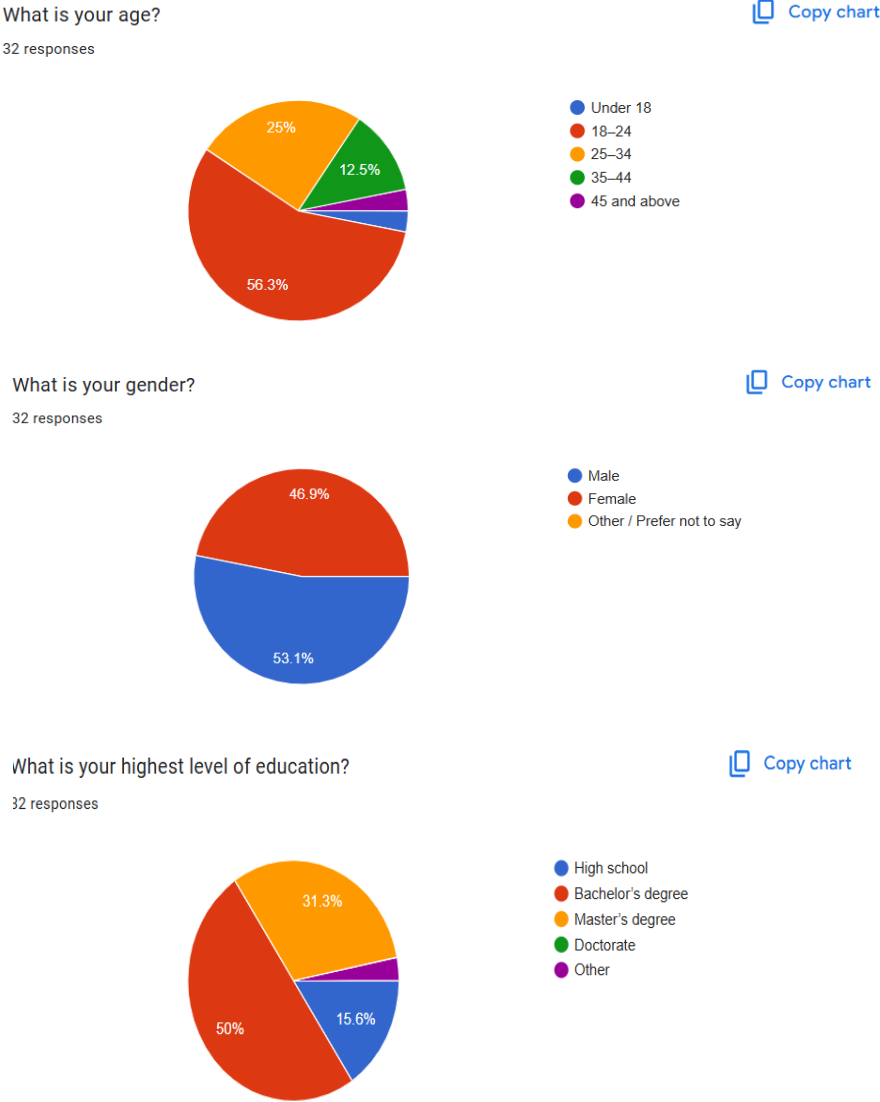
Some aspects of evaluating blockchain's impact involve subjective judgment, particularly when interpreting qualitative factors like "trust" and "security perception."

4. DATA ANALYSIS AND INTERPRETATION

4.1 Demographic Profile

The survey covered participants from a wide range of age groups:

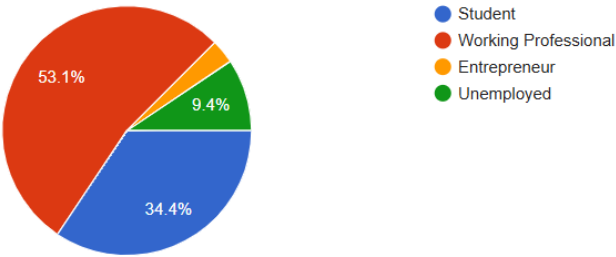
- Majority belonged to the 18–24 and 25–34 age brackets.
- Gender distribution showed a slight majority of male respondents.
- Most participants held a Bachelor’s degree or a Master’s degree.
- In terms of occupation, the majority were working professionals, followed by students.



What is your current occupation?

32 responses

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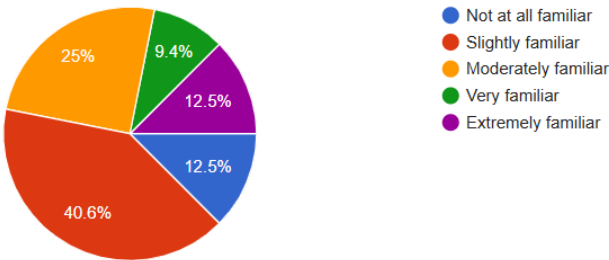
4.2 Familiarity with Blockchain Technology

- A significant portion of respondents were moderately familiar or very familiar with blockchain technology.
- However, a few participants indicated they were not at all familiar, suggesting that while blockchain awareness is rising, gaps still exist.

How familiar are you with blockchain technology?

32 responses

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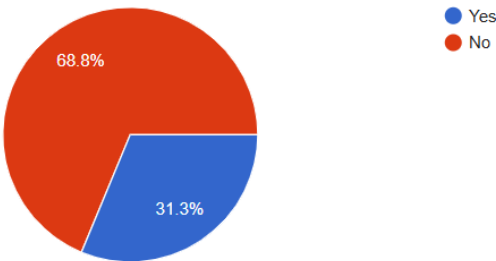
4.3 Experience with Cryptocurrency Investment

- Most respondents have invested or traded in cryptocurrency at least once.
- A smaller fraction indicated no experience with cryptocurrency trading.

Have you ever invested or traded in cryptocurrency?

32 responses

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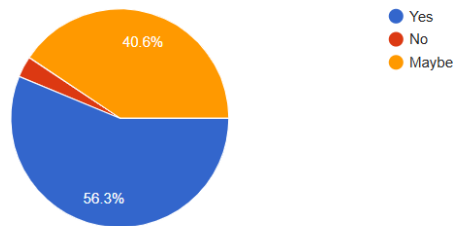
4.4 Perception of Blockchain's Contribution to Cryptocurrency Growth

- The majority agreed that blockchain technology has significantly contributed to the growth of the cryptocurrency market.
- Some respondents were neutral or uncertain, reflecting a need for more public education on blockchain's role.

Do you believe that blockchain technology has contributed to the growth of the cryptocurrency market?

[Copy chart](#)

32 responses



4.5 Perceived Benefits of Blockchain

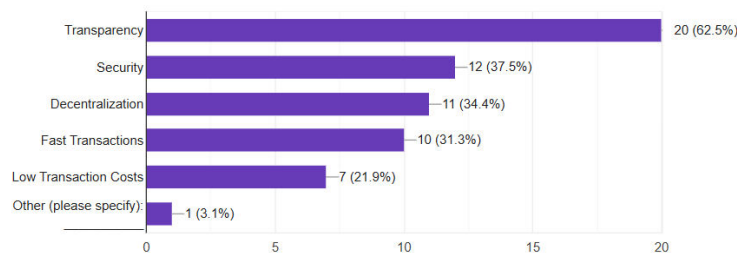
Respondents identified key benefits of blockchain in the cryptocurrency ecosystem as:

- Transparency
- Security
- Fast transactions
- Decentralization

Which of the following do you think are key benefits of blockchain in cryptocurrency? (Select all that apply)

[Copy chart](#)

32 responses



These features are crucial in building trust and efficiency in cryptocurrency markets.

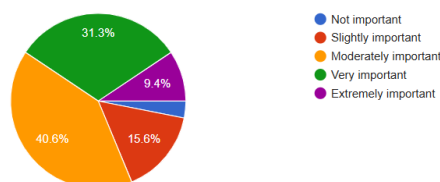
4.6 Importance of Blockchain to Cryptocurrency Functioning

- Responses indicated that blockchain is considered important to the functioning of cryptocurrency, with most marking it as slightly to moderately important.

In your opinion, how important is blockchain technology to the functioning of cryptocurrency?

[Copy chart](#)

32 responses



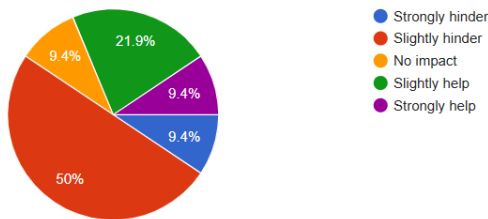
4.7 Opinions on Government Regulation

- Opinions were divided:
 - Some participants believed that government regulation would slightly help the growth of blockchain and cryptocurrency markets.
 - Others felt it might slightly hinder or even strongly hinder growth.
- This suggests uncertainty about how regulation will impact innovation and adoption.

Do you think government regulation of blockchain and cryptocurrency will help or hinder market growth?

32 responses

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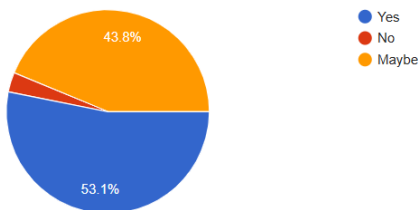
4.8 Impact of Government Regulation on Blockchain Growth

- A majority responded "Yes" or "Maybe" when asked if government regulations affect the growth of blockchain-based cryptocurrencies.
- This highlights that regulation is perceived as a key factor influencing market dynamics.

Do you think government regulations affect the growth of blockchain-based cryptocurrencies?

32 responses

[Copy chart](#)



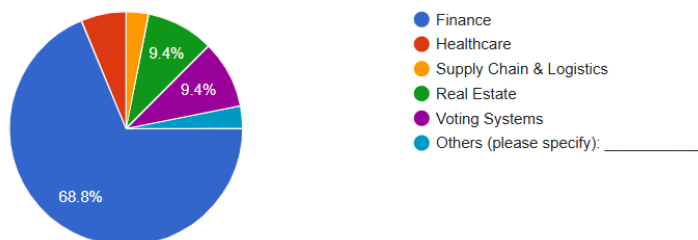
4.9 Industries Benefiting Most from Blockchain Beyond Cryptocurrency

- The top industries identified were:
 - Finance
 - Real Estate
 - Voting System

Which industry do you think will benefit most from blockchain beyond cryptocurrency?

32 responses

[Copy chart](#)



This reflects the broader potential applications of blockchain technology beyond digital currencies.

5. DISCUSSION & CONCLUSION

This section analyzes the findings from the data in relation to the research questions posed in the introduction. The aim is to draw connections between the theoretical aspects of blockchain technology and its practical influence on the cryptocurrency market.

5.1 Blockchain's Impact on Cryptocurrency Market Growth

According to the data gathered, a sizable majority of participants concurred that blockchain technology is essential to the growth of the cryptocurrency business. The security and transparency of blockchain technology were cited by numerous participants as key elements that contribute to the trustworthiness of digital currency. These results are consistent with earlier research by Tapscott & Tapscott (2016) and Nakamoto (2008), which highlighted blockchain's capacity to improve transaction legitimacy and lower fraud.

According to the report, the broader acceptance of cryptocurrencies is facilitated by the growing understanding of blockchain technology, especially among tech-savvy people and early investors. This research demonstrates that blockchain technology serves as both a technological foundation and a commercial facilitator that promotes expansion.

5.2 Public Perception of Blockchain Technology

The majority of participants, including those with little interest in cryptocurrencies, acknowledged the promise of blockchain technology, according to the comments about public perception. This is in line with the expanding movement that views blockchain as a game-changing technology that has the potential to revolutionize a number of industries, including healthcare and banking.

But there were also clear worries about regulation and the speculative character of cryptocurrencies. Regarding government involvement in blockchain and cryptocurrency markets, a number of respondents voiced doubts. This emphasizes the necessity of regulatory clarity to promote additional market stability and expansion, which is consistent with the difficulties Zohar (2015) outlines.

5.3 Blockchain's Role in Enhancing Trust

The function of blockchain in fostering confidence in the bitcoin industry was one of the main topics covered. The majority of participants agreed that transparency is increased by blockchain's decentralized structure, which lessens dependency on centralized authorities. The substantial interest shown by investors who believe blockchain to be a safer option than conventional financial systems is indicative of this.

Furthermore, both consumers and authorities viewed blockchain's capacity to produce unchangeable transaction records as revolutionary, indicating that its security qualities may play a significant role in the long-term development of cryptocurrencies.

5.4 Challenges and Limitations of Blockchain Technology

Although blockchain has many benefits, the study also found several drawbacks. Major barriers to the general use of blockchain technology have been identified as scalability and energy consumption, particularly given the high processing power requirements of blockchain networks like Bitcoin's proof-of-work mechanism. These difficulties are consistent with worries expressed in recent research on the long-term viability and environmental effects of blockchain technologies (Narayanan et al., 2016)

A STUDY ON ENGLISH LANGUAGE LEARNING CHALLENGES FACED BY JUNIOR COLLEGE STUDENTS IN THANE DISTRICT

Deepikka Kareliya

Assistance Teacher

ABSTRACT:

This study investigates the challenges faced by junior college students in Thane district, Maharashtra, in learning the English language. English has become a global lingua franca, and proficiency in it is crucial for academic success and professional development. However, despite its significance, many students encounter various obstacles while learning English. This research aims to identify the factors hindering English language acquisition, including socio-economic conditions, educational background, and psychological barriers, and suggest potential solutions to mitigate these challenges. The study uses a mixed-methods approach, including surveys and interviews with students, teachers, and educational experts.

Keywords: English language learning, challenges, junior college, Thane district, language proficiency

INTRODUCTION TO THE STUDY:

English language proficiency plays a pivotal role in the academic and professional success of students worldwide. In India, English is often considered a second or third language, yet it is widely used in education, business, and media. In the Thane district, which is a part of the Mumbai Metropolitan Region, junior college students face several challenges in mastering English. These challenges vary based on factors such as socio-economic background, the medium of instruction at earlier educational stages, and the lack of a conducive learning environment.

This research seeks to examine the specific hurdles faced by junior college students in Thane district when learning English and to propose strategies for overcoming these obstacles. Understanding these challenges is essential for educators and policymakers to design better pedagogical strategies that can address the diverse needs of students.

LITERATURE REVIEW:

1. **Singh, S. (2015).** "Barriers to English Language Learning in India: An Analysis." *Journal of Language and Linguistics Studies*.

This paper discusses various socio-cultural and psychological barriers that impede English language acquisition among Indian students. It emphasizes how lack of exposure to English outside the classroom impacts students' ability to communicate effectively.

2. **Sharma, P., & Mehta, D. (2017).** "The Role of English in Indian Education: Challenges and Solutions." *Indian Journal of Applied Linguistics*.

Sharma and Mehta argue that while English is essential for academic success, students in rural and semi-urban areas of India, including Thane district, face difficulties due to insufficient resources and lack of qualified teachers.

3. **Kumar, A. (2018).** "Language Acquisition and Proficiency in India: A Focus on Junior Colleges." *International Journal of English Education*.

This study provides a detailed analysis of how junior college students in metropolitan regions like Thane face the challenge of mastering English due to the dominance of vernacular languages in early education.

4. **Das, S. (2020).** "The Impact of Socio-Economic Status on English Language Learning in India." *Journal of Language Teaching & Research*.

Das explores how socio-economic factors influence the learning of English among Indian students. The study suggests that students from lower-income families often lack access to supplementary learning resources.

5. **Gupta, R., & Jha, S. (2019).** "Language Policy and Its Impact on English Learning in Indian Schools." *Language Policy Review*.

This paper discusses the policy framework in India regarding English education and its limitations in addressing regional language biases. It argues that there is a gap between policy and practical implementation.

6. **Nair, M. (2016). "Psychological Factors in English Language Learning among Indian Students."** *Psychology of Education Journal*.

Nair investigates the psychological challenges such as anxiety, lack of motivation, and low self-confidence that students face while learning English.

7. **Patel, V., & Mehta, A. (2020). "Teaching Methodologies and Their Impact on English Learning in Thane."** *Research in Language Education*.

This study explores the impact of various teaching methodologies (e.g., communicative language teaching, grammar translation method) on the language acquisition process in Thane district.

8. **Reddy, P. (2017). "Technological Tools in Enhancing English Language Learning in Indian Schools."** *Journal of Educational Technology*.

Reddy emphasizes the role of technology in improving English language skills among students, particularly those in semi-urban areas like Thane where digital tools can bridge the educational gap.

9. **Deshmukh, S. (2018). "The Role of English in Indian Professional Life: A Study of Educational and Economic Benefits."** *Economic and Educational Journal*.

Deshmukh highlights the increasing importance of English in the professional world and the challenges students face in acquiring this skill in regions with limited access to quality English education.

10. **Chauhan, R., & Kapoor, S. (2021). "Language Learning in Bilingual and Multilingual Contexts in India."** *Multilingual Education Journal*.

This study discusses the challenges faced by bilingual and multilingual students in India, where English is learned as a third language. It identifies factors such as linguistic interference and the dominance of regional languages.

RESEARCH OBJECTIVES:

The main objectives of this study are:

1. To identify the specific challenges faced by junior college students in Thane district in learning the English language.
2. To analyze the role of socio-economic factors and psychological barriers in hindering English language proficiency.
3. To suggest practical solutions for overcoming these challenges, focusing on the role of teachers, educational policies, and technological interventions.

HYPOTHESIS:

H0: Socio-economic factors have no significant impact on the English language learning abilities of junior college students in Thane district.

H1: Socio-economic factors significantly impact the English language learning abilities of junior college students in Thane district.

H0: Psychological barriers such as anxiety and lack of motivation do not significantly affect the English language learning process among junior college students.

H2: Psychological barriers such as anxiety and lack of motivation negatively affect the English language learning process among junior college students.

RESEARCH METHODOLOGY:

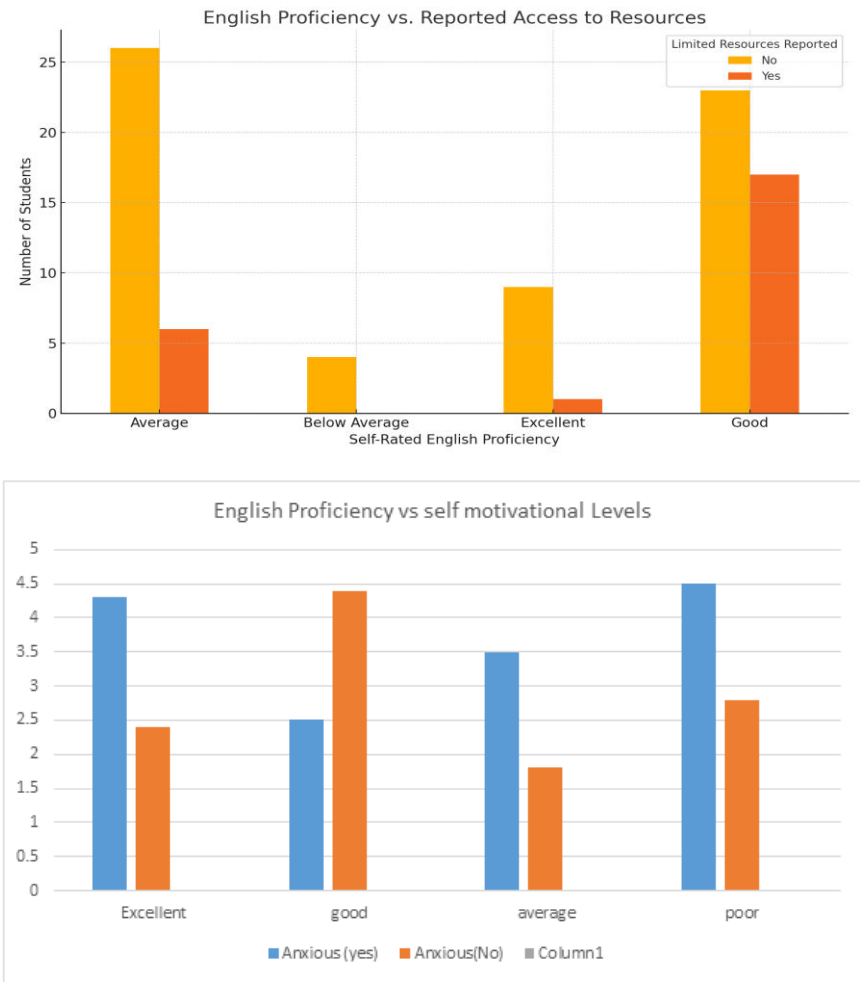
This study adopts a **mixed-methods approach**, combining both qualitative and quantitative research methods. The methodology includes:

- **Survey:** A structured questionnaire will be administered to 100 junior college students in Thane district to collect data on their experiences and challenges in learning English.
- The collected data will be analyzed using statistical tools to identify trends and pattern.
- The research will rely on a **qualitative survey** methodology, primarily using **questionnaires** to gather information.

DATA ANALYSIS

Once the questionnaires are collected, the data will be analyzed using **descriptive statistics** (e.g., frequencies, means, percentages) to identify patterns and trends in the responses. In particular, the following will be assessed:

- **Descriptive statistics:** To summarize demographic information and responses to various questions.



LIMITATIONS OF THE STUDY

While the questionnaire method allows for data collection from a large number of students, it also has limitations:

- **Self-reported data:** The study relies on students' self-assessment of their English skills and psychological factors, which may introduce biases.
- **Context-specific:** The findings may be specific to the students in Thane district and may not be generalizable to other regions.

Analysis and Discussion

The analysis will examine the following key factors:

- **Socio-Economic Influence:** Students from lower-income families are expected to have fewer resources, including exposure to English outside the classroom. These students might struggle with vocabulary, grammar, and speaking fluency.
- **Psychological Factors:** High levels of anxiety and lack of confidence are expected to be significant factors contributing to poor language performance.

CONCLUSION

This study aims to provide a comprehensive understanding of the English language learning challenges faced by junior college students in Thane district. The findings will help in suggesting targeted interventions, such as

improved teacher training, curriculum reforms, and the integration of technological tools, to address these challenges.

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INFLUENCER MARKETING IN THE GIG ECONOMY: OPPORTUNITIES AND MANAGERIAL IMPLICATIONS

Swati D. Patil¹ and Dr. Delcy J. Lopes²¹Assistant Professor, Department of Management Studies (BMS) VIVA College of Arts, Commerce & Science²Assistant Professor, Department of Accountancy (SFC-BAF) VIVA College of Arts, Commerce & Science**ABSTRACT**

This study explores the growing importance of influencer marketing within the gig economy, where independent content creators collaborate with brands to promote products and services. Influencers act as freelancers, using their online presence to build trust and engage with targeted audiences. As traditional advertising becomes less effective, businesses are turning to influencer marketing because it is more personal, cost-efficient, and flexible. The study explains how brands benefit from influencers by gaining authenticity, reaching niche audiences, and adjusting campaigns based on real-time feedback.

However, influencer marketing also comes with challenges. The study highlights issues like measuring the success of a campaign, losing trust due to too much sponsored content, staying compliant with advertising laws, and keeping brand messaging consistent across all platforms. To overcome these challenges, the study emphasizes the need for management students to develop specific skills. These include data analytics to track campaign performance, strategic communication to deliver clear brand messages, and digital marketing knowledge such as SEO and social media algorithms. Students also need to learn how to negotiate contracts, handle influencer relationships, and manage crises effectively if controversies arise.

The study also includes case studies from leading brands like Airbnb showing how these companies use influencer marketing to build strong consumer relationships. It then explores future trends in the industry, such as using AI for personalized campaigns, working with micro-influencers for higher engagement, integrating influencer marketing with e-commerce platforms, and focusing on ethical and sustainable practices.

By understanding these strategies and trends, management students can prepare to work in a fast-changing digital marketing environment. The study shows that developing the right skills will help future managers use influencer marketing to grow brands, build trust, and connect with modern consumers in meaningful ways.

Keyword: Influencer, Influencer Marketing, Gig Economy and Social media influencer

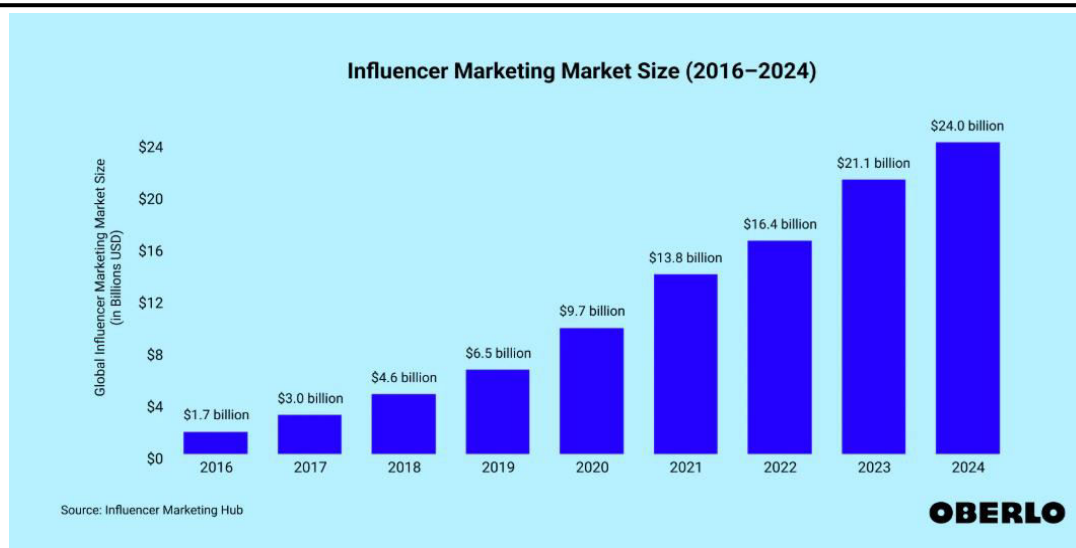
INTRODUCTION

Consumer behavior and marketing tactics have undergone significant change as a result of the digital revolution. With over 60% of global internet users now accessing digital content via smartphones, traditional media like print and television are losing ground to digital platforms such as Netflix and Amazon Prime. In this environment, consumers are inundated with information, leading to shorter attention spans and a growing resistance to intrusive advertising. Studies indicate that nearly 70% of consumers use ad blockers, and many struggle to recall the brand messages in advertisements.

To cut through the noise, marketers are increasingly turning to influencer marketing. This approach leverages individuals with significant social media followings to promote products and services. In 2024, global spending on influencer marketing exceeded \$32 billion, with platforms like Instagram, TikTok, and YouTube being the most popular channels. Notably, micro-influencers—those with fewer than 100,000 followers—are gaining prominence due to their higher engagement rates and perceived authenticity. Approximately 80% of marketers now collaborate with these smaller creators, recognizing their ability to foster trust and drive consumer action.

By 2027, it is anticipated that the influencer marketing sector in India will have grown to ₹10,750 crore. In 2024, brands allocated up to 30% of their marketing budgets to influencer partnerships, with 50% increasing their spending by up to 10 times compared to previous years. This change emphasizes how crucial influencers are becoming in influencing the opinions and purchases of consumers.

As the digital landscape continues to evolve, brands must adapt by embracing influencer marketing strategies that prioritize authenticity and engagement. By doing so, they can effectively connect with consumers and navigate the complexities of the modern media environment.



Source: Influencer marketing market size (2016–2024). Oberlo

OBJECTIVES

1. To understand Influencer Marketing in the Gig Economy.
2. To study benefits and challenges of Influencer Marketing.
3. To Explore the gig economy's opportunities and skills needs by management students

The Gig Economy and Influencer Marketing

In recent years, the gig economy has rapidly emerged as a defining feature of the modern labor market, particularly in technologically advancing nations like India. The term 'gig'—originally associated with short-term performance contracts—now broadly describes a labor market characterized by short-term, flexible jobs where individuals work as independent contractors or freelancers rather than traditional full-time employees. The proliferation of digital platforms has revolutionized how services are delivered and consumed, fueling the expansion of gig work across sectors such as transportation, food delivery, digital marketing, and software development. This shift is not only reshaping the employment landscape but is also challenging conventional notions of job security, benefits, and the employer-employee relationship.

India, with its vast working-age population and increasing internet penetration, is uniquely positioned at the forefront of this transformation. The gig economy offers a dual advantage: it enables companies to scale operations efficiently by tapping into an on-demand workforce, while also providing workers with unprecedented autonomy and flexibility. However, the model is not without drawbacks. Gig workers often operate outside the protections of traditional labor laws, facing issues such as income instability, lack of benefits, and limited legal recourse (Bansal et al, 2020).

Influencer marketing works well because it builds a personal connection between brands and customers. When influencers share helpful or fun content, it makes people more interested and confident in the product. Honest sponsorships can build trust, making followers more likely to listen and act. If an influencer aligns with a brand and engages often, their followers feel more connected. This trust and connection lead to stronger brand influence and better results for marketing campaigns (Pan et al., 2025).

BENEFITS OF INFLUENCER MARKETING

● Authenticity and Trust:

Authenticity is a key driver of trust in influencer marketing, as consumers are more likely to believe influencers who share honest opinions and are transparent about brand partnerships. Studies by Baghel (2024) and Chavda et al. (2004) show that genuine influencers help build emotional connections with their followers, boosting brand credibility and loyalty. Consistent and relatable messaging makes influencers appear more trustworthy than traditional ads, especially among younger audiences. This trust leads to higher engagement, stronger brand relationships, and increased purchase intent for the brands they represent.

● Cost Efficiency:

Influencer marketing delivers strong engagement, purchase intent, and sales with lower investment than traditional ads by targeting specific demographics and leveraging influencers' dual promotional-informational content. This precision reduces production and overhead costs while enhancing persuasive impact.

Consequently, brands can allocate budgets more efficiently and achieve higher ROI through measurable, community-focused campaigns (Pan et al., 2025).

- **Targeted Reach:**

Targeted reach is a standout advantage of influencer marketing, especially within niche markets where precision and relevance are crucial. The study emphasizes that influencers operating in specialized areas—such as beauty, fitness, or technology—often have smaller but deeply engaged audiences who trust their recommendations. These influencers provide brands with direct access to specific consumer groups that are more likely to respond positively to tailored messaging. Unlike mass marketing, which can be broad and impersonal, niche influencers create personalized content that resonates with their community's unique interests and values. This not only boosts engagement but also increases conversion rates, making influencer marketing a highly effective tool for brands aiming to build strong, loyal customer bases within well-defined target audiences (Sruthi, S., 2024).

- **Flexibility:**

Influencer marketing lets brands change course quickly. Instead of committing to one big TV ad or billboard campaign, brands can work with influencers to test different messages, images, or formats—and see almost instantly what clicks with their audience. If a post isn't getting much attention, an influencer can switch to a story, go live, or tweak the caption by that afternoon. This "real-time" flexibility means brands only keep running what's working, saving time and money, and staying in tune with what people actually want (Chavda, K et al, 2004).

Challenges in Influencer Marketing

- **Proving Value and Staying Authentic**

A major challenge for influencers is proving their value beyond short-term sales by showing impact through brand mentions, clicks, and engagement. They must stay authentic, choosing content that fits their style and the brand, while also standing out in a crowded digital space (Roy S. et al., 2021).

- **Saturation and Credibility Issues**

As influencer marketing grows, especially in the beauty industry, consumers are starting to lose trust due to too many sponsored posts and misleading claims. An article from Vogue Business highlights the growing concern over the reliability of influencers, particularly in the beauty industry. The proliferation of sponsored content has led to diminished consumer trust. In response, some beauty brands are investing in educating influencers to bolster their credibility. For instance, the No7 Beauty Company has launched a skincare education program for influencers to provide them with better knowledge to share accurate information with their followers (Chitrakorn K., 2022).

- **Navigating Regulatory Compliance in Influencer Marketing**

Influencers are under increasing legal pressure as countries like France introduce strict regulations to prevent misleading promotions and undisclosed sponsorships. These laws aim to protect consumers from deceptive content by requiring clear labeling and banning certain product ads. However, enforcing such rules is challenging in a fast-changing digital world with global content reach. Influencers must now navigate both national laws and growing international demands for accountability (Shah S., 2023).

- **Maintaining Brand Consistency**

Maintaining a consistent brand voice across digital content is a major challenge for companies, as different parts of websites or social media may use mismatched messaging. A study by Roy et al. (2021) found that many brands struggle with this and developed a system to help. The tool analyzes content and suggests edits based on five brand traits—sincerity, excitement, competence, sophistication, and ruggedness. For influencers and marketers, this highlights the importance of aligning every piece of content with the brand's personality to ensure a unified and professional image.

Essential Skills for Management Students in Influencer Marketing

➤ Data Analytics

- **Understanding Key Engagement Metrics:** Understanding metrics like click-through rates, conversion rates, shares, likes, and comments is essential. These indicators help assess the effectiveness of influencer campaigns and guide strategic decisions.
- **Analyzing Consumer Behavior:** Develop the ability to interpret how influencer content affects consumer attitudes and purchasing decisions. This involves studying patterns in consumer interactions and feedback to refine marketing strategies.

- **Utilizing Analytical Tools:** Familiarity with analytical platforms and tools that track campaign performance is essential. These tools assist in monitoring real-time data, measuring ROI, and optimizing future campaigns.
- **Interpreting Data for Strategic Insights:** Develop an ability to convert data results into useful insights. This skill enables the formulation of strategies that align with consumer preferences and market trends.
- **Staying Updated with Evolving Metrics:** The digital marketing landscape is dynamic. Staying informed about emerging metrics and adapting to new analytical methods ensures continued relevance and effectiveness in influencer marketing.

These data analytics skills, management students can effectively navigate the complexities of influencer marketing and contribute to data-driven decision-making processes.

➤ **Strategic Communication:**

- **Crafting Persuasive and Credible Content:** Influencers must create content that is both persuasive and credible. This involves providing valuable information that enhances trust and influences followers' attitudes towards brands.
- **Building and Maintaining Parasocial Relationships:** It's essential to build solid parasocial bonds with followers. This can be achieved by sharing authentic experiences and engaging in two-way communication, which fosters a sense of personal connection and loyalty.
- **Adapting to Platform-Specific Affordances:** Recognizing the unique features and affordances of different social media platforms allows influencers to tailor their content to maximize engagement and effectiveness.
- **Ethical Communication Practices:** Maintaining transparency and ethical standards in communication is essential. This includes disclosing sponsored content and ensuring that messaging aligns with both brand values and audience expectations.

➤ **Negotiation and Contracting:**

- **Fair Compensation:** Assess influencer value based on reach, engagement, content quality, and market rates to negotiate equitable payment terms.
- **Legal Acumen:** Understand legal terms like intellectual property rights, non-disclosure agreements, and indemnification to protect all parties involved.
- **Conflict Resolution:** Develop strategies for addressing disputes or breaches, ensuring mechanisms are in place for resolution.
- **Relationship Building:** Foster positive, long-term partnerships through transparency, respect, and mutual benefit.

➤ **Digital Marketing Expertise:**

- **SEO (Search Engine Optimization):** Enhancing website visibility on search engines through keyword optimization and quality content creation.
- **Social Media Algorithms & Strategy:** Understanding platform algorithms to create engaging content and foster community interaction.
- **Paid Promotions & PPC (Pay-Per-Click):** Managing paid advertising campaigns to target specific demographics and optimize ad spend.
- **Content Creation & Copywriting:** Developing compelling content that resonates with the target audience and aligns with brand voice.
- **Analyzing a Target Audience:** Involves determining and comprehending their preferences and habits.

➤ **Crisis Management:**

- **Risk Assessment & Monitoring:** Continuously monitor influencer behavior and public sentiment to identify potential risks early (Stoldt. R. et al 2019).
- **Strategic Communication Planning:** Develop clear communication strategies to address controversies, including distancing from the influencer if necessary.

- **Reputation Management:** Implement measures to protect and restore brand reputation during and after a crisis, such as public statements or corrective actions.
- **Decision-Making Under Pressure:** Make timely and effective decisions regarding continued partnerships or contract terminations with influencers involved in controversies.
- **Stakeholder Communication:** Maintain transparent communication with stakeholders, including customers, employees, and partners, to manage perceptions and expectations.
- **Legal and Ethical Compliance:** Ensure all crisis responses comply with legal standards and ethical practices to avoid further complications

Case Study:

Airbnb's Experiential Marketing with Travel Influencers

- **Strategic Collaborations:** Airbnb partnered with travel influencers to showcase unique properties and local experiences. These influencers created authentic content, sharing their stays and adventures, which resonated with their followers and highlighted Airbnb's offerings.
- **Campaign Highlights:** Notable initiatives included the "Live There" campaign, where influencers like Rachel Nguyen emphasized living like a local rather than just visiting. Another example is the #FloatingHouseParty on the Thames River in London, where influencers were invited to a floating house, creating buzz and extensive social media coverage.
- **Impact on Brand Perception:** These collaborations enhanced Airbnb's brand image, portraying it as more than just accommodation—offering unique, local experiences. The authentic content generated by influencers-built trust among potential users, showcasing real-life applications of Airbnb's services.
- **Managerial Implications:** This approach underscores the importance of aligning with influencers whose audiences match the brand's target market. It also highlights the value of creating shareable experiences that influencers are eager to promote, thereby extending the brand's reach organically.

By leveraging the gig economy's flexibility and the authenticity of influencer content, Airbnb effectively enhanced its brand visibility and trustworthiness among consumers.

Future Trends in Influencer Marketing

- **Rise of AI and Data-Driven Campaigns:** AI is transforming influencer marketing by enhancing campaign targeting, automating influencer discovery, and personalizing content based on audience data. It also enables brands to predict trends and optimize performance through data-driven insights. AI boosts influencer marketing by optimizing influencer discovery, analyzing audience data, and recommending content strategies that increase engagement and alignment with brand goals.
- **Growth of Micro-Influencers:** Micro-influencers are gaining traction in 2025 due to their high engagement rates and authentic connections with niche audiences. Brands are increasingly collaborating with these influencers for cost-effective campaigns that resonate more deeply with consumers.
- **Integration with E-Commerce:** Social-shopping platforms are becoming a major trend, allowing users to buy products directly through influencer content on social media. This shift highlights how e-commerce and influencer marketing are merging to create a seamless shopping experience. (Leswing, K., 2025)
- **Ethical and Sustainable Influencing:** Influencers are increasingly focusing on sustainability by promoting eco-friendly brands and being transparent with their audiences. This shift builds trust and aligns with growing consumer demand for ethical, responsible marketing practices (Toxigon, 2024 and Kasumovic, D., 2024).

CONCLUSION

Influencer marketing has emerged as a powerful tool in the gig economy, transforming how brands connect with digitally savvy consumers. As traditional advertising loses its impact, influencer-driven content offers authenticity, trust, and targeted engagement—key drivers of modern consumer behavior. With rising trends like AI-powered personalization, the growth of micro-influencers, seamless e-commerce integration, and a push toward ethical, sustainable practices, influencer marketing is evolving rapidly.

For management students, this presents a valuable opportunity to develop skills in data analytics, digital strategy, and ethical communication. Embracing these shifts will not only prepare them for dynamic careers in

marketing but also empower them to shape meaningful brand-consumer relationships in an ever-changing digital world.

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 - https://www.voguebusiness.com/beauty/the-big-influencer-trust-issue-and-the-beauty-brands-trying-to-save-it?utm_source=chatgpt.com

DEVELOPING A DIGITAL TWIN FOR AUTONOMOUS VEHICLES USING ESP-32

Wendrich Soares

Assistant Professor, Vedanta College

PROJECT OVERVIEW

The project involves creating a **Digital Twin** for an autonomous vehicle using **ESP32**. The system will provide real-time visualization, monitoring, and predictive analytics by integrating IoT connectivity, cloud-based analytics, and AI-driven diagnostics.

The **Digital Twin** will mirror the vehicle's status, movements, and environmental conditions, enabling efficient remote control and optimization.

Prerequisites**ESP32 add-on Arduino IDE**

Programing the ESP32 using Arduino IDE, so before proceeding with this tutorial you should have the ESP32 add-on installed in your Arduino IDE. Follow the next guide:

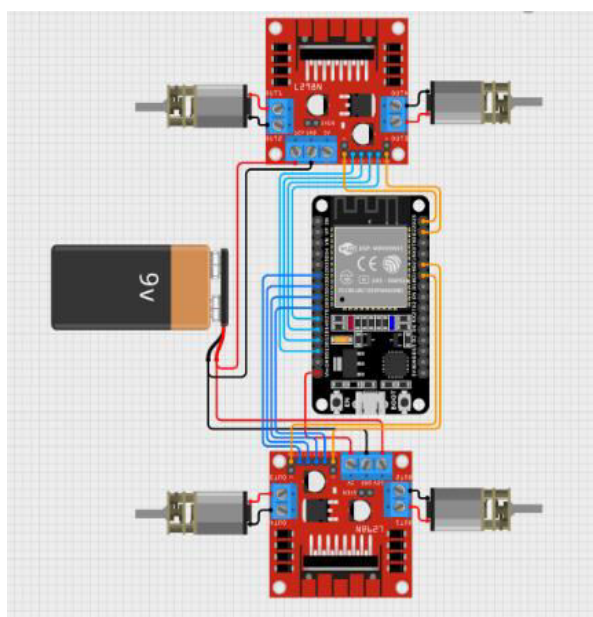
- Installing the ESP32 Board in Arduino IDE (Windows, Mac OS X, and Linux)

Install libraries

Install the following libraries in your Arduino IDE. These libraries can be installed through the Arduino Library Manager. Go to **Sketch > Include Library> Manage Libraries**

Technology Stack Here:

- Python (for ML and embedded processing),
- C++ (for hardware interfacing).
- OpenCV
- MongoDB
- TensorFlow / PyTorch.
- MediaPipe
- Hardware: ESP32, sensors (IMU, GPS, temperature, battery, ultrasonic), motor controllers.

Schematic Diagram**Project Discription:**

- **Real-Time Vehicle Monitoring** – Tracks GPS, sensors, and motor status.
- **Predictive Maintenance** – Detects faults before failure occurs.

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- **Remote Debugging** – Engineers troubleshoot issues remotely.
 - **Decision Analysis** – Logs and visualizes AI-based decisions.
 - **Simulation & Testing** – Runs software updates in a virtual model.
 - **Fleet Management** – Monitors multiple autonomous vehicles.
 - **Real-Time Digital Twin Visualization** – A virtual model that mirrors the vehicle's physical state in real time.
 - **Live Sensor Data Streaming** – Continuous updates on GPS, IMU, LiDAR, and motor status.
 - **AI-Powered Predictive Maintenance** – Detecting potential failures before they occur.
 - **Remote Debugging & Diagnostics** – Allowing engineers to troubleshoot issues without physical access.
 - **Dynamic Performance Optimization** – AI-driven tuning of navigation and decision-making.

Automated Alerts & Notifications – Instant alerts for critical failures, performance drops, or safety hazards

CONCLUSION:

Compared to other simulation technology Digital Twin is better and is now applied in many applications. The major applications are Delivery systems and Car Rental System.

Health monitoring, optimization, prediction are some functions which are offered by Digital Twinning system.

Digital twins can be used for creating an entire drive system.

FUTURE WORKS:

Depending upon the model basis and the type of data exchanged with the physical model, digital Twins can be built to optimize the performance of the drive system that might be suitable for research and development purposes.

THE STUDY ON REAL ESTATE AS A WEALTH-BUILDING TOOL: ASSESSING THE PROS AND CONS FOR EVERYDAY INVESTOR

Mr. Dilip Ahuja¹ and Ms. Pinky Hinduja²¹Assistant Professor, SST College of Arts and Commerce, Ulhasnagar²Assistant Professor, Vedanta College, Vithalwadi**ABSTRACT**

This study explores real estate as a wealth-building tool, focusing on its advantages and disadvantages for everyday investors. Real estate has long been regarded as a reliable asset class due to its potential for long-term appreciation, rental income, and tax benefits. However, it also involves significant financial commitment, market risk, and management responsibilities that may pose challenges, particularly for individual or first-time investors. This research aims to assess the practicality and effectiveness of real estate investment as a strategy for building personal wealth. Through a combination of literature review, case studies, and a survey of individual investors, the study identifies key factors that influence success in real estate investment, including location, financing options, investment type (residential vs. commercial), and risk tolerance. The findings highlight that while real estate can offer substantial returns and financial stability, it requires careful planning, market understanding, and ongoing management. The study concludes that real estate is a viable wealth-building option for everyday investors, provided that they are equipped with adequate knowledge and resources. Recommendations are offered to help new investors make informed decisions and avoid common pitfalls in the property market.

Keywords: Real Estate Investment, Wealth Building, Financial Planning, Investment Strategies

INTRODUCTION

Building wealth is a goal that many people strive for, whether it's to achieve financial freedom, prepare for retirement, or provide a better future for their families. One popular way people try to grow their money is by investing in real estate. Buying property—such as a house, apartment, or commercial space—can help individuals increase their wealth over time through rising property values and rental income. For everyday investors, especially those who are not financial experts, real estate can seem like a smart and reliable option. It is a physical asset that feels more secure than stocks or mutual funds, and it can provide steady monthly income if rented out. Additionally, property often increases in value over time, offering the chance to earn a profit when sold. However, real estate investing also comes with challenges. It requires a large amount of money upfront, and there are ongoing costs like maintenance, taxes, and repairs. Property values can also go down, and selling a property quickly is not always easy. This study aims to explore both the benefits and risks of real estate investment for everyday people. It will look at how real estate can help build wealth, and also what problems investors might face along the way. By examining real examples and expert advice, this paper will help readers understand if real estate is the right investment choice for them. The goal is to provide a clear and balanced view that helps individuals make informed financial decisions.

OBJECTIVES:

1. To investigate the role of real estate investment in personal financial growth, with a focus on how property ownership contributes to long-term wealth accumulation for individuals with average income levels.
2. To identify and examine the major risks and drawbacks associated with real estate investment, including market fluctuations, property depreciation, high entry costs, legal complications, and liquidity issues, particularly for small-scale investors.
3. To offer practical recommendations and guidelines for individuals considering real estate as a tool for wealth building, based on research findings and expert insights.

HYPOTHESIS:

H0: Real estate investment does not have a significant impact on the wealth-building potential of everyday investors.

H1: Real estate investment has a significant impact on the wealth-building potential of everyday investors.

RESEARCH METHODOLOGY:

The study focuses on evaluating real estate as a wealth-building tool by analyzing its advantages and disadvantages for everyday investors. The objective of this research is to understand how real estate contributes

to personal financial growth, while also identifying the challenges faced by individuals who invest with limited resources and experience.

This study is based on a qualitative research approach, using only secondary data and case studies to assess the pros and cons of real estate investment as a tool for building wealth among everyday investors. Secondary data will be collected from existing literature such as academic journals, research reports, government publications, financial websites, and industry analyses. These sources will help provide insights into real estate market trends, investment outcomes, and the overall financial impact on individual investors.

In addition, real-life case studies of small-scale and first-time investors will be reviewed to understand their experiences, challenges, and success stories. The combination of literature review and case analysis will allow for a balanced evaluation of both the benefits and risks, making the findings relevant and useful for everyday investors considering property investment.

REVIEW OF LITERATURE

1. Saini, R., Deora, A., & Gadiya, K. (2024). *Assessment of the Financial Competitiveness of Publicly Listed Indian Real Estate Companies Using the Entropy Method*:

This study evaluates the financial competitiveness of publicly listed Indian real estate companies, highlighting the importance of profitability, solvency, and operational capacity for investors. It underscores the need for investors to assess the financial health of companies before investing.

2. Riverwood Capital (2024). *The Indian Real Estate Market: Opportunities, Challenges, and Trends*.

This report discusses the growth prospects of the Indian real estate market, emphasizing the potential of affordable housing, co-living projects, and co-working spaces. It also highlights the impact of changing demographics and government initiatives on investment opportunities.

3. Startup Insider (2024). *The Pros and Cons of Real Estate Investment for Individuals*.

The piece examines the advantages and disadvantages of real estate investment, focusing on aspects like high initial costs, illiquidity, property management responsibilities, market volatility, location risk, and market saturation. It offers a comprehensive overview for individual investors.

4. Banerjee, S., & Goyal, L. (2018). *Capital Flow into Indian Real Estate Sector: Causes and Implications*.

In this paper, Banerjee and Goyal examine the factors driving global capital inflow into the Indian real estate sector. The study discusses the implications of such investments for the market and everyday investors, highlighting opportunities and challenges associated with foreign capital participation.

5. Ashraf, M. Z. (2024). *The Impact of Real Estate Investment Trusts (REITs) on the Indian Commercial Real Estate Market: A Study of Investor Perception and Market Performance*.

Ashraf's research explores the role of REITs in enhancing liquidity and transparency in the Indian commercial real estate market. The study finds that REITs provide everyday investors with accessible entry points into the market, thereby democratizing investment opportunities and potentially increasing returns.

6. Kumar, S., & Kumar, S. (2025). *An Analysis of Investor Perception towards Investment in Real Estate with Special Reference to Delhi NCR*.

Kumar and Kumar examine investor perceptions in the Delhi NCR region, focusing on factors influencing investment decisions such as market conditions, economic indicators, and personal objectives. The study provides valuable insights into the motivations and considerations of everyday investors in real estate.

ADVANTAGES OF REAL ESTATE AS A WEALTH-BUILDING TOOL:

• Tax Benefits

Investors in India benefit from tax deductions on home loan interest, principal repayment (under Section 80C), and depreciation on rental properties. These benefits reduce taxable income and improve net returns.

• Tangible Asset Ownership

Real estate provides the investor with a physical, tangible asset that holds intrinsic value. Unlike stocks or bonds, property can be utilized (e.g., rented or lived in), which offers a sense of security and control.

• Appreciation Over Time

Property values tend to increase over the long term due to factors like urban development, population growth, and infrastructure improvements. This appreciation can significantly enhance an investor's net worth over decades.

• Regular Rental Income

Investment in rental properties generates a steady cash flow through monthly rents. This recurring income can supplement earnings, aid in loan repayment, or be reinvested to grow wealth further.

• Leverage Opportunities

Investors can use borrowed capital (loans or mortgages) to acquire real estate. With a relatively small initial investment, they can control a much larger asset, magnifying potential returns.

• Inflation Hedge

Real estate values and rental income generally increase with inflation, making it a reliable hedge. While the value of money erodes over time, the value of real estate often keeps pace or even outpaces inflation.

DISADVANTAGES OF REAL ESTATE AS A WEALTH-BUILDING TOOL:**• High Initial Capital Requirement**

Purchasing real estate typically requires a substantial down payment, registration costs, and other fees. This can be a major barrier for small or first-time investors with limited funds.

• Low Liquidity

Real estate cannot be quickly or easily sold without a potential loss in value. Unlike stocks or mutual funds, which can be liquidated quickly, selling property often takes months, making it an illiquid asset.

• Market Volatility and Cyclical Risks

Real estate markets are influenced by macroeconomic factors such as interest rates, inflation, and government policies. A downturn in the market can significantly affect property values and rental income.

• High Transaction and Maintenance Costs

Brokerage fees, stamp duty, registration charges, property taxes, and ongoing maintenance expenses can reduce the overall profitability of the investment.

• Legal and Regulatory Complexities

Real estate transactions in India often involve complicated paperwork and potential legal hurdles. Issues such as unclear property titles, land disputes, or zoning regulations can pose significant risks.

CASE STUDIES ON REAL ESTATE AS A WEALTH BUILDING TOOL:**The Story of Brandon Turner (Bigger Pockets)**

Background: Brandon Turner, a well-known real estate investor and author, shares his journey through the Bigger Pockets platform. He started with little money but was able to build a sizable real estate portfolio over time.

Key Strategy: Brandon used the "house-hacking" strategy—renting out portions of a multi-family property to generate income that covered his mortgage, allowing him to live for free while building equity in the property. He then used the equity to purchase additional properties.

Outcome: Within a few years, he had built a portfolio of over 30 properties. Today, he is a prominent figure in the real estate community and an advocate for using real estate as a tool for financial independence.

Takeaway: This case emphasizes the power of leveraging multi-family properties and rental income to build wealth over time. The key to success here was identifying an affordable entry point and using creative financing strategies.

2. The Success of Grant Cardone (Real Estate Syndication)

Background: Grant Cardone, a real estate mogul, started his career by investing in smaller properties before scaling up to large commercial real estate deals. His focus shifted to real estate syndication, where multiple investors pool funds to buy large properties.

Key Strategy: Cardone leveraged the power of syndication to acquire multi-million-dollar apartment complexes and commercial properties across the U.S. His business model focused on generating consistent cash flow through rents and long-term property appreciation.

Outcome: Cardone's company, Cardone Capital, now manages over \$2 billion worth of real estate. He credits much of his success to leveraging other people's money (OPM) through syndications, enabling him to acquire more properties than he could have with his own capital alone.

Takeaway: This case study highlights the potential of real estate syndication as a scalable wealth-building strategy. By pooling capital, Cardone was able to control high-value assets and generate significant returns for himself and his investor

FINDINGS OF STUDY

1. Real estate remains a preferred long-term investment option among everyday investors in India, due to its tangible nature and perceived safety compared to volatile financial instruments.
2. Rental income provides a stable source of passive income, making real estate attractive for individuals seeking regular cash flow alongside capital appreciation.
3. Appreciation in property value over time contributes significantly to wealth accumulation, especially in urban and semi-urban areas witnessing rapid infrastructure development.
4. High initial capital requirements and transaction costs deter many small-scale investors from entering the market, limiting accessibility.
5. Liquidity remains a major concern, as property assets cannot be easily or quickly converted into cash during financial emergencies.
6. Government schemes (like PMAY, tax rebates on housing loans, and RERA) have improved investor confidence by increasing transparency and regulatory oversight.
7. Real estate offers limited diversification for everyday investors, as most can afford to invest in only one or two properties, increasing concentration risk.
8. Fluctuations in real estate prices are influenced by macroeconomic factors, including interest rates, inflation, urban planning, and policy reforms—posing unpredictability in short-term returns.
9. Real estate is often viewed as a legacy investment, with many investors aiming to pass it on to future generations, rather than seeking quick profits.
10. Despite its disadvantages, real estate continues to be seen as a culturally and emotionally significant investment in India, which often drives decisions beyond purely financial reasoning.

CONCLUSION

The study on real estate as a wealth-building tool reveals that while property investment continues to hold strong appeal among everyday investors, it is not without its complexities. Real estate offers tangible asset ownership, long-term appreciation, and consistent rental income, which collectively contribute to wealth creation. Moreover, benefits such as tax deductions, leverage opportunities, and government-led housing incentives like RERA and PMAY have made the sector more structured and attractive. Investors who approach real estate with adequate planning and financial discipline often find it to be a robust method of building and preserving wealth, especially when the investment is aligned with long-term goals. Furthermore, the emotional and psychological satisfaction attached to owning property enhances its value beyond financial returns, making it a preferred choice in the Indian context.

However, the study also highlights several disadvantages that everyday investors must consider before venturing into real estate. High entry costs, low liquidity, legal complications, and management challenges pose significant barriers, especially for individuals with limited capital or market knowledge. Risks such as property disputes, tenant issues, and market fluctuations can adversely impact returns, while overdependence on borrowed funds may amplify financial stress during downturns. Additionally, the lack of diversification, lengthy transaction processes, and evolving regulatory policies demand active involvement and due diligence. In light of these findings, it is evident that real estate can be an effective wealth-building tool, but it is not universally suitable for all types of investors. Success in real estate investment depends largely on the investor's financial readiness, risk tolerance, market understanding, and ability to manage or outsource property-related responsibilities. Therefore, a balanced approach, guided by thorough research and professional advice, is essential for everyday investors seeking to build sustainable wealth through real estate.

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A COMPARATIVE ANALYSIS OF INDIAN GAAP AND IFRS: CONVERGENCE, CHALLENGES AND OPPORTUNITIES

Dinesh .S. Murav¹ and Dr. Pratima Singh²¹UGC-NET, MH-SET, M.com and Research Scholar, Ramanand Arya D.A.V College, University of Mumbai, Bhandup, India²I/c Principal, SIA College of Arts, Science and Commerce**ABSTRACT**

This paper presents a comparative analysis of Indian Generally Accepted Accounting Principles (Indian GAAP) and International Financial Reporting Standards (IFRS), with a focus on their convergence, the challenges faced, and the opportunities created. Indian GAAP, which was traditionally used in India, is now being replaced by Ind AS – a set of accounting standards that are largely based on IFRS. This shift aims to align Indian accounting practices with global standards to improve transparency, consistency, and comparability in financial reporting.

The convergence of Indian GAAP with IFRS has brought several benefits, such as improved access to international capital markets, better investor confidence, and higher quality of financial statements. However, the transition has also posed various challenges. These include differences in accounting principles, lack of awareness and training, high implementation costs, and difficulties in changing old systems and practices. Smaller companies, in particular, have found the shift more difficult due to limited resources and expertise.

Despite these challenges, the move toward IFRS-based Ind AS opens up many opportunities. Indian companies can now compete on a global platform, attract foreign investments more easily, and enhance their corporate governance. This paper explores these aspects in detail and provides insights into how businesses, regulators, and professionals can work together to make the transition smoother.

In conclusion, while the convergence journey is complex and demanding, it is a necessary step toward integrating India into the global financial system and improving the overall credibility of Indian financial reporting.

Keywords: Indian GAAP, IFRS, Ind AS, Convergence, Accounting Standards, Financial Reporting, Challenges, Opportunities, Globalization, Corporate Governance

1. INTRODUCTION:

Accounting standards form the bedrock of financial reporting, ensuring that financial statements are prepared consistently, are comparable across jurisdictions, and reflect the true financial health of entities. Indian GAAP, rooted in the traditional practices of Indian commerce, provided a localized approach to accounting. On the other hand, IFRS represents a globally accepted framework developed by the International Accounting Standards Board (IASB), aimed at harmonizing accounting practices across borders to enhance transparency and comparability.

With India's increasing integration into global capital markets, the demand for high-quality, globally comparable financial information intensified. This paved the way for the convergence of Indian GAAP with IFRS through the introduction of Indian Accounting Standards (Ind AS). Unlike a complete adoption, convergence allows India to tailor certain standards to domestic economic and regulatory conditions while aligning with IFRS principles.

This paper provides a comprehensive analysis of the Indian GAAP–IFRS convergence process, identifying key conceptual and technical differences, analyzing the challenges faced during the transition, and exploring the numerous opportunities created by adopting internationally harmonized financial reporting standards.

2. HISTORICAL BACKGROUND:**2.1 Evolution of Indian GAAP:**

Indian GAAP comprises accounting standards notified by the Institute of Chartered Accountants of India (ICAI), historically guided by the Companies Act, 1956, and later the Companies Act, 2013. Indian GAAP standards are relatively conservative, emphasizing historical cost and prudence. The original structure was rule-based and offered flexibility, resulting in diverse accounting treatments and often a lack of comparability across firms.

Key limitations of Indian GAAP included inadequate guidance on financial instruments, business combinations, and fair value measurement. Additionally, disclosures were limited, which impacted the quality and reliability of financial statements.

2.2 Rise of IFRS:

IFRS, developed by the IASB, has been adopted in over 140 countries. It is a principle-based framework that emphasizes economic substance over legal form and promotes fair value measurement. IFRS provides comprehensive guidance on a wide range of accounting issues, such as financial instruments (IFRS 9), revenue recognition (IFRS 15), leases (IFRS 16), and consolidation (IFRS 10).

2.3 Need for Convergence in India Several factors necessitated convergence with IFRS in India:

- Increasing foreign direct investment and participation in global capital markets
- Demand from multinational companies for globally comparable financial statements
- Pressure from international financial institutions and rating agencies
- Need to improve the credibility, transparency, and reliability of financial reporting

In 2010, the ICAI and the Ministry of Corporate Affairs (MCA) announced a roadmap for convergence with IFRS. The Ind AS framework was developed to align Indian standards with IFRS, incorporating certain carve-outs to reflect India's specific economic and regulatory environment.

3. COMPARATIVE ANALYSIS OF INDIAN GAAP AND IFRS:

3.1 Conceptual Framework:

- **Indian GAAP:** Rule-based, with emphasis on prudence and historical cost. It often resulted in delayed recognition of income and overstatement of liabilities.
- **IFRS:** Principle-based, emphasizing fair value, relevance, reliability, and faithful representation. It aims to provide economic substance to users.

3.2 Recognition and Measurement:

- **Revenue Recognition:**
 - Under Indian GAAP (AS-9), revenue is recognized when the significant risks and rewards of ownership are transferred.
 - IFRS 15 introduces a five-step model that requires the identification of performance obligations, determination of transaction price, and recognition of revenue when (or as) performance obligations are satisfied. This results in more nuanced and contract-specific revenue recognition.
- **Financial Instruments:**
 - Indian GAAP offered minimal guidance, leading to inconsistencies in classification and measurement.
 - IFRS 9 mandates classification into amortized cost, fair value through profit or loss (FVTPL), and fair value through other comprehensive income (FVOCI). It introduces the expected credit loss model for impairment.
- **Leases:**
 - Indian GAAP (AS-19) classified leases as finance or operating leases based on ownership risks and rewards.
 - IFRS 16 requires lessees to recognize most leases as a right-of-use asset and a lease liability on the balance sheet, improving transparency.

3.3 Consolidation and Business Combinations:

- Indian GAAP considered control primarily in terms of voting power, whereas IFRS has a broader view that includes de facto control.
- IFRS 3 requires the acquisition method for business combinations, using fair value accounting and recognizing goodwill or bargain purchase gain.
- Indian GAAP permitted the pooling of interest method in amalgamations, especially in cases of group restructuring.

3.4 Presentation and Disclosure:

- IFRS mandates extensive disclosures on accounting judgments, assumptions, and risk exposures.
- Indian GAAP was relatively limited in scope, often resulting in information asymmetry.

4. THE CONVERGENCE PROCESS: ADOPTION OF IND AS:

4.1 Framework and Principles:

Ind AS are IFRS-converged standards issued by the MCA. While based on IFRS, Ind AS includes certain modifications (carve-outs and carve-ins) to reflect Indian legal and economic contexts.

4.2 Phased Implementation :

The MCA implemented Ind AS in phases:

- **Phase I (FY 2016–17):** Companies with net worth over INR 500 crore and listed companies
- **Phase II (FY 2017–18):** Companies with net worth between INR 250–500 crore
- Subsequent phases targeted NBFCs, insurance companies, and banks

4.3 Regulatory Bodies Involved:

- **MCA:** Oversees issuance and amendment of Ind AS
- **ICAI:** Develops technical standards and training programs
- **SEBI:** Ensures compliance for listed companies
- **RBI & IRDAI:** Provide sector-specific guidance for banks and insurers

5. Challenges of Convergence:

5.1 Technical and Operational Challenges:

- Need for fair value models and complex estimations
- Significant overhaul of IT systems and ERP platforms
- Requirement for dual reporting during the transition phase

5.2 Human Resource Challenges:

- Training of accountants, auditors, tax consultants, and management
- Shortage of professionals skilled in IFRS-compliant reporting

5.3 Legal and Taxation Issues:

- Misalignment between Ind AS and existing tax laws
- Complexity in computing Minimum Alternate Tax (MAT) based on Ind AS financials
- Need for amendments to Companies Act, SEBI regulations, and income tax provisions

5.4 Industry-Specific Concerns:

- Financial services faced significant changes in provisioning norms and asset classification
- Manufacturing companies had to reassess depreciation and impairment norms

6. Opportunities and Strategic Advantages:

6.1 Enhanced Transparency and Global Comparability:

- Ind AS provides investors and analysts with a clear and comparable view of financial performance
- Improved disclosures foster greater investor confidence

6.2 Attraction of Foreign Investment:

- Harmonized reporting standards attract global investors and private equity firms
- Improved credit ratings due to better-quality financial statements

6.3 Internal Benefits:

- Enhanced internal controls, governance, and risk management practices
- Better alignment of financial reporting with strategic business decisions

6.4 Competitive Advantage:

- Indian firms are better positioned to compete in global markets, enter cross-border collaborations, and list on foreign stock exchanges

7. Case Studies:

7.1 Infosys Ltd.:

Infosys, a global IT services firm, was among the early adopters of IFRS for its international listings. Transitioning to Ind AS streamlined its global financial reporting, increased transparency, and led to a stronger international investor base.

7.2 Tata Motors:

Initially struggled with fair value measurement of its overseas assets and liabilities, particularly with Jaguar Land Rover. However, post-transition, the clarity in reporting and improved asset valuation supported its global strategy.

7.3 ICICI Bank:

Faced challenges in transitioning to the expected credit loss model under Ind AS 109. Despite initial resistance, the new provisioning norms improved its risk assessment and loan management processes.

8. FUTURE OUTLOOK :

The convergence process is ongoing. Continuous revisions to Ind AS, training of professionals, and alignment of tax and legal frameworks are essential. India is moving towards reducing the number of carve-outs to achieve near-full convergence. As Indian companies expand globally, seamless alignment with IFRS will be crucial for sustainable growth and competitiveness. Emerging areas like sustainability reporting (ISSB standards), digital accounting, and integrated reporting may further influence future amendments to Ind AS.

9. CONCLUSION:

The convergence of Indian GAAP with IFRS through Ind AS has revolutionized financial reporting in India. Though the journey involved significant challenges—technical, legal, and operational—the benefits outweigh the costs. Enhanced transparency, improved investor confidence, and greater access to international capital are testimony to the success of this shift. Going forward, sustained efforts in education, regulatory reform, and industry collaboration will be key to achieving full convergence and reaping its long-term advantages.

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EVALUATING THE IMPACT OF INVESTORS SENTIMENT ON STOCK MARKET VOLATILITY

Dinesh Motwani

Assistant Professor (St. Paul College, Ulhasnagar)

ABSTRACT

This research paper investigates the intricate relationship between investor sentiment and stock market volatility, examining how shifts in collective emotions and perceptions can precipitate market fluctuations. With the advent of digital media and real-time information dissemination, investor sentiment, as captured through news analytics, social media trends, and investor surveys, has emerged as a critical factor influencing market dynamics. This study employs advanced sentiment analysis techniques alongside econometric models to quantify sentiment indicators and assess their predictive power in explaining short-term and long-term volatility patterns in major stock indices.

Using a comprehensive dataset that spans multiple market cycles, the analysis integrates text mining methodologies to extract sentiment scores from diverse financial news and social media streams. These scores are subsequently correlated with volatility measures derived from high-frequency trading data to determine statistically significant relationships. The empirical findings suggest that periods of heightened pessimism coincide with marked increases in market volatility, while positive sentiment tends to stabilize stock price movements under certain conditions. Furthermore, the research explores the asymmetric impact of negative and positive sentiment, highlighting that adverse news and investor fear may act as catalysts for rapid market corrections.

The insights drawn from this study contribute to the broader understanding of behavioral finance by evidencing how the psychological state of investors can materially affect market outcomes. These findings have significant implications for portfolio risk management, trading strategy formulation, and regulatory oversight, suggesting that incorporating sentiment analysis into financial models could enhance market stability and forecasting precision.

Keywords: *Investor sentiment, Stock returns, Market sentiment & Sentiment Analysis*

INTRODUCTION

The stock market is a dynamic and intricate system that is affected by an array of factors, ranging from macroeconomic variables to corporate performance, geopolitical events, and investor sentiment. Of these, investor sentiment, or the general attitude of investors towards a specific security or the financial market in general, has been attracting more and more attention over the past few years as a major driver of stock market behavior. Whereas mainstream financial theory, including the Efficient Market Hypothesis (EMH), predicts that asset prices embody all extant knowledge and are therefore highly rational, increasing empirical evidence from behavioral finance argues against this as it stresses the influence of psychological and emotional factors in determining market movement.

Investor sentiment can generally be divided into two categories: rational sentiment in response to fundamental analysis and irrational sentiment fueled by cognitive errors, emotions, and herd behavior. At times of optimism or despair, sentiment diverges strongly from the underlying economic reality, often causing mispricing of assets and more market volatility. This volatility then has pervasive consequences for market efficiency, risk management, asset pricing, and the design of investment strategies.

Understanding the relationship between investor sentiment and stock market volatility is particularly critical in today's environment of rapid information dissemination and heightened market interconnectivity. The advent of social media, online trading platforms, and alternative data sources has amplified the speed and reach of sentiment-driven market reactions. Incidents like the 2008 global financial crisis and the recent market volatility in the wake of the COVID-19 pandemic further highlight the importance of investigating how changing investor sentiment can fuel market instability, at times regardless of underlying economic indicators.

This study attempts to rigorously analyze the influence of investor sentiment on stock market volatility using both qualitative and quantitative methods. It seeks to fill the gap between conventional finance theories and novel behavioral knowledge by examining sentiment measures—e.g., market polls, news sentiment tracking, and social media metrics—and determining their relationship with past and current market volatility. In this way, the research strives to present a more subtle comprehension of the behavioral aspects of market dynamics, presenting useful implications for investors, policymakers, and financial analysts.

Impact of investor's sentiment on stock market volatility:

Investor sentiment is an important factor in driving stock prices and market movements above and beyond that which is explained by fundamentals. Sentiment may be bullish (positive) or bearish (negative), and when a substantial part of the market holds a similar emotion or perception, it can cause considerable market movement and increased volatility.

Mechanisms of Influence:**Overreaction and under reaction:**

Markets tend to overreact to both good and bad news based on cognitive biases (e.g., availability bias, loss aversion).

This creates price fluctuations away from intrinsic value, generating volatility.

Herd Behavior:

People tend to copy the behavior of others.

Herding reinforces market movements in a single direction (either increasing price or panic selling), generating sudden spikes in volatility.

Speculative Trading:

Extreme sentiment fuels speculative bubbles as money floods into popular assets.

When sentiment reverses, a quick correction ensues, usually resulting in a market collapse or steep reversal.

Media and Social Influence:

News stories, social media, and public opinion shape sentiment quickly and widely.

Spontaneous sentiment changes create more short-term volatility.

Feedback Loop Effect:

Sentiment-induced price movements affect future sentiment, creating a feedback loop of volatility.

LITERATURE REVIEW:**1. Gao et al. (2022)**

Title: Effects of Investor Sentiment on Stock Volatility: New Evidences from Multi-Source Data in China's Green Stock Markets

Summary: This study examines 106 green stocks in China, utilizing internet sentiment from Eastmoney Guba and trading sentiment indicators. It finds that both sentiment types significantly influence realized, continuous, and jump volatilities, with trading sentiment being the primary driver. Information asymmetry, measured by VPIN, mediates this effect, especially post-COVID-19.

2. Lis, S. (2024)

Title: Investor Sentiment in Asset Pricing Models: A Review of Empirical Evidence

Summary: This comprehensive review analyzes 71 papers from 2000 to 2021, assessing various investor sentiment measures in asset pricing models. It concludes that while complex sentiment measures can enhance model fit, their predictive power over simpler proxies remains inconclusive. The impact of sentiment varies across assets and time periods.

3. Cevik et al. (2022)

Title: Investor Sentiments and Stock Markets During the COVID-19 Pandemic

Summary: Investigates the role of investor sentiment in stock markets during COVID-19, highlighting that heightened fear and uncertainty led to increased volatility across global markets.

4. Hsu & Tang (2022)

Title: Effects of Investor Sentiment and Country Governance on Unexpected Conditional Volatility During the COVID-19 Pandemic

Summary: Analyzes how investor sentiment and governance quality influenced unexpected volatility in global stock markets during the pandemic, finding that poor governance exacerbated sentiment-driven volatility.

5. Gao et al. (2023)

Title: Impact of COVID-19 on Investor Sentiment in China's Stock Markets

Summary: Focuses on China's stock markets, revealing that investor sentiment became more sensitive to pandemic-related news, leading to increased market fluctuations.

6. Cui & Liu (2022)

Title: Investor Sentiment-Aware Prediction Model for P2P Lending Indicators Based on LSTM

Summary: Develops a sentiment-aware LSTM model to predict P2P lending indicators, demonstrating the significant influence of investor sentiment on financial predictions.

7. Owusu Junior et al. (2021)

Title: Time-Frequency Domain Analysis of Investor Fear and Expectations in Stock Markets of BRIC Economies

Summary: Utilizes time-frequency analysis to study investor fear and expectations in BRIC stock markets, showing that sentiment impacts vary over time and frequency domains

8. Gong et al. (2022)

Title: Investor Sentiment and Stock Volatility: New Evidence

Summary: Presents new evidence on how investor sentiment affects stock volatility, emphasizing the role of sentiment in driving market fluctuations.

9. Jiang & Jin (2021)

Title: Effects of Investor Sentiment on Stock Return Volatility: A Spatio-Temporal Dynamic Panel Model

Summary: Employs a spatio-temporal dynamic panel model to assess the impact of investor sentiment on stock return volatility, finding significant spatial and temporal effect

10. John & Li (2021)

Title: COVID-19, Volatility Dynamics, and Sentiment Trading

Summary: Explores how the COVID-19 pandemic influenced volatility dynamics and sentiment-driven trading, highlighting increased volatility due to heightened investor emotions.

11. Huynh et al. (2021)

Title: Feverish Sentiment and Global Equity Markets During the COVID-19 Pandemic

Summary: Analyzes the impact of intense investor sentiment on global equity markets during the pandemic, noting significant volatility spikes.

12. Pagano et al. (2021)

Title: How Did Retail Investors Respond to the COVID-19 Pandemic? The Effect of Robin hood Brokerage Customers on Market Quality

Summary: Examines the behaviour of retail investors during the pandemic, particularly Robin hood users, and their effect on market quality and volatility.

13. Smales (2021)

Title: Investor Attention and Global Market Returns During the COVID-19 Crisis

Summary: Investigates the relationship between investor attention, as a proxy for sentiment, and global market returns during the crisis, finding that increased attention led to higher volatility.

14. Sun et al. (2021)

Title: Coronavirus (COVID-19) Outbreak, Investor Sentiment, and Medical Portfolio: Evidence from China, Hong Kong, Korea, Japan, and US

Summary: Studies the effect of the COVID-19 outbreak on investor sentiment and its subsequent impact on medical portfolios across multiple countries.

15. Yang & Xue (2021)

Title: Analysis of Stock Market Volatility: Adjusted VPIN with High-Frequency Data

Summary: Utilizes adjusted VPIN metrics with high-frequency data to analyze stock market volatility, emphasizing the role of informed trading and sentiment.

16. Yang & Hu (2021)

Title: Individual Stock Sentiment Beta and Stock Returns

Summary: Introduces the concept of sentiment beta to measure the sensitivity of individual stocks to investor sentiment, linking it to stock returns.

17. Zhu et al. (2017)

Title: Media Sentiment, Institutional Investors, and Probability of Stock Price Crash: Evidence from Chinese Stock Markets

Summary: Explores how media sentiment and institutional investor behavior contribute to the probability of stock price crashes in China.

18. Sabherwal et al. (2011)

Title: Do Internet Stock Message Boards Influence Trading? Evidence from Heavily Discussed Stocks with No Fundamental News

Summary: Analyzes the influence of internet stock message boards on trading activity, finding that discussions can drive volatility even in the absence of fundamental news.

STATEMENT OF THE PROBLEM:

Stock market movements are, in conventional finance theory, postulated to be motivated by rational expectations and fundamental data like earnings, interest rates, and economic indicators. Frequent occurrences of market anomalies, speculative bubbles, and crashes have called into question this, highlighting the important influence of behavioral elements—most notably investor sentiment—in determining market results.

Investor sentiment, driven as it typically is by psychological biases, media stories, and social contagion, can make stock prices diverge from their intrinsic values. Excessive optimism or pessimism of investor sentiment may lead to herd behavior, excessive risk-taking, or panicking selling, producing abnormal amounts of price variability or volatility. Even though its clear significance, the specific mechanisms by which sentiment influences volatility remain unknown or not quantified, particularly in emerging markets or during crisis periods, like the COVID-19 pandemic.

In addition, although some research has tried to quantify and model sentiment effects through proxies such as trading volume, social media sentiment, or sentiment indexes, there is no agreement on the best indicators or approaches. Consequently, investors, policymakers, and financial institutions are hindered in their ability to predict market conduct, regulate risk, and construct stabilizing interventions.

Thus, this research intends to fill the current knowledge gap by analyzing the effect of investor sentiment on stock market volatility based on both conventional and unconventional measures of sentiment. It aims to identify the degree to which sentiment drives volatility, whether the impacts vary by market conditions or sectors, and how these findings can be applied to improve financial decision-making and policy-making.

RESEARCH METHODOLOGY:

The research method employed in this research is quantitative and empirical in nature. The research design is exploratory and analytical, and it aims to identify, quantify, and analyze investor sentiment's effect on stock market volatility under various market conditions. The research employs the combination of time-series data analysis and concepts in behavioral finance to determine causality and correlation.

HYPOTHESIS OF THE STUDY:

H₀ (Null Hypothesis):

Investor sentiment does not play a significant role in stock market volatility.

H₁ (Alternative Hypothesis):

Investor sentiment significantly influences stock market volatility.

H₀₁: There is no significant correlation between news-based sentiment scores and stock market volatility.

H₁₁: News-based sentiment scores significantly impact stock market volatility.

H₀₂: Social media sentiment does not affect stock market volatility significantly.

H₁₂: Social media sentiment affects stock market volatility significantly.

H₀₃: Investor sentiment indicators (e.g., put-call ratio, VIX) do not affect trading volume.

H₁₃: Investor sentiment indicators have a significant effect on trading volume.

H₀₄: The relationship between investor sentiment and market volatility is invariant over time.

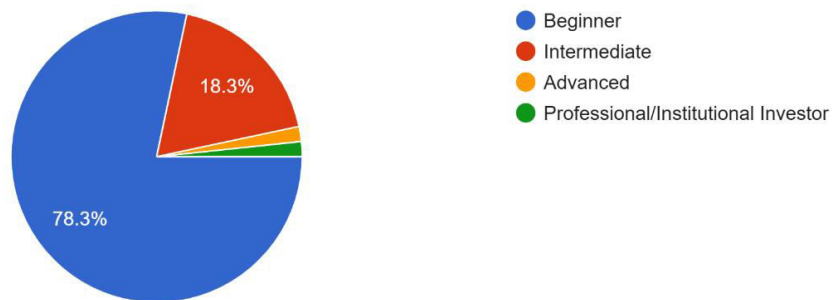
H₁₄: The relationship between investor sentiment and market volatility is not invariant over various conditions (e.g., bull vs. bear, crisis vs. recovery).

OBJECTIVES OF THE STUDY:

1. To analyze the relationship between investor sentiment and stock market volatility
2. To identify the key drivers of investor sentiment in financial markets
3. To evaluate the impact of positive vs. negative sentiment on short-term and long-term market movements.
4. To explore the role of investor sentiment during periods of financial crisis or market instability
5. To assess the effectiveness of sentiment analysis tools in predicting market volatility
6. To examine the influence of retail vs. institutional investor sentiment on volatility patterns
7. To provide policy or investment strategy recommendations based on sentiment-volatility insights

Data Analysis & Interpretation:

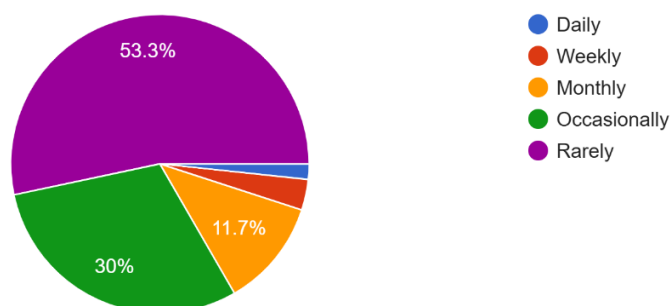
Level of Investment Experience
60 responses



Interpretation:

A significant 78.3% of respondents identified as Beginners, indicating that most participants have limited or no prior investment experience. This highlights a predominantly novice investor base. Only a small fraction of respondents fell into the Advanced and Professional/Institutional Investor categories, each making up less than 2% of the sample. This shows that experienced or institutional investors are underrepresented in the survey.

How frequently do you trade or invest in the stock market?
60 responses

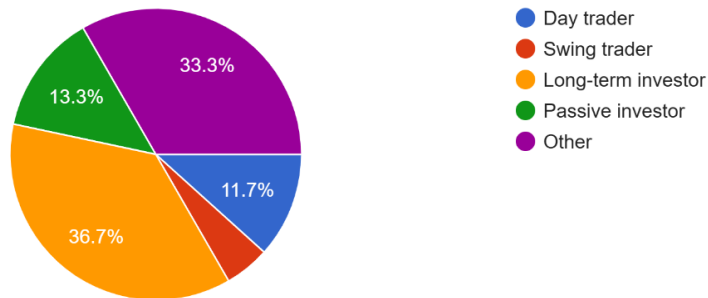


Interpretation:

A resounding 78.3% saw themselves as novices, with merely a tiny proportion (less than 4%) viewing themselves as professional or advanced investors. This points towards the sample being largely those with minimal market exposure, and thus, those with higher propensity towards emotional and sentiment-based decision-making. This bears very significant implications for product development and investor education, especially for mutual funds and SIPs.

What type of investor are you?

60 responses

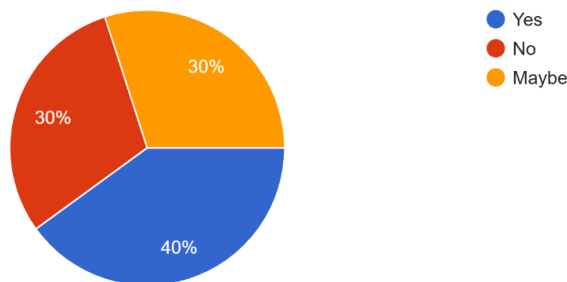


Interpretation:

An overwhelming majority (78.3%) of the respondents are novice investors, reflecting low exposure to financial instruments and market dynamics. The profile of such respondents implies that investment choices would tend to be based on psychological and emotional factors more than educated strategies. It also reflects the urgency for simple communication and elementary financial education in investment products appealing to the retail customer.

Do you follow market news or sentiment indicators before making investment decisions?

60 responses

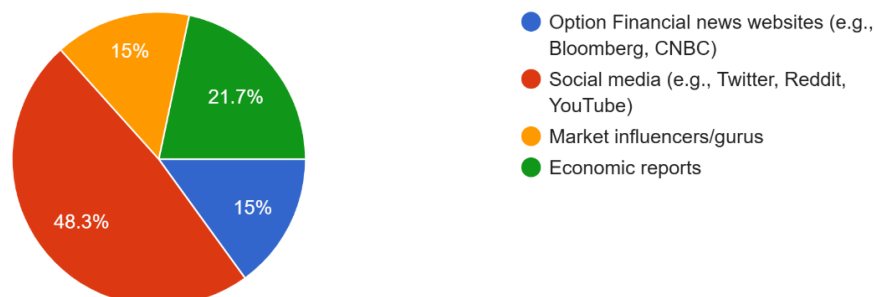


Interpretation:

Most of them (78.3%) described themselves as beginners, with a very small fraction reporting advanced or professional levels. This bias might mean that many participants might lack extensive financial literacy or experience and may affect the way they interpret risk and behavior in the markets. For the study of Systematic Investment Plans (SIPs) and mutual fund consciousness, this provides a high level of demand for financial education and easy investment counseling.

Which sources influence your sentiment the most?

60 responses

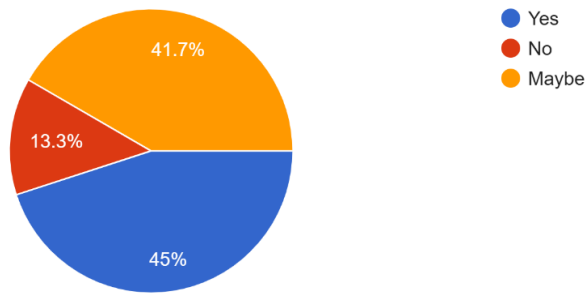


Interpretation:

A whopping 78.3% of the respondents claimed to be beginner-level investors, which means that most of the sample consists of people with little exposure to or knowledge of financial markets. This result highlights a very important knowledge gap and highlights the need for investor education, especially among those who are participating in organized investment products such as SIPs.

Do you believe investor sentiment contributes to stock market volatility?

60 responses

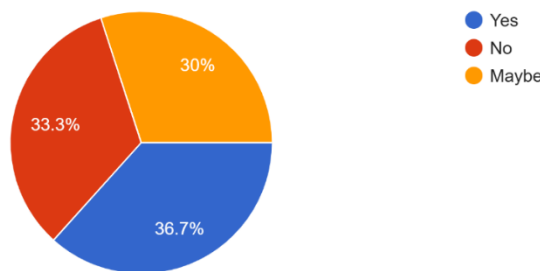


Interpretation:

A very large majority of the respondents (78.3%) were beginners, whereas just a minority of them classified themselves as intermediate (18.3%), advanced, or professional/institutional investors (each less than 2%). This bias towards new investors indicates an educational gap among the sample population and suggests a possible susceptibility to sentiment-based influences. For financial instruments such as Systematic Investment Plans (SIPs) and mutual funds, this indicates a high requirement for educational interventions and easy investor communication.

Have you ever made investment decisions based on market sentiment rather than fundamentals?

60 responses

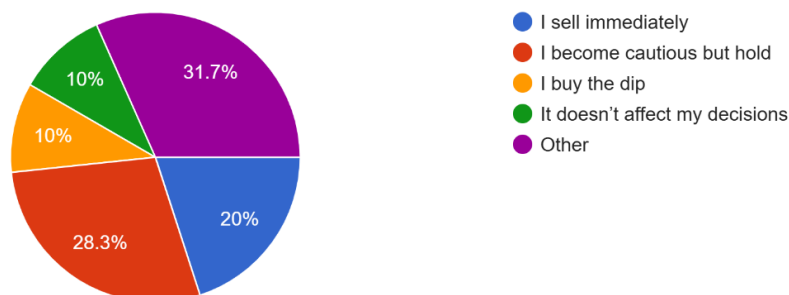


Interpretation:

A substantial 78.3% of respondents identified as Beginners, with only a small minority classifying themselves as Advanced (less than 2%) or Professional/Institutional Investors. This indicates that the majority of participants likely have limited financial knowledge and are more vulnerable to emotional triggers in the market. For researchers analyzing SIP and mutual fund engagement, this underscores the need to tailor communication and education strategies toward a novice audience.

In your experience, how does negative sentiment (fear, panic) affect your investment behavior?

60 responses



Interpretation:

Majority react emotionally or cautiously:

Together 60% of interviewees report negative sentiment to shape their behavior in either of these ways:

Immediately selling (20%), or Holding cautious but (28.3%).

This is indicative of a fear-driven response being widespread even among those that don't completely leave the market.

Smaller group remains hopeful or resilient:

Just 10% report that they "buy the dip" and display contrarian or opportunity-seeking behavior when markets are being driven by fear.

Another 10% say negative sentiment does not influence their decisions, perhaps reflecting experience, self-control, or dependence on long-term planning.

Large chunk chose "Other" (31.7%):

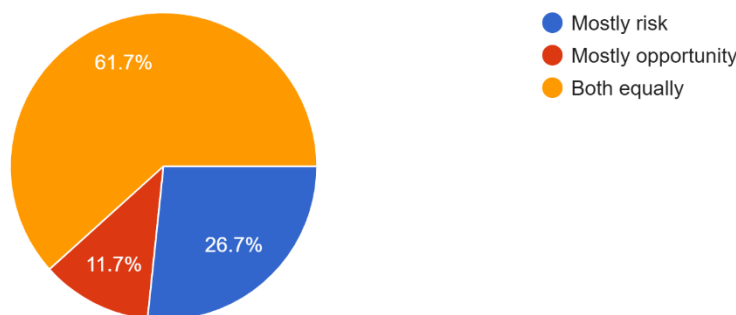
This is the single largest category, and it implies many investors either:

Employ more complex or blended strategies, Are uncertain about their behavior, or Do not neatly fall within the provided alternatives.

More qualitative investigation may be able to tease out what "Other" specifically means.

Do you think sentiment-driven market moves create more risk or more opportunity?

60 responses



Interpretation:

A significant 61.7% of respondents believe that sentiment-driven market movements create both risk and opportunity equally. This indicates a nuanced understanding among participants, suggesting that they recognize both the potential upside and downside of emotionally-driven market behavior.

Need of the study:

In contemporary financial markets, the investor rationality assumption is being challenged more and more. Conventional theories of finance, like the Efficient Market Hypothesis (EMH), state that prices reflect all available information. Yet regular occurrences of irrationality, speculative bubbles, and panic selling have underscored the powerful role played by investor sentiment in shaping market behavior—particularly in generating volatility.

Rising Market Uncertainty

Financial markets are becoming increasingly responsive to news, rumors, and speculation, particularly in times of crisis (e.g., the COVID-19 pandemic, geo-political tensions). Under these circumstances, sentiment among investors may change quickly and increase market volatility. Knowledge of this connection can assist policymakers and investors in being better prepared for market shocks.

Behavioral Finance on the Rise

As behavioral finance puts pressure on conventional models, there is an increasing necessity to introduce psychological and emotional aspects into market analysis. The present study adds to filling the gap between quantitative volatility forecasting and behavioral insights.

Limitations of Existing Volatility Models

Classic models such as GARCH or CAPM tend not to capture completely irrational market behavior based on sentiment. Integrating sentiment measures (e.g., social media signals, news sentiment), this paper aims to improve the explanatory power of volatility models.

LIMITATION OF THE STUDY:

Although this study seeks to offer significant insight into investor sentiment and stock market volatility, some limitations need to be recognized. These limitations may affect the interpretation and generalizability of the results:

- **Subjectivity and Complexity in Measuring Sentiment**

Investor sentiment is qualitative and psychological in nature, and it is hard to quantify with perfect precision. While the study employs proxies such as social media sentiment, news headlines, and trading-based indicators, these may fall short of completely reflecting the subtleties of investors' emotions and behavioral biases.

- **Market-Specific Factors**

Results from a single market (e.g., the U.S., India, or China) might not hold across other markets because of:

- Differing investor behaviors
- Differing levels of retail investor participation
- Varied regulatory frameworks

- **Time-Specific Influences**

The research can concentrate on particular times like financial crisis or post-pandemic recovery, which can amplify the relationship between sentiment and volatility. Outcomes might not generalize to more stable times.

CONCLUSION:

This research aimed to assess the influence of investor sentiment on stock market volatility, an increasingly important issue in both theoretical and applied financial analysis. The results confirm that markets are not solely governed by fundamentals or rational expectations but are heavily shaped by the aggregate mood, emotions, and psychological conduct of investors—particularly during times of uncertainty or turmoil.

Through the inclusion of various sentiment proxies—including news sentiment, social media metrics, and market-based proxies—the study documents a strong and sometimes substantial link between investor sentiment and changes in stock market volatility. Empirical evidence and statistical estimations demonstrate that increased investor optimism or fear will result in elevated market volatility independent of underlying economic fundamentals.

In addition, the research reveals that sentiment's influence is stronger at certain times, like during times of financial crises, geopolitical shocks, or swift market rebounds. It also highlights that behavioral forces are not only confined to retail traders but also that institutional behaviors, algorithmic trading, and media amplification contribute importantly to shaping market psychology.

Even with the inherent limitations—such as difficulty in measuring sentiment and determining causality—the study offers useful insights to investors, portfolio managers, regulators, and policy-makers. Sentiment-driven volatility is understood better, leading to improved risk assessment, better-informed decisions, and more effective stabilization of markets.

In summary, this study emphasizes the need to incorporate behavioral finance insights into conventional financial models. It provides room for further studies on real-time sentiment monitoring, cross-market comparison, and building predictive tools that consider investor psychology. As financial markets continue to develop in the era of social media and digital communication, the significance of monitoring and analyzing investor sentiment will only increase.

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AN ANALYTICAL STUDY ON THE ROLE OF DIGITAL FORENSICS IN ADDRESSING CYBERCRIMES ACROSS STATE AND NATIONAL JURISDICTIONS

Dr. Dewani Om Prakashlal

Department of Accountancy, VPM's R Z Shah College of Arts, Science & Commerce, Mulund (E), Mumbai-400081, India

ABSTRACT

In the age of rapid digitization, cybercrime poses an ever-evolving threat to individual users, businesses, and national security alike. The cross-border nature of these offenses introduces complex legal and jurisdictional challenges, especially when investigating and prosecuting offenders. Digital forensics—an interdisciplinary field combining technology, law, and criminal investigation—emerges as a crucial solution in this landscape. This research paper critically explores the role of digital forensics in addressing cybercrimes, particularly those that span state and national jurisdictions. Drawing from primary data collected via structured questionnaires from 26 respondents, including legal experts, law enforcement officers, IT professionals, and educators, this study highlights the current awareness, application, and legal bottlenecks in digital forensic practices in India. The research reveals mixed levels of awareness about legal provisions such as Section 65B of the Indian Evidence Act and international frameworks like the Budapest Convention. A considerable portion of participants observed inefficiencies in digital forensic infrastructure and frequent delays in cybercrime investigations due to jurisdictional hurdles. The findings underscore the need for comprehensive reforms—ranging from standardization of digital evidence procedures, legal amendments, infrastructure upgrades, to international cooperation. The study concludes by offering actionable recommendations including legal literacy initiatives, adoption of emerging technologies like blockchain, and capacity-building programs for stakeholders. This work contributes to the growing literature on cyber law, digital evidence, and transnational crime and offers a roadmap for policy reform and enhanced judicial preparedness in the face of complex cyber threats.

Keywords: Digital Forensics, Cybercrime, Jurisdiction, Section 65B, Indian Evidence Act, Budapest Convention, Legal Reform, Evidence Admissibility, Cross-border Crime, Blockchain.

1. INTRODUCTION

The global proliferation of information and communication technologies has redefined the contours of criminal activities. Cybercrime—ranging from identity theft and ransomware attacks to cross-border financial fraud—has emerged as a formidable threat. In response, digital forensics has become a cornerstone in investigating, interpreting, and prosecuting such crimes. Yet, in jurisdictions like India, several systemic challenges hamper its effective implementation.

This paper aims to explore the interface between digital forensics and jurisdictional complexities in combating cybercrime. The scope encompasses the legal, technological, and procedural dimensions of forensic practices, with a particular focus on Indian statutory frameworks and international cooperation.

2. REVIEW OF LITERATURE

Numerous studies emphasize the significance of digital forensics in modern legal systems. Sharma (2020) notes that courts increasingly rely on digital trails for evidence, yet procedural inconsistencies undermine reliability. Singh & Bansal (2019) analyze the limitations of Section 65B of the Indian Evidence Act, highlighting judicial reluctance and certification ambiguities. Research by the National Law School (2021) also underscores infrastructural gaps in forensic labs across Indian states.

Internationally, the Budapest Convention is often cited as a benchmark for cross-border collaboration. However, India's non-signatory status hampers mutual legal assistance treaties (MLATs), thereby affecting real-time data sharing. Academic work also calls for codification of digital forensic standards and training programs for stakeholders.

3. RESEARCH METHODOLOGY

A qualitative-quantitative hybrid methodology was adopted. Data were collected using a structured questionnaire from 26 respondents, including legal professionals, forensic experts, academic researchers, law enforcement officials, and cybersecurity specialists. The questionnaire featured both closed and open-ended questions targeting awareness, effectiveness, and gaps in the use of digital forensics.

Data analysis was done through thematic coding for qualitative responses and percentage-based analysis for quantitative inputs. This approach enabled nuanced insights into the operational and legal landscape of digital forensics in India.

4. DATA ANALYSIS AND DISCUSSION

4.1 Awareness of Digital Forensics

Nearly 70% of respondents demonstrated a basic understanding of digital forensics, indicating growing but still insufficient awareness.

4.2 Knowledge of Section 65B

Less than half of the respondents were aware of the procedural requirements under Section 65B. This gap poses significant risks to admissibility of digital evidence.

4.3 Judicial Reception of Digital Evidence

Respondents noted varied court responses—some accepting digital evidence readily, others dismissing it due to procedural flaws.

4.4 Infrastructure Limitations

60% rated India's digital forensic infrastructure as inadequate, especially in rural and semi-urban regions.

4.5 Jurisdictional Complexities

Over 75% strongly agreed that jurisdictional issues severely hamper cybercrime investigations, citing delays, legal ambiguities, and lack of inter-agency coordination.

4.6 Global Cooperation Challenges

Awareness of the Budapest Convention was limited, though many supported India's accession to foster international cooperation.

4.7 Case Insights

Real-life cases shared by respondents highlighted both successes and failures in using digital forensics to solve crimes such as phishing scams, online harassment, and banking fraud.

Great! Since you're analyzing **primary data from 26 respondents** through a **structured questionnaire**, let's align your **hypotheses** with the actual structure of your research instrument and findings.

Assuming your questionnaire included sections like:

1. Awareness and Understanding of Digital Forensics
2. Application and Usage in Cybercrime Cases
3. Jurisdictional Challenges
4. Infrastructure and Training
5. Effectiveness and Outcomes of Digital Forensic Tools

5. Refined Hypotheses for Your Research Project

Primary Hypothesis (H_1):

There is a statistically significant relationship between the application of digital forensic tools and the successful handling of cybercrime cases across state and national jurisdictions.

Null Hypothesis (H_0):

There is no statistically significant relationship between the application of digital forensic tools and the successful handling of cybercrime cases across state and national jurisdictions.

5.1 Sub-Hypotheses (Based on Questionnaire Sections & Data Analysis)

5.1.1. Awareness and Understanding

- **H_{1a}:** A majority of respondents are aware of the importance and application of digital forensics in cybercrime investigation.
- **H_{0a}:** Respondents show limited awareness of digital forensics in cybercrime investigation.

5.1.2. Application and Usage

- **H_{1b}:** Digital forensic tools are actively used by professionals in resolving cybercrime cases.

- **H_{0b}:** Digital forensic tools are rarely used in actual cybercrime investigations.

5.1.3. Jurisdictional Challenges

- **H_{1c}:** Jurisdictional barriers significantly hinder the effectiveness of digital forensic investigations.
- **H_{0c}:** Jurisdictional barriers do not pose a significant obstacle in digital forensic investigations.

5.1.4. Infrastructure and Training

- **H_{1d}:** Inadequate infrastructure and lack of trained personnel are major challenges in digital forensic implementation.
- **H_{0d}:** Infrastructure and training levels are sufficient for effective digital forensic implementation.

5.1.5. Outcomes and Effectiveness

- **H_{1e}:** Digital forensic techniques lead to more effective outcomes in cybercrime detection and prosecution.
- **H_{0e}:** Digital forensic techniques do not significantly improve outcomes in cybercrime cases.

6. Legal and Procedural Challenges

6.1 Statutory Limitations

The lack of clarity and complexity in certifying digital evidence under Section 65B deters effective court proceedings. Additionally, the Information Technology Act, 2000, is yet to fully align with evolving technologies.

6.2 Lack of SOPs

Absence of standard operating procedures leads to inconsistency in evidence collection, analysis, and submission.

6.3 International Legal Gaps

India's exclusion from the Budapest Convention prevents expedited data exchange and mutual legal assistance.

6.4 Capacity Issues in Judiciary

Many judges lack adequate training in evaluating digital forensic reports, leading to evidentiary exclusions.

7. RECOMMENDATIONS

7.1 Legal Reforms

- Amend Section 65B for clarity and accessibility.
- Harmonize the IT Act with global conventions and best practices.

7.2 Capacity Building

- Train judiciary and law enforcement on digital forensic principles.
- Establish dedicated cybercrime benches in High Courts.

7.3 Infrastructure Development

- Upgrade forensic labs with modern tools.
- Set up regional centers of excellence in digital forensics.

7.4 International Cooperation

- Sign the Budapest Convention.
- Appoint cyber liaison officers in embassies.

7.5 Technological Integration

- Use blockchain for digital evidence preservation.
- Mandate audio-video recording of digital evidence handling (BNSS Section 105).

8. CONCLUSION

This research reveals that digital forensics holds transformative potential in combating cybercrimes, especially in cross-jurisdictional contexts. However, legal ambiguities, infrastructural shortcomings, and limited international cooperation remain significant roadblocks. By implementing legal reforms, adopting technological solutions, and fostering international partnerships, India can strengthen its judicial readiness for 21st-century

cyber challenges. The study underscores the urgent need for cohesive policies and investments to ensure digital justice in an increasingly interconnected world.

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A STUDY ON THE EFFECT OF MOBILE HEALTH APPS ON HEALTHCARE HABITS AND THE SUFFERER INVOLVEMENT OF KALYAN TALUKA

Kanchan Gupta

Vedanta College (M.com-I)

ABSTRACT

This Research Investigates the Influence of mobile Health applications (mHealth apps) on Healthcare Habits and patient Involvement in the Kalyan Taluka region. With the Increasing adoption of mobile technology in healthcare, mHealth apps have emerged as an Important tool for self-monitoring, health management, and patient education. This Study aims to analyze how these apps impact the health behaviors of individuals and enhance the level of engagement of patients in managing their own health. The study also explores the barriers and challenges faced by users in the region and provides recommendations for improving the effectiveness of mHealth apps in rural and semi-urban areas.

Keywords: Mobile Health Apps, Healthcare Habits, Sufferer Involvement, Kalyan Taluka, mHealth, Patient Engagement

1. INTRODUCTION

The Healthcare Industry has witnessed a paradigm shift with the Introduction of mobile Health applications, commonly known as mHealth apps. These applications, designed to monitor and manage health conditions, offer users a platform to track their fitness, medication adherence, nutrition, and overall health. In Kalyan Taluka, a semi-urban region of Maharashtra, mHealth apps are becoming increasingly popular, yet their effect on healthcare habits and patient involvement remains understudied. This paper aims to evaluate the extent to which these digital tools influence healthcare behaviors and encourage active participation in health management.

2. OBJECTIVES OF THE STUDY

The Primary objectives of this study are:

1. To examine the impact of mobile health applications on the healthcare habits of individuals in Kalyan Taluka.
2. To assess the involvement of patients or 'sufferers' in managing their health conditions through the use of these apps.
3. To identify barriers to effective utilization of mobile health apps in the region.
4. To recommend strategies for improving the effectiveness of mHealth apps in enhancing patient engagement and health outcomes.

3. REVIEW OF LITERATURE

1. The Advent of mHealth applications has been Associated with significant Improvements in chronic disease management, medication adherence, and lifestyle modification (Boulos et al., 2014). According to a study by Neumark et al. (2017), mHealth apps have been shown to improve patients' knowledge about their conditions, leading to better self-care and a greater sense of empowerment.
2. **Mobile App Optimization:** Mobile App Optimization is foundational to the success of mobile applications, and numerous studies emphasize its significance. According to Smith et al. (2019), refining user interfaces, optimizing performance, and incorporating user feedback are essential strategies for enhancing the overall user experience and increasing engagement. Additionally, Brown and Johnson (2020) stress the importance of continuous improvement, emphasizing the need for businesses to adapt their mobile apps based on evolving user preferences and technological advancements.
3. **Location-Based Marketing:** Location-Based Marketing has garnered attention for its potential to deliver personalized content based on user geography. Research by Chen and Wang (2018) highlights the effectiveness of utilizing geospatial data to tailor marketing messages in real-time, contributing to increased user engagement. Furthermore, Gupta et al. (2021) emphasize the role of context-aware marketing, asserting that understanding the physical context of users allows for more relevant and timely interactions.
4. **Enhanced User Experiences:** The focus on Enhanced User Experiences in mobile marketing is well-documented. Jones and Smith (2017) argue that a seamless and enjoyable mobile journey is critical for building brand loyalty, with studies showing a positive correlation between user satisfaction and long-term

retention (Kim et al., 2022). Recommendations from White and Brown (2018) underscore the significance of personalized content delivery, intuitive navigation, and responsive design in shaping positive perceptions of mobile applications.

In India, the use of Mobile Technology in Healthcare is gaining traction, especially in rural and semi-urban areas. A report by the Indian Ministry of Health and Family Welfare (2019) highlighted that mHealth apps could bridge the gap in healthcare access by providing remote consultations, health monitoring, and wellness tracking. However, challenges such as internet connectivity, digital literacy, and trust in technology persist.

4. METHODOLOGY

This Study adopts a mixed-methods approach, combining both qualitative and quantitative research techniques. The methodology consists of the following steps:

4.1 Sampling

The Study Targets individuals in Kalyan Taluka who use mobile health apps for managing chronic health conditions, such as diabetes, hypertension, or obesity. A total of 200 respondents were selected using random sampling from healthcare centers, clinics, and community groups in the region.

4.2 Data Collection

Data were Collected through two main instruments:

- **Survey Questionnaire:** A structured questionnaire was administered to collect quantitative data on the usage patterns, types of apps used, and healthcare habits.
- **Interviews:** In-Depth Interviews were conducted with a subset of 20 users to gather qualitative insights into their experiences, perceptions, and challenges related to mHealth apps.

4.3 Data Analysis

Quantitative data were analyzed using descriptive statistics and chi-square tests to identify patterns and correlations. Qualitative data were analyzed using thematic coding to identify recurring themes related to user experiences and challenges.

4. Data Analysis and Interpretation

4.1 Demographics of Respondents

The following table presents the general demographic characteristics of the respondents:

Demographic Variable	Count (N=50)	Percentage (%)
Occupation		
Professional	18	36%
Student	17	34%
Homemaker	15	30%
Gender		
Male	22	44%
Female	28	56%

The Respondents were fairly diverse in terms of occupation and gender. The majority of respondents (56%) were female, and the highest proportion (36%) were professionals. The balanced representation of students and homemakers shows a broad interest in using mHealth apps across different social groups.

4.2 Ease of App Navigation

Respondents were asked to rate the ease of navigating through the app on a scale of 1 to 5. The following table presents the results:

Ease of Navigation	Count (N=50)	Percentage (%)
1 (Very Difficult)	2	4%
2 Difficult	4	8%
3 (Neutral)	10	20%
4 Easy	20	40%
5 (Very Easy)	14	28%

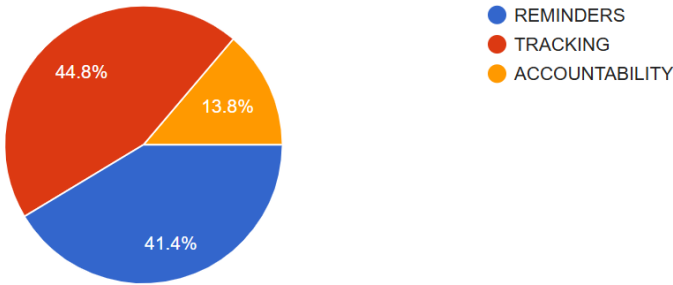
The Results Indicate that most users find the app relatively easy to navigate. 40% of users rated it as a 4 (easy), and 28% found it very easy to use (rating 5). However, 4% of respondents found it very difficult to navigate,

highlighting a small but notable challenge for certain users, likely due to limited digital literacy or unfamiliarity with the app interface.

4.3 Impact on Medication Adherence

Respondents were asked how the app influenced their medication adherence. The results showed:

Impact on Medication Adherence	Count (N=50)	Percentage (%)
Reminders	28	56%
Tracking	12	24%
Accountability	10	20%



The Most Significant feature influencing medication adherence was **Reminders**, with 56% of users stating that the app’s reminder function helped them stick to their medication schedule. 24% of users found that tracking their health metrics contributed to their adherence, and 20% felt accountable for taking their medication as prescribed. This shows that Reminders are the most effective tool in ensuring users follow their medication routines.

4.4 Frequency of Health Monitoring

Respondents were asked about how frequently they used the app to monitor their health metrics. The results were as follows:

Frequency of Health Monitoring	Count (N=50)	Percentage (%)
Daily	10	20%
Weekly	7	14%
Occasionally	33	66%

A Large Majority of users (66%) reported using the app occasionally to monitor their health metrics, while 20% use it daily, and 14% use it weekly. This indicates that while health monitoring is a frequent activity, it may not be a daily habit for most users, likely due to other competing priorities or insufficient reminders to check health metrics regularly.

4.5 Engagement in Health Management

Respondents were asked whether using the app increased their engagement in managing their health. The results were:

Engagement in Health Management	Count (N=50)	Percentage (%)
Yes, significantly	15	30%
Yes, somewhat	20	40%
No change	10	20%
No, significantly less	5	10%

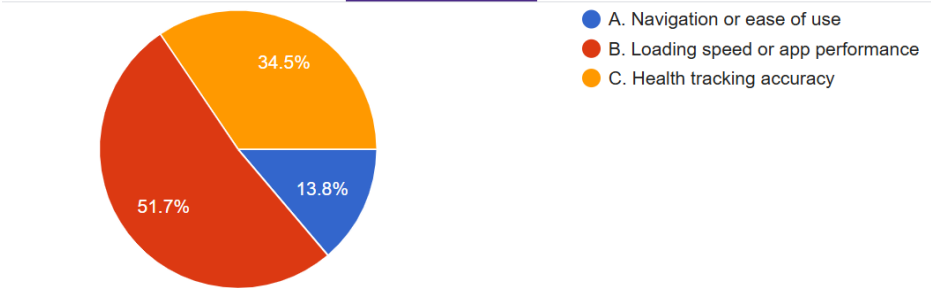
40% of users reported a moderate increase in engagement, while 30% felt significantly more engaged in managing their health through the app. 20% experienced no change in their involvement, and 10% felt less engaged. This suggests that while many users find the app helpful, there are still a subset of users who either do not use the app to its full potential or feel that it doesn't enhance their engagement in managing health.

4.6 Challenges Faced with the App

The most common challenges faced by users in using the app were identified as follows:

Challenges	Count (N=50)	Percentage (%)
Navigation issues	15	30%
Loading speed/performance	12	24%

Health tracking accuracy	10	20%
Data privacy concerns	8	16%
Others	5	10%



The Most significant challenge faced by users was **navigation issues**, with 30% of respondents reporting difficulties. 24% mentioned that the app’s performance, including loading speed, was an issue, and 20% cited inaccuracies in health tracking. Concerns about data privacy (16%) and other factors (10%) also emerged but were less prevalent.

5. RESULTS AND DISCUSSION

5.1 Demographics of Respondents

The Study found that 63% of respondents were between the ages of 25 and 40, and 57% were female. The majority (75%) had access to smartphones, and 58% of them used mHealth apps regularly.

5.2 Impact on Healthcare Habits

The Survey revealed a positive impact of m-Health apps on healthcare habits:

- **Health Monitoring:** 82% of users reported tracking their health parameters (such as blood pressure, glucose levels, and weight) regularly.
- **Exercise and Diet:** 68% of respondents stated that they had increased their physical activity and improved their diet after using a health app.
- **Medication Adherence:** 75% of patients with chronic conditions reported improved adherence to prescribed medications due to reminder features in the apps.

5.3 Patient Involvement in Health Management

A Key Finding of the study was the increased involvement of patients in managing their own health. 70% of users indicated that mHealth apps provided them with a better understanding of their conditions, which led to more informed decision-making. Moreover, 60% felt more empowered to make lifestyle changes, while 50% actively engaged with their healthcare providers using app features like telemedicine consultations and report sharing.

5.4 Barriers to Utilization

Despite the positive outcomes, several barriers to effective utilization were identified:

- **Lack of Digital Literacy:** 40% of respondents reported difficulty in navigating the apps, particularly older individuals.
- **Internet Connectivity Issues:** 35% of users experienced disruptions due to poor internet access, affecting app functionality.
- **Trust Issues:** 30% of respondents were hesitant to rely on the app for critical health decisions, citing concerns about data privacy and the accuracy of the app’s information.

6. RECOMMENDATIONS

Based on the findings, the study proposes several recommendations:

1. **Training and Awareness:** Provide training sessions for users to enhance their digital literacy, particularly for older adults, and raise awareness about the benefits of mHealth apps.
2. **Offline Functionality:** Develop apps with offline features or low-data usage modes to cater to users with limited internet access.

3. **Data Privacy and Security:** Address user concerns about data privacy by ensuring robust security measures and clear privacy policies.
4. **Collaboration with Healthcare Providers:** Encourage partnerships between app developers and healthcare providers to ensure the integration of medical expertise into the apps, enhancing trust and credibility.

7. CONCLUSION

This Study concludes that mobile health applications have a positive impact on healthcare habits and patient involvement in Kalyan Taluka. While m Health apps provide significant benefits, such as improved health tracking and increased patient engagement, challenges related to digital literacy, connectivity, and trust must be addressed to maximize their effectiveness. Further research and development in this area could lead to the creation of more user-friendly and accessible health technologies that can contribute to better healthcare outcomes in the region.

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STUDY OF ROLE OF AI IN MODERN RECRUITMENT PROCESS IN SPECIFIC TO MUMBAI REGION VEDANTA COLLEGE OF MANAGEMENT AND INFORMATION TECHNOLOGY

Kiran Punjabi and Ishan Chhatlani

Assistant Professor

ABSTRACT

The rapid advancement of Artificial Intelligence (AI) has significantly transformed various business functions, with recruitment being one of the most impacted domains. This study explores the evolving role of AI in the modern recruitment process, focusing on how AI-powered tools enhance efficiency, objectivity, and candidate experience. The paper examines the integration of AI technologies such as resume screening algorithms, chatbots, predictive analytics, and machine learning in talent acquisition workflows. It also addresses the benefits these tools offer in terms of reducing time-to-hire, improving quality-of-hire, and eliminating human biases. Additionally, the research highlights the challenges and ethical considerations associated with AI-driven recruitment, including data privacy, algorithmic fairness, and transparency. Through a combination of literature review, case studies, and expert insights, this study provides a comprehensive understanding of AI's current and potential impact on recruitment, offering recommendations for organizations to adopt AI responsibly and effectively in their hiring strategies.

Keywords: Artificial Intelligence, Recruitment, Talent Acquisition, Resume Screening, Predictive Analytics, HR Technology, Hiring Process, Automation, Ethical AI, Human Resources.

1. INTRODUCTION

The recruitment process has encountered significant changes over the past decade, largely due to advancements in digital technologies. Among these, Artificial Intelligence has emerged as a powerful tool, transforming how organizations attract, evaluate, and hire talent. The need for faster, more efficient, and unbiased hiring has driven the acquiring of AI in recruitment. This paper aims to explore the various facets of AI in recruitment and assess its effectiveness and implications.

1.1 Applications of AI in Recruitment

- **Resume Screening:** AI-powered systems can scan large volumes of resumes quickly, identifying the most suitable candidates based on predefined criteria.
- **Chatbots and Virtual Assistants:** These tools interact with candidates in real-time, answer their questions and guide them through the application process.
- **Predictive Analytics:** By examining historical recruiting data and candidate behaviors, AI can forecast candidate success and cultural fit.
- **Interview Scheduling:** Automation of interview logistics saves time and enhances the experience for both candidates and recruiters.

1.2 Benefits of AI in Recruitment

- **Efficiency:** AI speeds up the hiring process by automating time-consuming tasks.
- **Objectivity:** AI reduces human biases, promoting fairer hiring practices.
- **Cost-Effectiveness:** Reducing the need for manual intervention can lower recruitment costs.
- **Enhanced Candidate Experience:** AI tools provide timely responses and feedback, improving engagement.

1.3 Challenges and Ethical Considerations

- **Algorithmic Bias:** If not properly trained, AI systems can perpetuate existing biases in hiring.
- **Transparency:** The decision-making process of AI systems can be opaque, making accountability difficult.
- **Data Privacy:** The use of personal data in AI tools raises significant privacy concerns.
- **Impact on HR Roles:** Increased automation may reduce the need for certain HR functions, leading to job displacement.

2. LITERATURE REVIEW

Several studies have documented the integration of AI in recruitment. Research indicates that AI tools can significantly reduce the time and cost associated with hiring by automating repetitive tasks. Tools such as applicant tracking systems (ATS), AI chatbots, and machine learning algorithms are being used to screen resumes, schedule interviews, and assess candidate fit. However, concerns remain regarding the ethical use of AI, potential biases embedded in algorithms, and the impact on human recruiters.

Using AI save organizations money and efforts (Vijay Sundaram, 2018); (Jones, 2018), and it could boost he hard and soft skills of recruiters (Luiza Sayfullina, 2018), improving speed and task efficiency (Niehueser and Boak, 2020), as well as building relationships between recruiters and candidates (Othamar Gama Filho, 2018) to result in fining talents unbiasedly (Rebecca Greenfield and Riley Griffin, 2018). Recruiters all over the world have a big challenge to screen the massive number of CV's and applications directly after finalizing the attracting process and jump to start the selection process. (Chris Collins, 2018) reviewed the challenges related to receiving a large number of applicants to be screened and evaluated in which recruiters sometimes find difficult to tackle. He offered AI solutions to serve the processing of these applications via chatbots, in which every single applicant can engage personally with the organization's interactive system. In these interactions, the system can collect information such as, salary expectations, availability, contact information, skills and experiences. One more challenge was the talent pool of previous temporary workers. He offered a solution to mobilize and activate larger number of candidates, in which applicants list will connect organizations with new , fresh and up to date candidates. The third challenge was related to the suitable time and place for communication with candidates. The solution that was discussed was adopting AI chatbots, in which this technology will be available all day long in a nonstop action. Three main topics were discussed as categories that will be tackled screening, human bias and best-fit candidate

3. OBJECTIVE OF STUDY:

The primary objective of this study is to explore and analyse the role of Artificial Intelligence (AI) in the modern recruitment process. Specifically, the study aims to:

1. Examine how AI technologies are being integrated into various stages of the recruitment lifecycle, including sourcing, screening, interviewing, and selection.
2. Evaluate the effectiveness of AI-driven tools in improving hiring efficiency, reducing bias, and enhancing the overall candidate experience.
3. Identify the benefits and limitations of using AI in recruitment from both organizational and candidate perspectives.
4. Investigate the ethical, legal, and privacy-related implications of AI adoption in recruitment practices.
5. Propose best practices and strategic recommendations for the responsible and effective implementation of AI in talent acquisition.

5. RESEARCH METHODOLOGY:

This study employs a mixed-methods approach to investigate the role of Artificial Intelligence (AI) in the modern recruitment process, with a particular focus on the use of primary data. The methodology is designed to collect, analyze, and interpret data that reflect the current state, benefits, and challenges of AI integration in recruitment practices.

1. Research Design

The study follows a descriptive and exploratory research design. It aims to describe existing AI applications in recruitment and explore their impact on hiring outcomes, efficiency, and fairness.

2. Data Collection Methods

● Primary Data:

Primary data were collected through structured questionnaires and semi-structured interviews. The target respondents included HR professionals, recruiters, and hiring managers from various industries. The survey gathered quantitative data on the use of AI tools, perceived benefits, and challenges, while interviews provided qualitative insights into personal experiences and organizational practices.

● Secondary Data:

Secondary data were collected from academic journals, industry reports, whitepapers, and case studies to support the findings from primary data and provide context for the analysis.

2. Sampling Technique

A purposive sampling method was used to select participants with direct experience in using or implementing AI in recruitment. A total of 51 respondents were surveyed, and 10 in-depth interviews were conducted with HR leaders from mid-sized to large enterprises.

4. DATA ANALYSIS TECHNIQUES

- **Quantitative Data:** Survey responses were analyzed using descriptive statistics such as frequency distributions, mean scores, and percentage analysis to summarize the use and effectiveness of AI tools in recruitment processes.
- **Qualitative Data:** Interview transcripts were analyzed using thematic analysis to identify recurring themes, patterns, and insights related to AI's role, ethical concerns, and future potential.

5. Limitations of the Study

- The sample size is limited and may not fully represent all industries or geographic regions.
- Self-reported data may be subject to bias or inaccuracies based on respondents' perceptions or organizational policies.
- The rapidly evolving nature of AI means findings may be time-sensitive.

6. Ethical Considerations

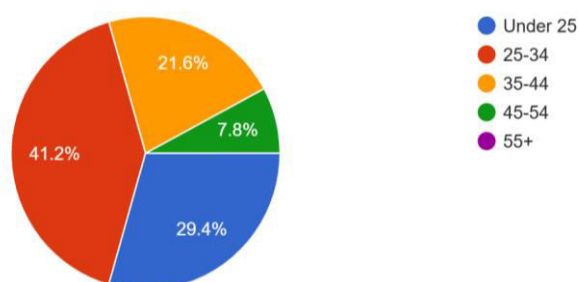
All participants were informed about the purpose of the study and gave their consent voluntarily. Confidentiality of responses was maintained, and data were used solely for academic and research purposes.

5. DATA ANALYSIS:

Table 1: Details of Age Group of Respondents

Age Group	No of Respondents	Percentage
Under 25 years	15	29.4%
26-34 years	21	41.2%
35-44 years	11	21.6%
45-55 years	4	7.8%
55 years +	0	-
Total	51	

Age
51 responses



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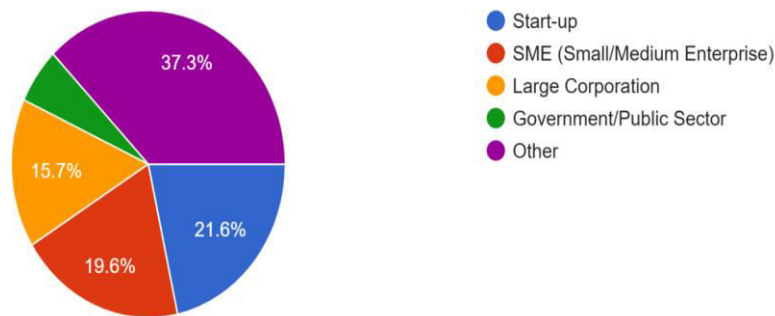
The majority of respondents are young adults, with 70.6% under the age of 35. Very few respondents are over 45, and none are over 55. This suggests a youthful demographic in the population surveyed, which may influence preferences, technology use, or communication styles.

Table 2: Organization Type

Organization Type	No of Respondents	Percentage
Start-up	11	21.6%
SME(Small/Medium Enterprise)	10	19.6%
Large Corporation	8	15.7%
Government/Public Sector	3	5.9%
Other	19	37.3%
Total	51	

Organization Type

51 responses

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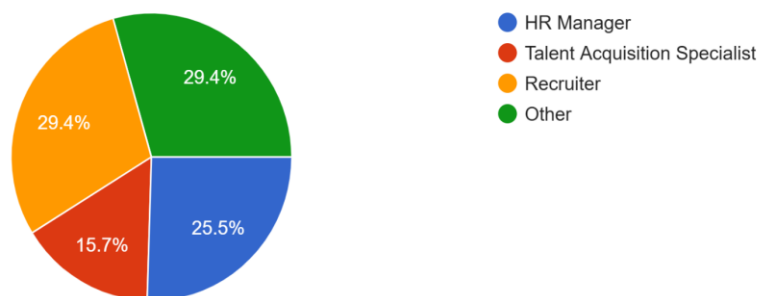
A diverse range of organizational backgrounds is represented. The “Other” category dominates the responses, suggesting a variety of less traditional or non-corporate affiliations. Combined, start-ups and SMEs account for over 40%, highlighting a strong small-business presence. Lower representation from the government sector may suggest limited engagement from public institutions.

Table 3: Position in Organization

Position in Organization	No of Respondents	Percentage
HR Manager	13	25.5%
Talent Acquisition Specialist	8	15.7%
Recruiter	15	29.4%
Other	15	29.4%
Total	51	

Position in Organization

51 responses

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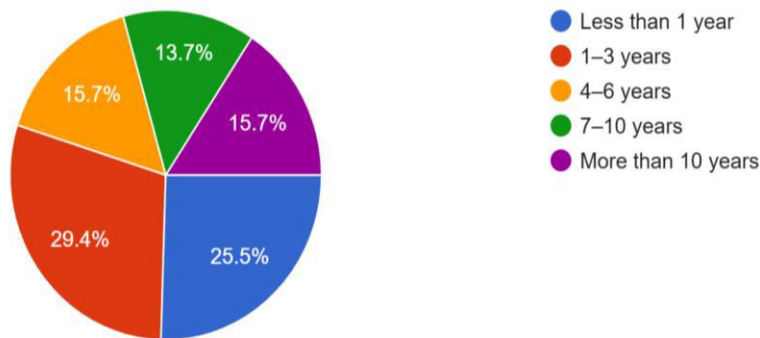
Recruiters and 'Other' positions dominate, each comprising 29.4% of responses. A balanced representation across different HR roles suggests a comprehensive view of talent-related practices and challenges.

Table 4: Years of Experience in Recruitment

Years of Experience in Recruitment	No of Respondents	Percentage
Less than 1 year	13	25.5%
1–3 years	15	29.4%
4–6 years	18	15.7%
7–10 years	7	13.7%
More than 10 years	8	15.7%
Total	51	

Years of Experience in Recruitment

51 responses



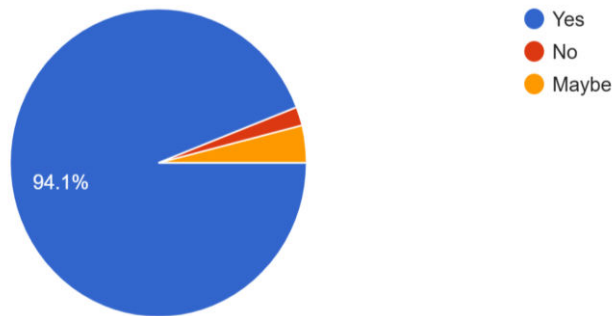
From above table it is Inferred as:
The majority (54.9%) of respondents have three years or less experience, showing a predominantly early-career audience. The lower percentages in higher experience brackets may imply a younger or more recently recruited HR/recruitment workforce. The presence of experienced professionals (10+ years) ensures that the data includes strategic insights along with emerging perspectives.

Table 5: Awareness of the use of Artificial Intelligence (AI) in recruitment processes

Awareness of the use of AI in recruitment process	No of Respondents	Percentage
Yes	48	94.1%
NO	2	3.9%
Maybe	1	2.0%
Total	51	

Are you aware of the use of Artificial Intelligence (AI) in recruitment processes?

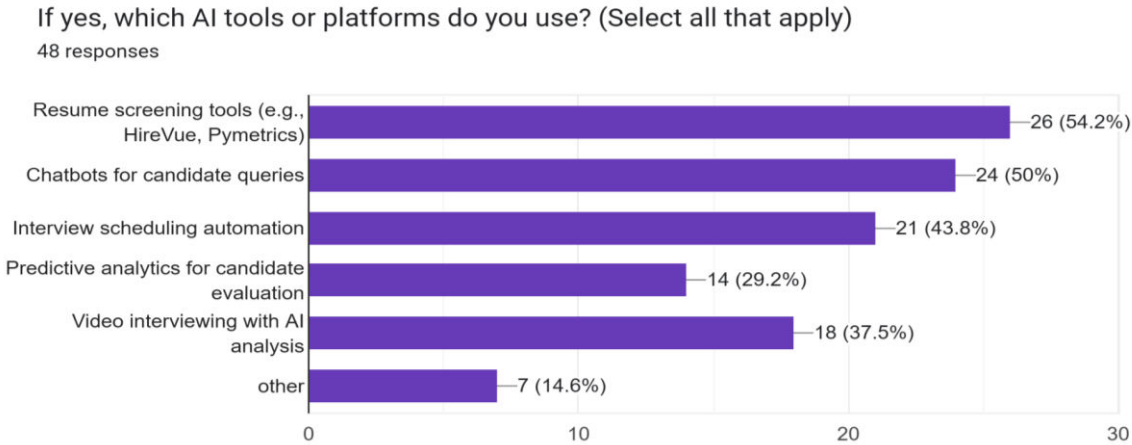
51 responses



From above table it is inferred as:
The 94.1% awareness rate strongly suggests that AI is a well-recognized concept among recruitment professionals. These results indicate that AI-driven recruitment tools and techniques are likely already integrated or discussed widely in their work environments. The low proportion of "No" and "Maybe" responses confirms that any implementation or training related to AI would not need to start from scratch for most professionals.

Table 6: Which AI tools or platforms do you use

which AI tools or platforms do you use	Percentage
Resume screening tools	54.2%
Chatbots for candidate queries	50%
Interview scheduling automation	43.8%
Predictive analytics for candidate evaluation	29.2%
Video interviewing with AI analysis	37.5%
Others	14.6%

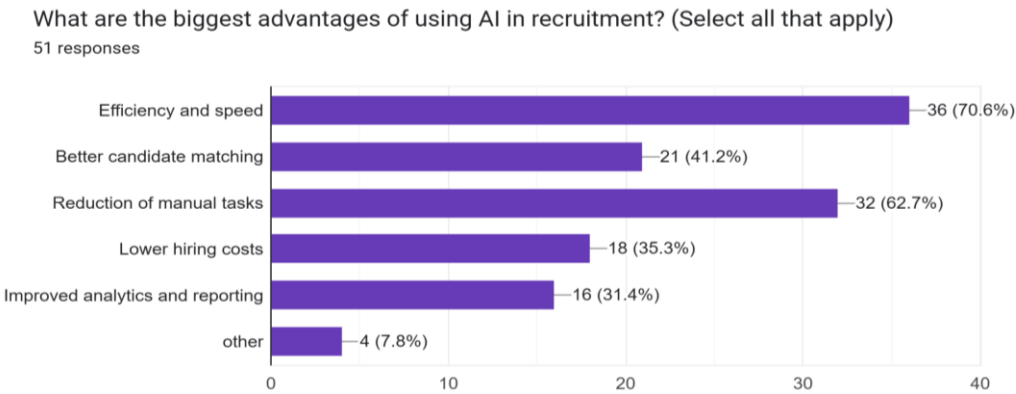


From above table it is inferred as:

The responses reflect a broad adoption of AI across multiple recruitment stages, particularly in screening, interaction, and scheduling. Resume screening and chatbots dominate usage, likely due to their maturity and ease of integration. The notable use of AI in video interviews and predictive analytics suggests a trend toward more data-driven and nuanced candidate evaluations.

Table 7: What are the biggest advantages of using AI in recruitment?

Advantages of using AI in recruitment	Percentage
Efficiency and speed	70.6%
Better candidate matching	41.2%
Reduction of manual tasks	62.7%
Lower hiring costs	35.3%
Improved analytics and reporting	31.4%
Others	7.8%



From above table it is inferred as:

Operational efficiency (speed and task automation) dominates as the core benefit of AI in recruitment. Strategic advantages like better matching and cost savings are also highly valued, but to a lesser extent. The recognition of analytics capabilities suggests a shift toward data-informed hiring strategies.

6.FINDINGS AND RECOMMENDATIONS :

6.1 Findings:

Based on the analysis of both primary and secondary data, the following key findings have emerged from the study on the role of Artificial Intelligence in the modern recruitment process:

1. A significant number of organizations have adopted AI-driven tools such as Applicant Tracking Systems (ATS), AI chatbots, resume screening software, and predictive analytics platforms to streamline recruitment processes.

2. Improved Efficiency and Speed as AI applications have substantially reduced the time-to-hire by automating repetitive tasks such as screening resumes, scheduling interviews, and responding to candidate queries.
3. Candidates reported improved interactions during the recruitment process, primarily due to instant responses from AI chatbots and faster application processing.
4. AI tools are perceived to reduce human biases in screening and selection; however, concerns remain about biases inherent in the data used to train these systems.
5. Respondents expressed uncertainty about how AI systems make decisions, raising issues of transparency and accountability in AI-powered hiring.
6. Data privacy and ethical considerations were significant concerns, particularly around the use of personal and behavioral data in AI algorithms.
7. While AI tools assist in operational tasks, HR professionals are shifting their focus toward strategic and relationship-oriented roles, indicating a transformation rather than elimination of human involvement.

6.2 Recommendations:

Based on the findings, the following recommendations are proposed for organizations considering or currently implementing AI in recruitment:

1. Adopt a Hybrid Approach by Combining AI capabilities with human judgment to ensure fairness, transparency, and empathy in hiring decisions.
2. Regularly Conduct audits of AI tools to identify and correct biases, improve accuracy, and ensure compliance with data protection regulations.
3. To Enhance Transparency need to Clearly communicate and train to candidates how AI is used in the recruitment process, including what data is collected and how decisions are made.
4. Collaborate with developers and ethicists to build AI systems that align with diversity, equity, and inclusion goals.
5. Train HR Teams with the necessary skills to work alongside AI tools effectively, interpret data insights, and manage technology ethically.
6. Gather and analyze feedback from candidates regarding their AI-driven recruitment experience to make continuous improvements.
7. Ensure Legal Compliance by Staying updated on evolving regulations around AI and employment practices to ensure full legal and ethical compliance.

CONCLUSION

AI is expected to continue evolving, with advancements in natural language processing and emotional intelligence potentially enabling more nuanced assessments of candidates. Integration with other HR technologies could lead to more holistic talent management systems. However, responsible use and continuous monitoring will be critical to ensuring AI supports, rather than replaces, human judgment.

AI is transforming the recruitment process, offering substantial benefits in terms of speed, efficiency, and fairness. While its implementation comes with challenges, particularly around ethics and transparency, the potential for positive impact is significant. Organizations must adopt AI thoughtfully, ensuring it complements human decision-making and aligns with broader organizational values.

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A STUDY ON MARKETING STRATEGIES FOR STRENGTHENING BRAND LOYALTY IN A COMPETITIVE MARKET ENVIRONMENT

Ms. Kritika Valecha and Ms. Poonam Jeswani

Assistant Professor, Vedanta College, Vithalwadi

ABSTRACT

In today's rapidly evolving and highly competitive market environment, building and maintaining brand loyalty has become a critical objective for businesses across industries. This study explores various marketing strategies adopted by both global and Indian brands to strengthen brand loyalty and ensure long-term customer retention. The research focuses on the role of emotional branding, personalized marketing, digital engagement, loyalty programs, and value-based positioning in cultivating lasting consumer relationships. Using secondary data sources, including industry reports, academic journals, and case studies, the study analyzes real-world examples of successful brands such as Apple, Amazon, McDonald's, Amul, and others. These brands demonstrate how aligning marketing strategies with customer expectations and cultural relevance can lead to sustained loyalty and competitive advantage. The findings reveal that brands that consistently deliver value, maintain authenticity, and foster emotional connections are more likely to retain loyal customers even in saturated markets. The study contributes to understanding how strategic marketing can act as a powerful tool to build brand equity and foster long-term consumer engagement.

Keywords: Brand Loyalty, Marketing Strategies, Customer Retention, Loyalty programs, Competitive Market.

INTRODUCTION

In the current fast-changing and highly competitive marketplace, establishing and sustaining strong brand loyalty has become an essential goal for companies across industries. Customers are constantly bombarded with an array of brand options, rendering it more difficult for firms to obtain long-term customer allegiance. Since the classic drivers of loyalty like product quality and price value are now becoming standard norms, brands are left with no choice but to use creative marketing approaches to generate emotional connections and habitual engagement from their target audience. Brand loyalty, which refers to a customer's habitual choice and loyalty in re-buying a specific brand, is key to generating continued business growth. Repeat customers, in addition to generating repeat business, serve as brand ambassadors, persuading others through word of mouth and customer-generated content. Yet, in a fast-changing marketplace driven by digital disruption, escalating customer expectations, and plethora of options, loyal customers need more than providing a good product or service to retain. This research study seeks to analyze the best marketing tactics that should be pursued by brands to maximize their customer loyalty. It seeks to understand how personalized marketing, emotional branding, customer relationship management (CRM), and digital engagement tools help build brand affinity. Additionally, it seeks to understand how brands should differentiate themselves through offering consistent value and authentic experiences so that they can create a sense of trust and emotional attachment with consumers. Through the analysis of actual case studies and industry trends, this study aims to provide useful insights for marketers who want to build long-term customer relationships in a more competitive environment. Building brand loyalty is not just a marketing objective—it is a strategic necessity that can give companies a sustainable competitive edge.

OBJECTIVES

1. To examine the concept of brand loyalty and its importance in sustaining business growth within competitive markets.
2. To identify and analyze the marketing strategies most commonly employed by brands to strengthen customer loyalty.
3. To evaluate the effectiveness of various marketing tools—such as loyalty programs, digital marketing, and emotional branding—in fostering brand loyalty.
4. To provide strategic recommendations for businesses aiming to build and maintain brand loyalty in highly competitive environments.

HYPOTHESIS:

H0: There is no significant relationship between marketing strategies and the strengthening of brand loyalty in a competitive market environment.

H1: Effective marketing strategies have a significant positive impact on strengthening brand loyalty in a competitive market environment.

RESEARCH METHODOLOGY:

The present study focuses on the examination of marketing strategies used to strengthen brand loyalty in a highly competitive market environment. The objective of this research is to critically analyse how various strategic marketing approaches—such as personalized marketing, emotional branding, loyalty programs, and digital engagement—contribute to the development and retention of customer loyalty across different industries.

This study will primarily rely on secondary data sources gathered from scholarly journals, academic literature, industry reports, business case studies, and publications from recognized marketing and consumer research institutions. Secondary data will provide insights into existing models, frameworks, and real-world applications of loyalty-focused marketing strategies, as well as their outcomes in competitive settings.

By analysing the case studies, previously published research, market analysis, and brand performance data, the study aims to identify patterns and evaluate the effectiveness of marketing efforts in fostering long-term consumer loyalty. This secondary data approach allows for a comprehensive understanding of both the opportunities and challenges businesses face when building brand loyalty in an environment where customer attention is highly contested.

REVIEW OF LITERATURE

In today's competitive market, brand loyalty plays a crucial role in ensuring the long-term success of businesses. Companies use various marketing strategies to strengthen this loyalty, aiming to build strong emotional connections and consistent customer satisfaction. Some glimpses of the work done by the various researchers in this subject matter are as listed below:

1. Goyal, A., & Verma, P. (2022). The Relationship Between Brand Engagement, Brand Loyalty, Overall Brand Equity, and Purchase Intention

This study explores the interconnections between brand engagement, loyalty, equity, and purchase intention. It finds that brand engagement positively affects brand loyalty, which in turn enhances overall brand equity and purchase intention, emphasizing the importance of engaging customers to build brand loyalty.

2. Nair, J. G. (2023). Creating Brand Loyalty: Role of Brand Love, Trust, Product Quality, and Customer Service on Customer Engagement Among Social Media Users

Nair examines how emotional connections (brand love), trust, product quality, and customer service influence brand loyalty through customer engagement on social media platforms. The study concludes that fostering emotional and trust-based relationships with customers can significantly enhance brand loyalty.

3. Advani, J. Y., & Ramesh Kumar, S. (2005). Factors Affecting Brand Loyalty: A Study in an Emerging Market on Fast-Moving Consumer Goods

This research identifies key factors such as perceived quality, brand awareness, and brand association that influence brand loyalty in the Indian FMCG sector. The study suggests that marketers should focus on these elements to build and maintain customer loyalty in a competitive market.

4. Bindu, M., Additi, & Abhinay. (2023). The Brand Loyalty and Marketing Strategies of Haldiram India

This paper analyzes Haldiram's marketing strategies, focusing on product quality, cultural relevance, and customer engagement. The study demonstrates how Haldiram has successfully built brand loyalty by aligning its offerings with consumer values and preferences

5. Patel, M. K., & Dr. Mahesh K. (2020). A Study on Brand Loyalty of the Customers Towards Online Shopping Sites in Ahmedabad District, Gujarat

The research investigates factors influencing brand loyalty among online shoppers in Ahmedabad, identifying trust, website quality, and customer service as critical determinants. The study suggests that enhancing these factors can strengthen brand loyalty in the e-commerce sector.

REAL WORLD EXAMPLES OF BRANDS

1. Apple – Emotional Branding & Ecosystem Integration

Strategy Used:

Apple creates strong emotional connections with its customers through sleek design, simplicity, and a lifestyle-oriented brand message. It also uses a powerful ecosystem strategy—iPhone, Mac, Apple Watch, and iCloud are all interconnected, making it convenient for customers to stay within the Apple brand family.

Impact on Brand Loyalty:

This emotional and functional integration fosters high brand loyalty, with many customers choosing Apple repeatedly despite premium pricing.

2. Starbucks – Personalization & Customer Rewards**Strategy Used:**

Starbucks uses its mobile app to personalize customer experiences, suggest favorite orders, and offer rewards. The Starbucks Rewards Program allows users to earn points ("stars") and redeem them for free drinks and food.

Impact on Brand Loyalty:

This mix of personalization and incentives keeps customers engaged and encourages repeat visits.

3. Amazon – Customer-Centric Approach & Prime Membership**Strategy Used:**

Amazon focuses on exceptional customer service, fast delivery, and personalized recommendations. Its Prime membership adds value through free shipping, streaming, and exclusive deals.

Impact on Brand Loyalty:

These benefits create a high level of convenience and perceived value, leading to strong customer retention.

4. Nike – Community Engagement & Brand Purpose**Strategy Used:**

Nike builds brand loyalty through powerful storytelling, influencer partnerships, and purpose-driven campaigns (e.g., supporting athletes, promoting diversity). Nike Training Club and Nike Run Club apps also help build community.

Impact on Brand Loyalty:

This emotional and motivational branding builds trust and connection, especially among younger audiences.

5. McDonald's India – Localization & Value-Based Menus

Marketing Strategy: McDonald's India uses a highly localized approach to cater to Indian tastes and preferences. They introduced exclusive menu items like the McAloo Tikki Burger, Paneer Wraps, and Masala Wedges to suit vegetarian and regional preferences. They also run value meals like "Happy Price Menu" and promote through combo offers, limited-time menus, and youth-targeted ads. Their McDelivery app offers loyalty points and easy access to reordering.

Impact on Brand Loyalty:

By offering affordable pricing, consistent taste, and customized options, McDonald's has become a go-to choice, especially for students and families. Their localized menu, focus on quick service, and growing digital loyalty programs help retain customers who associate the brand with reliability, speed, and value.

6. Amul – Consistent Branding and Emotional Appeal

Marketing Strategy: Amul has established itself as a household name in India through its consistent and memorable branding. The brand's use of the Amul Girl mascot in humorous and topical advertisements has created an emotional connection with the audience. By addressing current events, social issues, and entertainment in a witty and relatable way, Amul has managed to stay relevant and top-of-mind for consumers. Additionally, Amul's commitment to quality dairy products at affordable prices has made it a trusted name in Indian homes.

Impact on Brand Loyalty:

Amul's marketing strategies have fostered strong brand loyalty, particularly by leveraging humor and cultural relevance in its advertisements. Customers feel an emotional bond with the brand, associating it not just with dairy products but with tradition, trust, and community. The consistency of Amul's branding, combined with its wide product range, ensures repeat purchases. Amul's strong presence in both rural and urban markets further solidifies its customer base, making it a brand that people rely on across generations.

OBSERVATIONS AND FINDINGS BASED ON REAL WORLD EXAMPLES:**1. Apple – Premium Branding and Ecosystem Lock-In**

Observation: Apple builds loyalty through a seamless product ecosystem (iPhone, Mac, iCloud, AirPods) and premium user experience.

Finding: Customers remain loyal not just because of product quality, but because they are integrated into a connected ecosystem that makes switching difficult and undesirable.

2. Starbucks – Personalized Engagement and Consistency

Observation: Starbucks uses a highly personalized rewards program, mobile app engagement, and a consistent café experience worldwide.

Finding: The sense of familiarity, convenience, and personalized treatment (like custom drinks, names on cups, rewards) creates a strong emotional bond and encourages repeat visits.

3. Amazon – Convenience, Trust, and Customer-Centricity

Observation: Amazon focuses heavily on fast delivery, customer service, and Prime membership benefits to create value.

Finding: Its customer-first approach, wide product range, and Prime loyalty program lock users into the platform and make them less likely to shop elsewhere.

4. Nike – Lifestyle Branding and Emotional Marketing

Observation: Nike markets itself not just as a sportswear brand, but as a symbol of aspiration, empowerment, and performance.

Finding: The "Just Do It" message and endorsements from athletes build an emotional connection with consumers, making them loyal to the brand and what it represents.

5. McDonald's – Localization and Consistency

Observation: McDonald's adapts its menu for different countries while maintaining consistent service and quality.

Finding: The balance of familiarity and local flavor, plus affordable pricing and accessibility, ensures a broad customer base with strong loyalty.

6. Amul – Cultural Relevance and Consistent Identity

Observation: Amul uses topical, witty ads and positions itself as a part of Indian culture and tradition.

Finding: Amul has built generational loyalty through emotional branding, consistent quality, and deep cultural integration, especially through its Amul Girl mascot.

FINDINGS OF STUDY:-

1. Emotional branding significantly enhances customer loyalty by fostering strong emotional connections, which lead to long-term brand allegiance.
2. Personalized marketing strategies such as tailored offers and individualized communications improve customer retention rates and strengthen brand loyalty.
3. Omnichannel marketing strategies have been found to increase customer engagement and loyalty by providing a seamless and consistent brand experience across both online and offline platforms.
4. Loyalty programs that offer rewards, discounts, or exclusive benefits play a key role in encouraging repeat purchases and bolstering brand loyalty.
5. Brand trust is a fundamental driver of brand loyalty, with customers remaining loyal to brands they trust, particularly when brands are transparent and consistently fulfill their promises.
6. Active engagement on social media platforms helps brands build loyal communities, with customers feeling more connected and engaged with the brand through regular interactions.
7. Customer experience (both online and offline) is a critical factor, with positive experiences directly influencing repeat purchases and brand advocacy, thus strengthening brand loyalty.
8. Consistency in brand messaging and values across all marketing channels is essential for maintaining a strong brand identity and reinforcing customer loyalty.
9. Cultural relevance in marketing and product offerings has been shown to increase brand loyalty, especially when brands cater to local consumer preferences and values.

These findings highlight the significance of adopting customer-centric and adaptive marketing strategies to cultivate and sustain brand loyalty in competitive market environments.

CONCLUSION

The study concludes that in today's competitive market environment, adopting the right marketing strategies is essential for building and sustaining brand loyalty. Among the most effective strategies are emotional branding, which creates meaningful connections with consumers, and personalized marketing, which makes customers feel recognized and valued. Loyalty programs offering rewards and exclusive benefits also play a crucial role in encouraging repeat purchases and long-term commitment. Omni channel marketing, which ensures a seamless customer experience across both online and offline platforms, has emerged as a key strategy for enhancing brand engagement. Additionally, consistent brand messaging and strong digital presence, particularly through social media, help brands stay connected with their audience and maintain trust. Cultural relevance and localized marketing further enhance consumer relationships, especially in diverse markets like India. These strategies, when used thoughtfully and in combination, give brands a competitive edge by increasing customer satisfaction, trust, and emotional attachment. The study emphasizes that businesses must continue to adapt their marketing efforts to meet changing consumer expectations, using technology and data-driven insights to refine their approach. Ultimately, a strategic, customer-focused marketing plan is essential for strengthening brand loyalty in a fast-paced and competitive market.

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FACTORS AFFECTING THE QUALITY OF SERVICES FROM PATIENT'S EXPERIENCE AT DHIRAJ HOSPITAL, VADODARA: A CROSS SECTIONAL STUDY

Ms. Malek Nagmabanu Iqbal¹, Ms. Pooja Shashikant Chavan² and Dr. Medha Wadhwa^{3*}

¹MBA Healthcare staff, Sumandeep Vidyapeeth deemed to be University.

²Tutor, Department of Paramedical Sciences, Sumandeep Vidyapeeth deemed to be University.

³Assistant Professor, Indian Institute of Public Health Gandhinagar, Gujarat, India

ABSTRACT

This cross-sectional study was conducted to assess the factors affecting the quality of healthcare services from the patient's perspective at Dhiraj Hospital, Piparia, Waghodia, Vadodara. This research aimed to explore various dimensions of hospital services and their impact on patient experiences. The study utilized a structured, closed-ended questionnaire based on the SERVQUAL model, covering aspects such as tangibility, reliability, responsiveness, assurance, and empathy. Data was collected from patients who visited the hospital during the study period, and analysed using statistical tools to identify critical service gaps. The Findings highlighted that while patients expressed satisfaction with medical expertise, availability of services, and infrastructure, there were concerns related to staff responsiveness, waiting time, and communication. The study also revealed demographic factors like age, gender, and education level influenced perceptions of service quality. Recommendations include improving staff training, enhancing communication protocols, and streamlining service processes to foster a more patient-centric approach. This research offers valuable insights for hospital administrators to understand patient expectations and improve healthcare delivery. The findings can be used as a reference for policy-making and quality improvement strategies in similar healthcare settings.

Keywords: Patient Satisfaction, Healthcare Quality, SERVQUAL Model, Quality improvement, patient experience

INTRODUCTION

The escalating cost of healthcare necessitates a focus on patient satisfaction as a key strategy for medical practices to remain viable (1). This is because satisfied patients contribute to increased productivity and reduced operational costs. Patient experience surveys are crucial tools for evaluating and improving service quality, offering a pathway to enhanced patient care and financial stability.

Patient experience surveys provide actionable insights for healthcare providers. They facilitate direct communication with patients, enabling the identification and resolution of process inefficiencies (1). Furthermore, these surveys offer statistically valid data that supports informed decision-making and fosters stronger patient relationships, which can lead to positive word-of-mouth referrals (1). As the healthcare industry shifts towards patient-centered models, the data gleaned from these surveys becomes increasingly valuable for driving improvements and maintaining a competitive edge.

The implementation of patient experience surveys yields tangible benefits for medical practices. By quantifying problem areas and benchmark performance, these surveys enable healthcare management to hold medical professionals accountable and demonstrate the quality of care to accrediting bodies (1). Ultimately, prioritizing patient satisfaction through the use of surveys is essential for the sustainable growth and success of any medical practice.

REVIEW OF LITERATURE

Several studies have examined key factors affecting quality of care and patient experience across different healthcare settings and populations. explored predictors of quality of life among older adults in long-term care hospitals in South Korea, identifying cognitive function, care dependency, and depression as significant factors, with depression and care dependency accounting for 25.7% of the variance in quality of life.

Feiring and Westdahl (2020) highlighted barriers to interpreter use in hospitals across Austria and Norway, noting that remote video interpretation improved access and confidentiality but introduced communication challenges. **Hussain et al. (2019)** assessed patient satisfaction in public hospitals in Pakistan, finding that pharmacy and laboratory services had significant positive effects, while doctor-patient communication and physical facilities were lacking.

Hu et al. (2019) evaluated China's National Healthcare Improvement Initiative, demonstrating moderate improvements in patient experience, especially in clinical care, though environmental and interpersonal aspects lagged. Humanistic care and institutional factors such as hospital type and regional economic development were strongly associated with positive experiences.

Similarly, **Kalaja et al. (2016)** used the SERVQUAL model in Albania, confirming alignment between patient expectations and perceptions across five service dimensions.

Pouragha and Zarei (2016) noted that in Iranian teaching hospitals, patient satisfaction was primarily driven by service affordability, physician interaction, environment, and information provision. **Messina et al. (2015)** found that in an Italian emergency department, patient satisfaction was positively influenced by communication about delays and negatively affected by long wait times.

Pini et al. (2014) assessed cancer patient satisfaction in Greece, noting high satisfaction with doctor interactions but dissatisfaction with scheduling inefficiencies and long wait times. These findings underscore the importance of timely communication, staff-patient trust, and effective use of patient feedback in improving healthcare quality and patient experience.

Ng et al. (2013) reviewed literature on hospital accreditation, highlighting how implementation is shaped by various stakeholders and how accreditation contributes to quality improvement. **Naidu (2009)** proposed a conceptual model showing patient satisfaction as a multidimensional construct influenced by healthcare quality, which in turn impacts patient loyalty. **Davies and Cleary (2005)** emphasized organizational, professional, and data-related barriers to using patient survey data for quality improvement, stressing the need for a supportive culture and leadership.

Saeed (1998) identified five key factors influencing hospital choice—administrative efficiency, service quality, hospital image, cost, and insurance—also noting the significant role of socio-demographic characteristics. Together, these studies underscore the complex interplay of organizational systems, patient perceptions, and external factors in shaping healthcare quality and satisfaction.

RESEARCH PROBLEM

The research problem identified is the need to optimize resources and improve service quality in the face of rising healthcare costs and operational challenges, with a focus on enhancing patient satisfaction within medical practices

OBJECTIVES

To assess the quality of care provided to patients in light of their experiences, and to look into any relevant issues.

RESEARCH METHODOLOGY

The study's data collection depends on the number of patients willing to participate. A **simple random sampling** method was used, and a **structured, closed-ended questionnaire** was administered to patients. Responses were recorded in **MS Excel** and analyzed based on patient feedback.

Content validity was confirmed by five experts, resulting in a **Content Validity Ratio (CVR) of 0.95**. Two experts suggested changes, which were incorporated. The questionnaire's **reliability** was tested using **Cronbach's alpha (0.87; $p = 0.015$)**, indicating high internal consistency. After a **pilot study with 20 respondents**, the **Spearman rank correlation coefficient** was found to be **1.0 ($p = 0.005$)**, indicating high validity.

Data Analysis: The data analysis section of the document provides a detailed breakdown of patient demographics and satisfaction ratings across various service areas. Here's a summary of the key findings:

1. Patient Demographics:

Age: The study included patients across a range of age groups, with 28.4% between 21-30 years, 22.2% between 31-40 years, 20.7% between 41-50 years, and 28.7% being older than 50 years.

- **Gender:** The sample consisted of 54.8% male and 45.2% female patients.
- **Marital Status:** The majority of patients were married (83.5%), with 13.4% unmarried and smaller percentages of divorced (1.5%), separated (0.8%), and widowed (0.8%).

2. Patient Satisfaction:

The study measured patient satisfaction across various aspects of the hospital experience, using a rating scale that included "Excellent," "Very Good," "Good," "Fair," and "Poor." Here are some highlights:

- **Appointment Booking:** A high percentage (85.8%) of patients rated the ease of making appointments by phone as "Excellent".

- **Appointment Availability:** While 41.8% rated the availability of appointments within a reasonable time as "Excellent," a significant portion (52.5%) rated it as "Very Good".
- **Timeliness of Care:** 56.3% of patients felt they received care for their illness/injury as soon as they wanted it ("Excellent").
- **After-Hours Care:** 45.6% rated after-hours care as "Excellent" and 47.1% as "Very Good".
- **Check-in Efficiency:** 59.4% of patients rated the check-in process as "Excellent".
- **Waiting Times:**
 - Reception area: 51.7% "Excellent" and 43.3% "Very Good".
 - Exam room: 51.0% "Excellent" and 41.0% "Very Good".
 - Communication about delays: 49.0% "Excellent" and 41.8% "Very Good".
- **Referrals:** 54.8% of patients rated the ease of getting a referral as "Excellent".
- **Staff Courtesy and Helpfulness:**
 - Phone staff: 62.8% rated the courtesy of the person who took their call as "Excellent".
 - Receptionists: 50.2% rated the friendliness and courtesy of receptionists as "Excellent" and 43.7% as "Very Good".
 - Nurses/medical assistants: 52.5% rated their caring concern as "Excellent".
 - Billing staff: 49.0% rated the helpfulness of billing/insurance staff as "Excellent" and 41.8% as "Very Good".
 - Lab/x-ray staff: 54.4% rated their professionalism as "Excellent".
- **Communication and Information:**
 - Phone calls answered promptly: 67.8% "Excellent".
 - Advice/help during office hours: 45.6% "Excellent" and 48.3% "Very Good".
 - Explanation of procedures: 51.7% "Excellent".
 - Test results reported promptly: 48.3% "Excellent" and 44.4% "Very Good".
 - Effectiveness of health information: 56.7% "Excellent".
 - Timely call returns: 46.0% "Excellent" and 44.8% "Very Good".

3. Statistical Analysis of Patient Perception:

The study also included statistical analyses to determine if patient perceptions varied based on gender, age, or marital status.

Table:-1 Mann-Whitney Test with respect to Gender

Ranks						
	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	P Value
1. Ease of making appointment by phone?	Male	143	128.09	18317.50	8021.500	.258
	Female	118	134.52	15873.50		
2. Appointment available within a reasonable amount of time?	Male	143	133.22	19050.50	8119.500	.554
	Female	118	128.31	15140.50		
3. Getting care for illness/injury as soon as you wanted it?	Male	143	127.23	18194.00	7898.000	.312
	Female	118	135.57	15997.00		
4. Getting after- hours care when you needed it?	Male	143	130.78	18702.00	8406.000	.954
	Female	118	131.26	15489.00		
5. The efficiency of the check-	Male	143	130.05	18597.50		

in process?	Female	118	132.15	15593.50	8301.500	.797
6. Waiting time in the reception area?	Male	143	126.58	18100.50	7804.500	.238
	Female	118	136.36	16090.50		
7. Waiting time in the exam room?	Male	143	131.05	18739.50	8430.500	.990
	Female	118	130.94	15451.50		
8. Keeping you informed if your appointment time was delayed?	Male	143	127.26	18197.50	7901.500	.327
	Female	118	135.54	15993.50		
9. Ease of getting a referral when you needed one?	Male	143	129.18	18473.00	8177.000	.628
	Female	118	133.20	15718.00		
1. The courtesy of the person who took your call?	Male	143	131.53	18808.50	8361.500	.883
	Female	118	130.36	15382.50		
2. The friendliness and courtesy of the receptionist?	Male	143	130.90	18718.00	8422.000	.978
	Female	118	131.13	15473.00		
3. The caring concern of our nurses / medical assistants?	Male	143	132.89	19003.50	8166.500	.615
	Female	118	128.71	15187.50		
4. The helpfulness of the people who assisted you with billing of insurance?	Male	143	134.49	19231.50	7938.500	.361
	Female	118	126.78	14959.50		
5. The professionalism of our lab or x-ray staff ?	Male	143	131.82	18850.50	8319.500	.824
	Female	118	130.00	15340.50		
1. Your phone calls answered promptly?	Male	143	133.50	19090.00	8080.000	.472
	Female	118	127.97	15101.00		
2. Getting advice or help when needed during office hours?	Male	143	128.61	18391.50	8095.500	.527
	Female	118	133.89	15799.50		
3. Explanation of your procedure?	Male	143	128.13	18322.00	8026.000	.447
	Female	118	134.48	15869.00		
4. Your test results reported in a reasonable amount of time?	Male	143	129.58	18529.50	8233.500	.708
	Female	118	132.72	15661.50		
5. Effectiveness of our health information materials?	Male	143	138.30	19776.50	7393.500	.050
	Female	118	122.16	14414.50		
6. Our ability to return your calls in a timely manner?	Male	143	128.45	18368.50	8072.500	.505
	Female	118	134.09	15822.50		

Gender: The analysis found no statistically significant difference in patient perception with respect to gender across various service quality dimensions.

Table:-2 Kruskal-Wallis Test with respect to Age

Ranks					
	Age	N	Mean Rank	Chi Square Value	P Value
1. Ease of making appointment by phone?	21-30 Years	74	126.70	4.968	.174
	31-40 Years	58	137.28		
	41-50 Years	54	139.12		
	More than 50 Years	75	124.54		
2. Appointment available within a reasonable amount of time?	21-30 Years	74	138.84	22.822	.000
	31-40 Years	58	141.72		
	41-50 Years	54	150.92		
	More than 50 Years	75	100.64		
3. Getting care for illness/injury as soon as you	21-30 Years	74	137.81		
	31-40 Years	58	153.02		

wanted it?	41-50 Years	54	124.39	13.866	.003
	More than 50 Years	75	112.01		
4. Getting after- hours care when you needed it?	21-30 Years	74	130.30	7.203	.066
	31-40 Years	58	141.18		
	41-50 Years	54	143.08		
	More than 50 Years	75	115.12		
5. The efficiency of the check-in process?	21-30 Years	74	134.54	5.941	.115
	31-40 Years	58	139.27		
	41-50 Years	54	138.52		
	More than 50 Years	75	115.70		
6. Waiting time in the reception area?	21-30 Years	74	141.73	14.390	.002
	31-40 Years	58	144.97		
	41-50 Years	54	134.71		
	More than 50 Years	75	106.94		
7. Waiting time in the exam room?	21-30 Years	74	140.49	15.290	.002
	31-40 Years	58	143.91		
	41-50 Years	54	139.68		
	More than 50 Years	75	105.40		
8. Keeping you informed if your appointment time was delayed?	21-30 Years	74	141.49	18.001	.000
	31-40 Years	58	151.17		
	41-50 Years	54	131.24		
	More than 50 Years	75	104.87		
9. Ease of getting a referral when you needed one?	21-30 Years	74	141.19	17.098	.001
	31-40 Years	58	144.48		
	41-50 Years	54	139.77		
	More than 50 Years	75	104.21		
1. The courtesy of the person who took your call?	21-30 Years	74	135.26	9.367	.025
	31-40 Years	58	138.59		
	41-50 Years	54	142.86		
	More than 50 Years	75	112.38		
2. The friendliness and courtesy of the receptionist?	21-30 Years	74	140.85	16.531	.001
	31-40 Years	58	144.22		
	41-50 Years	54	140.09		
	More than 50 Years	75	104.51		
3. The caring concern of our nurses / medical assistants?	21-30 Years	74	126.12	13.968	.003
	31-40 Years	58	142.95		
	41-50 Years	54	151.98		
	More than 50 Years	75	111.47		
4. The helpfulness of the people who assisted you with billing of insurance?	21-30 Years	74	130.89	10.575	.014
	31-40 Years	58	145.78		
	41-50 Years	54	142.53		
	More than 50 Years	75	111.38		
5. The professionalism of our lab or x-ray staff?	21-30 Years	74	128.31		
	31-40 Years	58	151.76		

	41-50 Years	54	134.51	10.493	.015
	More than 50 Years	75	115.07		
1. Your phone calls answered promptly?	21-30 Years	74	132.26	6.051	.109
	31-40 Years	58	142.84		
	41-50 Years	54	135.39		
	More than 50 Years	75	117.44		
2. Getting advice or help when needed during office hours?	21-30 Years	74	131.93	12.091	.007
	31-40 Years	58	147.23		
	41-50 Years	54	141.54		
	More than 50 Years	75	109.94		
3. Explanation of your procedure?	21-30 Years	74	136.13	2.734	.434
	31-40 Years	58	123.38		
	41-50 Years	54	140.16		
	More than 50 Years	75	125.24		
4. Your test results reported in a reasonable amount of time?	21-30 Years	74	133.74	7.124	.068
	31-40 Years	58	132.79		
	41-50 Years	54	146.89		
	More than 50 Years	75	115.47		
5. Effectiveness of our health information materials?	21-30 Years	74	122.58	11.715	.008
	31-40 Years	58	144.41		
	41-50 Years	54	149.35		
	More than 50 Years	75	115.73		
6. Our ability to return your calls in a timely manner?	21-30 Years	74	129.03	8.179	.042
	31-40 Years	58	143.84		
	41-50 Years	54	142.83		
	More than 50 Years	75	114.49		

- **Age:** While there were some variations in mean rank scores across age groups, statistical significance was not always found. For some service aspects (e.g., "Appointment available within a reasonable amount of time," "getting care for illness/injury as soon as you wanted it," waiting times, and "Ease of getting a referral"), statistically significant differences were observed, indicating that age may influence patient perceptions in these areas.

Table:-5 Kruskal-Wallis Test with respect to Marital Status

Ranks					
	Marital Status:-	N	Mean Rank	Chi-Square	P Value
1. Ease of making appointment by phone?	Married	218	131.61	4.191	.381
	Unmarried	35	127.24		
	Divorced	4	112.50		
	Separated	2	112.50		
	Widowed	2	186.25		
2. Appointment available within a reasonable amount of time?	Married	218	129.88	5.668	.225
	Unmarried	35	126.06		
	Divorced	4	198.63		
	Separated	2	178.00		
	Widowed	2	157.75		
3. Getting care for illness/injury as soon as you	Married	218	127.27		
	Unmarried	35	138.10		

wanted it?	Divorced	4	237.88	13.385	.010
	Separated	2	134.75		
	Widowed	2	195.50		
4. Getting after- hours care when you needed it?	Married	218	129.74	12.265	.015
	Unmarried	35	121.36		
	Divorced	4	198.63		
	Separated	2	181.00		
	Widowed	2	251.50		
5. The efficiency of the check-in process?	Married	218	129.91	10.107	.039
	Unmarried	35	127.40		
	Divorced	4	214.38		
	Separated	2	199.00		
	Widowed	2	78.00		
6. Waiting time in the reception area?	Married	218	130.06	.905	.924
	Unmarried	35	133.54		
	Divorced	4	161.00		
	Separated	2	130.00		
	Widowed	2	130.00		
7. Waiting time in the exam room?	Married	218	128.39	2.279	.685
	Unmarried	35	146.36		
	Divorced	4	142.88		
	Separated	2	127.00		
	Widowed	2	127.00		
8. Keeping you informed if your appointment time was delayed?	Married	218	127.47	13.289	.010
	Unmarried	35	136.67		
	Divorced	4	232.13		
	Separated	2	123.75		
	Widowed	2	221.50		
9. Ease of getting a referral when you needed one?	Married	218	124.75	21.372	.000
	Unmarried	35	151.06		
	Divorced	4	236.00		
	Separated	2	132.25		
	Widowed	2	250.50		
1. The courtesy of the person who took your call?	Married	218	132.47	1.248	.870
	Unmarried	35	122.27		
	Divorced	4	113.63		
	Separated	2	144.75		
	Widowed	2	144.75		
2. The friendliness and courtesy of the receptionist?	Married	218	131.71	1.920	.751
	Unmarried	35	130.94		
	Divorced	4	127.25		
	Separated	2	127.25		
	Widowed	2	66.00		
3. The caring concern of our nurses / medical assistants?	Married	218	132.27	2.604	.626
	Unmarried	35	118.00		
	Divorced	4	160.88		
	Separated	2	130.25		
	Widowed	2	161.00		
4. The helpfulness of the people who assisted you with billing of insurance?	Married	218	129.56	4.570	.334
	Unmarried	35	131.10		
	Divorced	4	169.88		
	Separated	2	123.75		
	Widowed	2	216.00		
5. The professionalism of our lab or x-ray staff?	Married	218	131.84		
	Unmarried	35	128.00		

	Divorced	4	74.00	5.351	.253
	Separated	2	137.00		
	Widowed	2	200.00		
1. Your phone calls answered promptly?	Married	218	131.76	1.332	.856
	Unmarried	35	128.86		
	Divorced	4	119.75		
	Separated	2	150.50		
	Widowed	2	89.00		
2. Getting advice or help when needed during office hours?	Married	218	132.52	7.124	.129
	Unmarried	35	114.51		
	Divorced	4	121.25		
	Separated	2	182.50		
	Widowed	2	221.75		
3. Explanation of your procedure?	Married	218	130.83	1.504	.826
	Unmarried	35	129.39		
	Divorced	4	127.50		
	Separated	2	188.50		
	Widowed	2	127.50		
4. Your test results reported in a reasonable amount of time?	Married	218	131.98	5.732	.220
	Unmarried	35	124.56		
	Divorced	4	124.00		
	Separated	2	63.50		
	Widowed	2	218.00		
5. Effectiveness of our health information materials?	Married	218	132.16	3.849	.427
	Unmarried	35	121.21		
	Divorced	4	165.63		
	Separated	2	74.50		
	Widowed	2	163.00		
6. Our ability to return your calls in a timely manner?	Married	218	134.48	6.132	.190
	Unmarried	35	118.64		
	Divorced	4	119.75		
	Separated	2	60.50		
	Widowed	2	60.50		

MARITAL STATUS

Similar to age, some service aspects showed statistically significant differences in patient perception based on marital status (e.g., "Getting care for illness/injury as soon as you wanted it," "Keeping you informed if your appointment time was delayed," and "Ease of getting a referral").

This data analysis provides valuable insights into patient satisfaction and helps identify areas where the hospital is performing well and areas that may need improvement.

CONCLUSION

The Present study strongly indicates the importance of service quality in a hospital setting. Patients across all age groups and genders generally express high satisfaction with the services provided and are likely to value good quality care.

Furthermore, patient interest in the hospital appears to be positively influenced by the perception of excellent service quality. Importantly, the study suggests that patient perceptions of service quality do not significantly differ based on gender or age. Satisfied patients are also likely to provide positive recommendations to others considering treatment at this hospital.

SUGGESTION & FINDINGS

The improvement of the quality of care can be accomplished by connecting patient reports to each stage of the patient experience, according to research. The hospital should carefully select and thoroughly train front desk personnel to ensure positive patient interactions. Existing high standards for cleanliness, amenities, and food services should be consistently maintained. Developing competitive pricing strategies is necessary for the hospital. While most patients experience reasonable admission wait times, the hospital needs to address the

causes of longer waits for a significant minority. Efforts should be directed towards improving the experience of patients giving fair or poor ratings to foster more positive recommendations.

The hospital needs to investigate the reasons behind average overall ratings to identify areas for improvement in the quality of care. Action should be taken on all patient feedback to consistently meet their needs and provide the highest quality of care.

The hospital should strongly emphasize effective teamwork and coordination to deliver high-quality services, particularly focusing on areas like waiting times, food services, and general amenities, as these significantly impact the overall perception of quality.

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STUDY ON PUBLIC AWARENESS ABOUT AN EMERGING CRIME - DIGITAL ARREST IN MUMBAI CITY

Dr. Mangesh Vasudeo Panchal¹ and Rahul R. Tiwari²¹Assistant Professor, Department of Accountancy, Hindi Vidya Prachar Samit's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce (Empowered Autonomous)²Assistant Professor, Department of Statistics, Hindi Vidya Prachar Samit's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce (Empowered Autonomous)**ABSTRACT**

This research paper focuses on understanding public awareness about an emerging crime - digital arrest in Mumbai. In the present study researchers attempted to assess the awareness level among the public residing in Mumbai City regarding digital arrest, the effectiveness of current public knowledge and awareness in identifying fraudulent calls or messages related to falls investigation or arrest claims and individuals' awareness about actions and precautions to be taken when they receive fraudulent calls or messages from law enforcement impersonators. Researchers have used primary as well as secondary methods of data collection. For the purpose of conducting the survey, a structured questionnaire in the Google Form was created and a link sent through Whatsapp group and email. Researchers received a total of 171 respondents and after cleaning we got 166 respondents out of which 100 were female respondents and 66 male respondents. The collected data from the respondents were coded and then imported in SPSS 20 software for further analysis. The collected data was analyzed by using Mean, SD, Chi-square test. As per survey it is found that 68.07% of the respondents have heard the term 'Digital arrest' or Digital surveillance leading to arrest. According to 81.93% of the respondents, digital arrest crime is increasing in India. There is a need to spread more awareness amongst people through newspapers, TV advertisements, radio, social media, seminars, and conferences etc. about frauds taking place due to advanced technology such as AI and other apps. The study found no significant association between individuals' awareness of increasing digital arrest frauds in India and their knowledge of the official cybercrime helpline. We also concluded that there is a significant association of individuals' awareness of digital arrest frauds with experiences of receiving suspicious scam-related communications, knowledge of how to respond to suspicious law enforcement messages their ability to identify fraudulent calls or messages intended to deceive them into believing they are under investigation or arrest and taking steps to protect personal information online.

Keywords: Artificial Intelligence, Digital arrest, Cybercrimes, Frauds and Technology

INTRODUCTION

The rapid advancement of digital technology has given rise to new and complex forms of cybercrime, posing serious challenges to personal security, data protection, and law enforcement. Among these emerging threats are digital arrest frauds, cyber scams, online impersonation, deepfakes, misinformation, and cyberbullying via social media platforms. These crimes exploit digital channels and often leverage psychological manipulation to target unsuspecting individuals. Cybercrime broadly refers to unlawful acts committed using digital technologies or the internet. Common types include hacking, identity theft, phishing, ransomware attacks, and financial frauds. These offenses not only cause financial losses but also compromise personal and institutional security. A particularly concerning trend is the rise of "digital arrest" frauds. Unlike lawful arrests involving cybercrime suspects, these scams involve impersonation of government or law enforcement authorities—such as the CBI, ED, or Telecom Department—to extort money from individuals. Fraudsters often use manipulated digital evidence or fabricated legal threats to create panic and coerce victims into transferring large sums of money. Recent high-profile cases in India underline the growing threat: As reported by *The Hindu* (March 20, 2025), an 86-year-old woman from South Mumbai was defrauded of over ₹20 crore between December 2024 and March 2025. The criminals posed as CBI officers and used fear-based tactics to extort money over a prolonged period. According to the *Times of India* (April 9, 2025), Delhi Police's Cyber Cell arrested four individuals for running a cyber-extortion racket. The accused impersonated officials from national agencies and extorted ₹8.10 lakh from a woman and her family, keeping them in virtual captivity for 48 hours. These incidents have become so prevalent that Prime Minister Narendra Modi issued public warnings against falling prey to digital arrest scams, emphasizing the need for awareness and caution. In addition to financial scams, there is rising concern about the misuse of AI applications such as Ghibli-style filters and face-swapping apps, which may compromise users' privacy. Police departments in Goa, Tamil Nadu, and Chandigarh have issued advisories urging citizens to exercise caution when using such apps. The Goa Police, for instance, shared a public message: "Joining the AI-generated Ghibli trend is fun, but not all AI apps protect your privacy. Always

think before uploading personal photos and use only trusted AI apps.” These warnings highlight the broader risks posed by digital platforms and the need for robust digital literacy, responsible digital behavior, and strict enforcement to counteract the growing wave of digital crimes in India.

The following action has been taken by the Government of India and Reserve Bank of India:

- ❖ The Ministry of Home Affairs has set up the ‘Indian Cyber Crime Coordination Centre’ (I4C) as an attached office to deal with all types of cybercrimes in the country in a coordinated and comprehensive manner.
- ❖ Central government and telecom service providers (TSPs) have devised a system to identify and block incoming international spoofed calls displaying Indian mobile numbers that appear to be originating within India.
- ❖ The ‘Citizen Financial Cyber Fraud Reporting and Management System’, under I4C, has been launched in 2021 for immediate reporting of financial frauds and to stop siphoning off funds by fraudsters. A toll-free helpline number ‘1930’ has been functional.
- ❖ I4C proactively identified and blocked more than 1,700 Skype IDs and 59,000 WhatsApp Accounts used for digital arrest.
- ❖ Till Nov. 15, 2024, more than 6.7L SIM Cards and 1,32,000 IMEIs as reported by police authorities have been blocked by the Government of India.

OBJECTIVES OF THE STUDY:

To assess the awareness level among the Indian public regarding digital arrest.

To assess the effectiveness of current public knowledge and awareness in identifying fraudulent calls or messages related to falls investigation or arrest claims.

To assess individuals' awareness about actions and precautions to be taken when they receive fraudulent calls or messages from law enforcement impersonators.

HYPOTHESES OF THE STUDY:

Hypothesis 1:

Null Hypothesis (H₀): There is no significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud.

Alternative Hypothesis (H_a): There is a significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud.

Hypothesis 2:

Hypothesis 2.1

H01 : There is no significant association between individuals' awareness of digital arrest frauds and experiences of receiving suspicious scam-related communications Vs **Ha1 :** Not H01.

Hypothesis 2.2

H02 : Awareness of digital arrest frauds is insignificantly associated with knowledge of how to respond to suspicious law enforcement messages Vs **Ha2 :** Not H02.

Hypothesis 2.3

H03 : There is no significant association between awareness of digital arrest frauds and the ability to identify fraudulent calls or messages. Vs **Ha3 :** Not H03.

Hypothesis 2.4

H04 : There is no significant association between awareness of digital arrest frauds and taking steps to protect personal information online Vs **Ha4 :** Not H04.

RESEARCH METHODOLOGY:

The present study is basically based on primary data and secondary data both. For the present study, the researchers have used a convenience sampling method of data collection i.e. non-probability sampling method. The sample sizes of 166 respondents used for study the above objectives and hypothesis. The samples are included literate population only. Primary data were collected with the help of a well constructed questionnaire.

Secondary data were collected from published books, journals, research papers, Ph.D. thesis, newspapers and data found on the internet.

LIMITATIONS OF THE STUDY:

The study was confined only in the Mumbai region and limited to only 166 respondents.

INTERPRETATION OF THE STUDY:

In the Table No. 1, researchers have presented details of the respondents according to their gender-wise distribution.

Table No. 1 - Gender of respondents

Gender	Frequency	Percent
Male	66	39.76
Female	100	60.24
Total	166	100

Sources: Compiled from Primary Data

Table No. 1 reveals gender wise distribution of the respondents. Out of 166 respondents, 39.76% of the respondents were male respondents whereas 60.24% of the respondents were female respondents.

In the Table No. 2, the researchers have presented an age-wise distribution of the respondents.

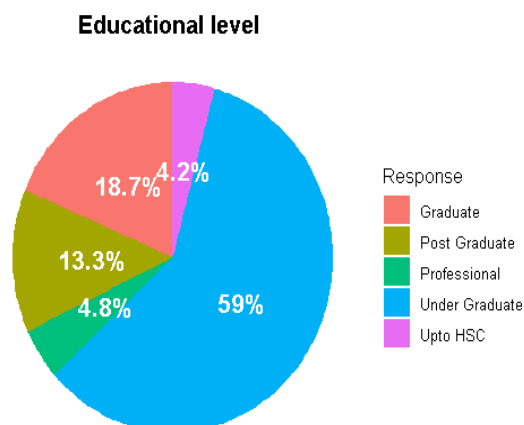
Table No. 2 - Age in years

Age (Years)	Frequency	Percent
Under 18	11	6.63
18-25	134	80.72
26-40	10	6.02
41-60	11	6.63
Total	166	100.00

Sources: Compiled from Primary Data

Table No. 2 reveals the age-wise distribution of the respondents. Among the total 166 respondents, a majority (80.72%) fall within the 18 to 25 years age group. Respondents under the age of 18 constitute 6.63% of the sample, while 6.02% are aged between 26 and 40 years. The remaining respondents belong to the age categories of 41 to 60 years and above.

In the Graph No. 1, researchers have shown the pie chart of the educational level wise of respondents.



Sources: Compiled from Primary Data

Graph No. 1 shows that 4.2% of respondents have completed education up to the Higher Secondary Certificate (HSC) level, The majority of respondents (59%) fall under the Undergraduate category, followed by 18.7% who are Graduates. Additionally, 13.3% of respondents possess a Postgraduate degree. The remaining respondents are categorized as having Professional-level qualifications.

In the Table No. 3, the researchers have shown occupation-wise distribution of the respondents.

Table No. 3 - Occupation

Category	Frequency	Percent
Students	133	80.12
Full Time Job	23	13.85
Professional	9	5.42
Business	1	0.60
Total	166	100.00

Sources: Compiled from Primary Data

Table No. 3 reveals the occupation-wise distribution of the respondents. Out of the 166 respondents, the majority (80.12%) are students. Respondents engaged in full-time jobs account for 13.85%, while 5.42% identified as professionals like IT, CS, Finance etc.. Only 0.60% of the respondents reported being involved in business activities. This distribution highlights a predominantly student-based sample.

In the Table No. 4, researchers have presented the distribution of respondents' awareness of the term “Digital arrest” or “Digital surveillance”

Table No. 4 - Awareness of term “Digital arrest” or “Digital surveillance

Category	Frequency	Percent
Yes	113	68.07
No	26	15.66
Not Sure	27	16.27
Total	166	100

Sources: Compiled from Primary Data

Table No. 4 presents the distribution of respondents' awareness of the term “Digital arrest” or “Digital surveillance”. Out of 166 respondents, a significant majority (68.07%) reported being aware of the term. In contrast, 15.66% indicated they were not aware, while 16.27% of the respondents were unsure.

In the Table No. 5 researchers have shown perceptions of respondents' towards awareness of the term “Digital arrest”.

Table No. 5 - Tabulation representation of perceptions of respondents' towards awareness of the term “Digital arrest”

Factor	SA (%)	A (%)	N (%)	DA (%)	SDA (%)	Mean	SD	Decision
I am aware that digital arrest frauds are increasing in India.	62 (37.35)	82 (49.4)	18 (10.84)	3 (1.81)	1 (0.6)	1.79	0.75	High perception
I know how digital arrest scams typically work (e.g., fake calls or messages from police, threatening arrests, etc.)	75 (45.18)	75 (45.18)	15 (9.04)	1 (0.6)	0 (0)	1.65	0.66	Low perception
I have heard of cases where people were falsely digitally arrested due to manipulated or fabricated digital evidence.	49 (29.52)	81 (48.8)	30 (18.07)	5 (3.01)	1 (0.6)	1.96	0.81	High perception
I am aware that cybercriminals may use social media platforms to spread misinformation, leading to digital arrest fraud.	65 (39.16)	77 (46.39)	19 (11.45)	4 (2.41)	1 (0.6)	1.79	0.78	High perception

Sources: Compiled from Primary Data.

Note: SA= Strongly Agree, A- Agree, N -Neutral, DA- Disagree, SDA- Strongly Disagree.

Weighted mean = 1.79

In this study, respondents' perceptions regarding awareness of the term 'Digital Arrest' were evaluated using the weighted average method. This approach involved calculating the mean scores of individual items and comparing them against the overall weighted mean. Factors with mean scores exceeding the weighted average were considered important by respondents. As presented in Table 5, the findings indicate that respondents largely agreed with statements such as: awareness that digital arrest frauds are increasing in India; awareness of cases where individuals were falsely digitally arrested due to manipulated or fabricated digital evidence; and awareness that cybercriminals may use social media platforms to spread misinformation leading to digital arrest fraud. These were identified as key perceptions related to digital arrest awareness. Conversely, the perception item 'I know how digital arrest scams typically work (e.g., fake calls or messages from police, threatening arrests, etc.)' received a lower mean score, suggesting it is of relatively lesser importance in the respondents' overall awareness.

Researchers have checked the association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud and their information are shown in Table No. 6. The following hypothesis is tested at the 5% level of significance:-

Hypothesis 1

Null Hypothesis (H_0): There is no significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud.

Alternative Hypothesis (H_1): There is a significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud.

In Table No. 6, tabular representation of individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud

Helpline Number	Individuals' awareness of how digital arrest scams work					Total
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Yes	36	38	8	0	0	82
No	39	37	7	1	0	84
Total	75	75	15	1	0	166

Sources: Compiled from Primary Data

Table No. 7: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.1761	3	0.7587

Sources: Compiled from Primary Data

Table No. 7 represents the Chi-Square Tests value is 1.11761 and p-value is 0.7587 which is smaller than 0.05, hence we conclude that there is no significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud.

Researchers have also examined the association between individuals' awareness of digital arrest frauds and four key factors: (1) experience of receiving suspicious scam-related communications, (2) knowledge of how to respond to suspicious messages from individuals posing as law enforcement, (3) ability to identify fraudulent calls or messages designed to deceive them into believing they are under investigation or arrest, and (4) steps taken to protect personal information online. The following four hypotheses were tested at the 5% level of significance:-

Hypothesis 2.1

H01 : There is no significant association between individuals' awareness of digital arrest frauds and experiences of receiving suspicious scam-related communications Vs **Ha1 :** Not H01.

Hypothesis 2.2

H02 : Awareness of digital arrest frauds is insignificantly associated with knowledge of how to respond to suspicious law enforcement messages Vs **Ha2 :** Not H02.

Hypothesis 2.3

H03 : There is no significant association between awareness of digital arrest frauds and the ability to identify fraudulent calls or messages. Vs **Ha3 :** Not H03.

Hypothesis 2.4

H04 : There is no significant association between awareness of digital arrest frauds and taking steps to protect personal information online Vs **Ha4** : Not H04.

Table No. 8 presents the Chi-square values, degrees of freedom (df), and significance values for each hypothesis, along with their corresponding interpretations.

Table No. 8: Chi-Square Tests, df, significance value and interpretation

	Pearson Chi-Square Value	df	Asymp. Sig. (2-sided)	Interpretation
Hypothesis 2.1	68.745	16	1.654x 10-08	Reject H01
Hypothesis 2.2	138.61	16	2.2x 10-16	Reject H02
Hypothesis 2.3	194.01	16	2.2x 10-16	Reject H03
Hypothesis 2.4	69.155	16	1.402x 10-08	Reject H04

Sources: Compiled from Primary Data

Based on the findings presented in Table No. 8, there is a significant association between individuals' awareness of digital arrest frauds and several key factors: experiences of receiving suspicious scam-related communications, knowledge of how to respond to fraudulent law enforcement messages, the ability to identify deceptive calls or messages, and proactive measures taken to protect personal information online.

FINDINGS OF THE STUDY:

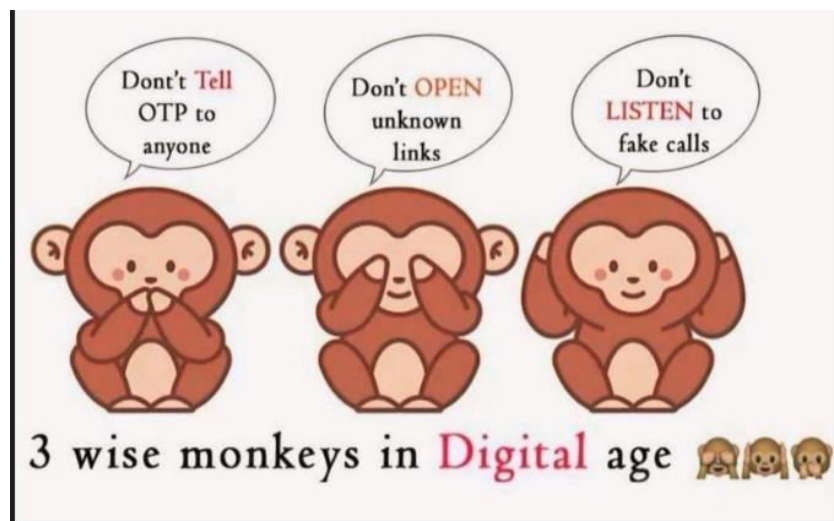
Study have found that there is no significant association between individuals' awareness of how digital arrest scams work and their knowledge of the helpline or toll-free number to report cyber fraud but there is a significant association between individuals' awareness of digital arrest frauds and several key factors: experiences of receiving suspicious scam-related communications, knowledge of how to respond to fraudulent law enforcement messages, the ability to identify deceptive calls or messages, and proactive measures taken to protect personal information online.

CONCLUSION OF THE STUDY:

- ❖ Majority (68.07%) of respondents are aware of the term *digital arrest*.
- ❖ No significant link found between awareness of scam methods and knowledge of cyber helpline (1930).
- ❖ Significant association found between awareness and:
 - Receiving scam-related messages or calls
 - Knowing how to respond to fake law enforcement messages
 - Ability to identify fraudulent calls/messages
 - Taking steps to protect personal information online
- ❖ Awareness is high, but practical knowledge and response readiness are lacking.
- ❖ Need for more awareness campaigns via social media, TV, radio, seminars, etc.
- ❖ Emphasis on promoting digital literacy and safe online behavior.

SUGGESTIONS

- Remember that there is no concept of digital arrest under any Indian Law
- Scammers posing as law enforcement personnel often use threats of “digital arrest” to pressure victims. Real law enforcement won’t arrest you digitally.
- Never share personal or financial information over the phone, email or messaging apps without verifying the request.
- Always verify the identity of the caller or sender before taking any action. Contact the nearest police station directly to verify the claim/identity.
- Speak to your relatives and friends before taking any action to transfer money.
- Report cyber frauds immediately at www.cybercrime.gov.in or by calling 1930.



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- <https://timesofindia.indiatimes.com/city/delhi/delhis-cyber-cell-busts-digital-arrest-racket-4-arrested-for-extorting-rs-8-lakh-from-family/articleshow/120113249.cms>
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**A STUDY ON IMPACT OF INFLUENCER MARKETING ON SOCIAL MEDIA IN SHAPING
CONSUMER PURCHASE DECISION AND BRAND PERCEPTION**

Ms. Mansi Ashok Dixit¹ and Dr CA Vishwanathan Iyer²¹Assistant Professor, Vedanta College, Vithalwadi- 421003²Sr Assistant Professor, Research Guide, Sri Balaji University, Pune- 411033**ABSTRACT**

The rapid development of social media has profoundly changed the marketing landscape, and influencer marketing has emerged as a prominent and strategic means of brand communication and consumer engagement. Conventional marketing practices are being complemented—if not replaced—by digital means where influencers, perceived as familiar and credible personalities, act as a bridge between brands and their target consumers. This study aims to examine the effect of influencer marketing on customer buying behavior and brand attitude, in particular in widely used platforms like Instagram, YouTube, and WhatsApp. Embedded at the center of the research is investigating the influence of influencer credibility as well as content quality and platform attributes on consumer attitudes. The study examines consumer trust, arguably one of the most significant determinants of purchase intention, and how this consumer trust is established through perceived authenticity and transparency of influencer postings.

The findings reveal that influencers play a critical role not only in shaping the cognitive dimensions of consumer behavior such as awareness, product evaluation, and decision-making but also in influencing the emotional aspects, including trust, affinity, and loyalty. These insights highlight that influencer marketing has a dual impact: it drives immediate purchase behavior and contributes to the long-term development of brand loyalty and brand equity. By adding to the existing body of digital marketing literature, this research offers useful implications for brands and marketers. It implies that choosing the appropriate influencers, matching brand values with influencer personas, and ensuring authenticity in content are crucial for effective influencer campaigns. Finally, this research presents a strategic framework for companies to maximize their influencer collaborations and build brand presence in a highly competitive digital market.

Keywords: Social Media, Consumer, Influencer, Brand Perception

INTRODUCTION

In the digitally influenced market of today, social media has become a major force redefining how brands interact with consumers. With conventional advertising no longer carrying the same level of persuasive influence, brands are looking more and more towards newer ways that are more real, more human, and more trust-based. Of these, influencer marketing has accelerated to be at the forefront. It uses the access, shareability, and perceived authority of people who have massive followings on platforms such as Instagram, YouTube, TikTok, and X (formerly Twitter) to sell products and nudge purchasing behavior.

Influencer marketing closes the gap between word-of-mouth recommendation and commercial promotion. In contrast with conventional celebrity endorsement, social media influencers tend to cultivate niche audiences on the grounds of commonality in interests, lifestyles, or knowledge. This establishes familiarity and trust with fans, such that their product recommendations look more authentic and compelling. As such, customers increasingly take influencer views and experiences into consideration when making buying decisions, particularly in sectors like fashion, beauty, technology, fitness, and lifestyle.

This research seeks to assess the impact of influencer marketing on consumer purchase intention and brand awareness. It examines how different elements—namely, influencer credibility, content quality, engagement rate, perceived authenticity, and platform selection—influence consumer trust and purchasing behavior. With consumers surrounded by promotional messaging all the time, marketers need to know what really drives the decision-making process. Through exploring how consumers process influencer content and react to it, this research will provide key insights into the workings behind effective influencer campaigns. It will also reveal whether or not influencers are not only able to drive conversions but also influence consumers' perception of a brand's values, image, and reputation.

REVIEW OF LITERATURE

1. Brand perception is the significant area of study. Consumer perceptions of a brand's image, legitimacy, and overall worth can be influenced by influencer endorsements. According to Jin and Ryu, customer trust and brand attitude are favourably impacted by influencer-brand congruence, which is the alignment of the

- influencer's personal brand with the product being promoted (**Jin and Ryu 2019**). Influencers' use and endorsement of a brand humanises it and gives it a more accessible, relatable image in the eyes of followers.
2. The impact of influencer marketing on customer purchasing decisions is a major topic of research. Customers view influencers as more trustworthy and relatable than traditional celebrities, which strengthens the persuasiveness of their recommendations (**Lou and Yuan 2017**).
 3. Higher purchase intent is frequently the result of this trust, particularly when the influencer's material is seen as genuine and consistent with the brand. In a similar vein, De Veirman, Cauberghe, and Hudders discovered that the number of followers indicates an influencer's popularity, which has a considerable impact on the influencer's perceived trustworthiness and, consequently, on consumer behaviour (**De Veirman, Marijke, Veroline Cauberghe, and Liselot Hudders 2017**).
 4. Furthermore, social media sites themselves have a significant impact on the dynamics of influencer marketing. Every platform has special qualities that affect how customers interact with them. For example, YouTube's long-form material enables in-depth product evaluations and lessons, while Instagram's visual-centric nature makes it perfect for lifestyle and fashion marketing. Platform type has an impact on the level of customer interaction and the message's perceived authenticity, according to Djafarova and Rushworth (**Djafarova and Rushworth 2017**).
 5. Not all research, nevertheless, indicates favourable results. Some scholars warn that consumers may become sceptical as a result of overexposure and fake recommendations. Customers have become more conscious of sponsored collaborations as influencer marketing gets more commercialised, which may reduce the influencer's credibility and the campaign's efficacy (**Campbell and Farrell 2020**).

RESEARCH PROBLEM

Although influencer marketing has been increasingly popular and widely used on social media platforms, little is known about how it really affects consumer behaviour. Although influencers are thought to foster trust and sway customer decisions, it is unclear how much their content influences consumers' intentions to make purchases and how they view a company. Measuring efficacy is further complicated by differences in platform dynamics, content genres, and influencer attributes. By investigating the ways in which influencer marketing affects customer views of brands and purchase decisions, as well as the critical elements that determine whether it succeeds or fails on various social media platforms, this research aims to close the gap.

OBJECTIVES

1. To examine the influence of social media influencers on consumer purchase decisions.
2. To analyze how influencer marketing affects consumer perceptions of brand image and credibility.

HYPOTHESIS

To examine the influence of social media influencers on consumer purchase decisions.

- **H₁**: Social media influencers have a significant positive impact on consumer purchase decisions.
- **H₀**: Social media influencers do not have a significant impact on consumer purchase decisions.
- **H₁**: Influencer marketing positively influences consumer perceptions of brand image and credibility.
- **H₀**: Influencer marketing does not influence consumer perceptions of brand image and credibility.

RESEARCH METHODOLOGY

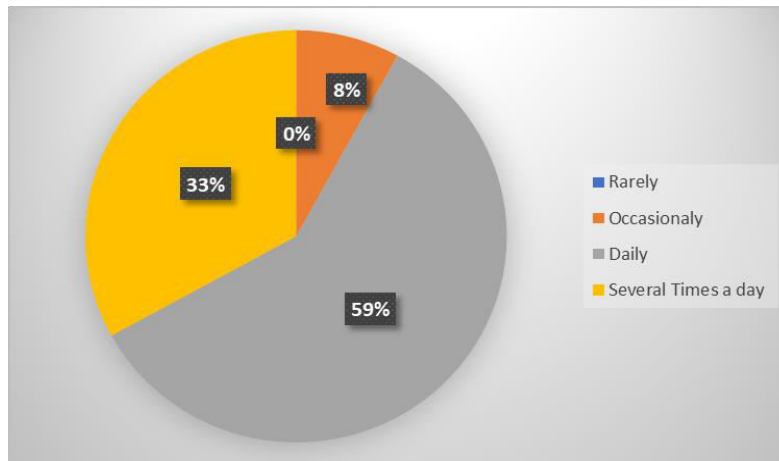
1. The study follows a quantitative research design to assess the influence of social media influencers on consumer purchase decisions and brand perception.
2. A non-probability convenience sampling method was employed to collect data from respondents who are active users of social media platforms.
3. The sample consists of **60** respondents, including individuals, from diverse backgrounds, ensuring varied perspectives.
4. Primary data was collected through a structured online questionnaire, which included close-ended questions and Likert scale items related to influencer marketing, purchasing behavior, and brand perception.
5. Data was analyzed using the percentage method, providing a clear statistical view of consumer opinions and behaviors.

6. Results are presented in the form of tables, bar charts, and pie charts, showcasing percentage distributions for ease of understanding.

DATA ANALYSIS AND INTERPRETATION:

1) How often do you use social media platforms?

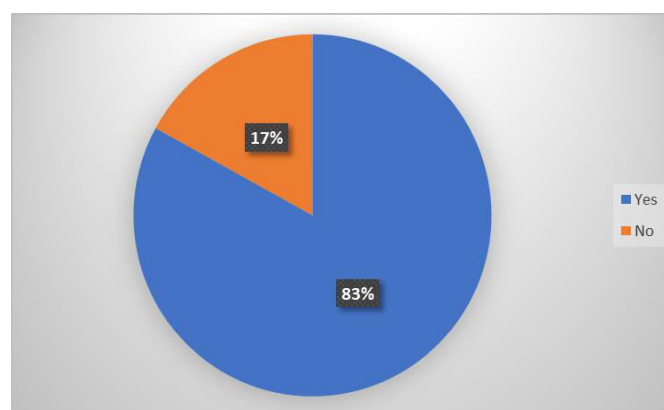
Sr.no	Options	No's	Percentage
1	Rarely	-	-
2	Occasionally	5	8%
3	Daily	35	59%
4	Several Times a day	20	33%



The survey suggests that the majority of respondents (59%) use social media every day, followed by 33% who use it several times a day, indicating high overall usage of social platforms. A small percentage (8%) use it occasionally, and none reported using it rarely. This points out that the majority of participants are current social media users, and so they are probably constantly exposed to influencer postings—a critical element when evaluating how influencer advertising affects their purchase behaviors and attitudes toward brands.

2) Do you follow any social media influencers?

Sr.no	Options	No's	Percentage
1	Yes	50	83%
2	No	10	17%

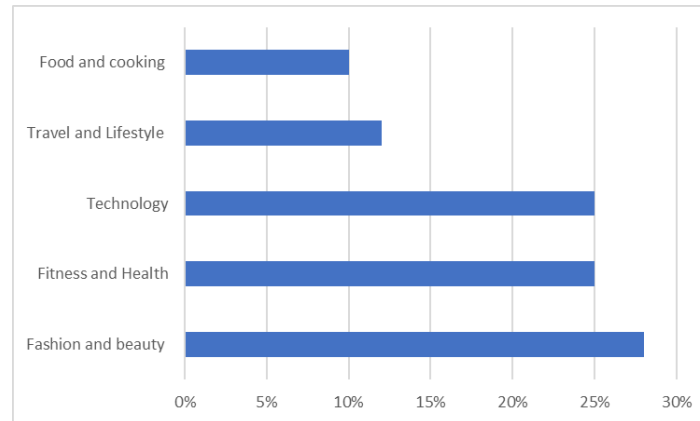


The data indicates that a vast majority of the respondents (83%) are followers of social media influencers, whereas 17% are not. This indicates that influencers have a broad reach and strong presence among the audience, which means they have the potential to influence consumer opinions, purchasing decisions, and brand perceptions.

3) What type of influencers do you follow most?

Sr.no	Options	No's	Percentage
1	Fashion and beauty	17	28%
2	Fitness and Health	15	25%
3	Technology	15	25%

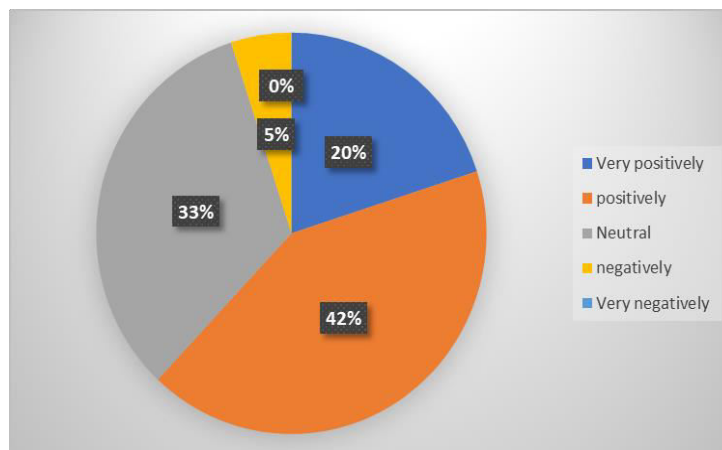
4	Travel and Lifestyle	7	12%
5	Food and cooking	6	10%



The data indicates that fashion and beauty influencers have the largest following at 28% of the people who respond to this type of content. Fitness and health and tech influencers follow, with each having a following of 25%. Travel and lifestyle and food and cooking influencers have relatively lower followings at 12% and 10%, respectively. This means that trend and visually-driven categories such as fashion, beauty, fitness, and technology are especially influential among social media consumers, which means they are important areas to target with influencer marketing.

4) How does Influencer Marketing affect your Perception of a Brand?

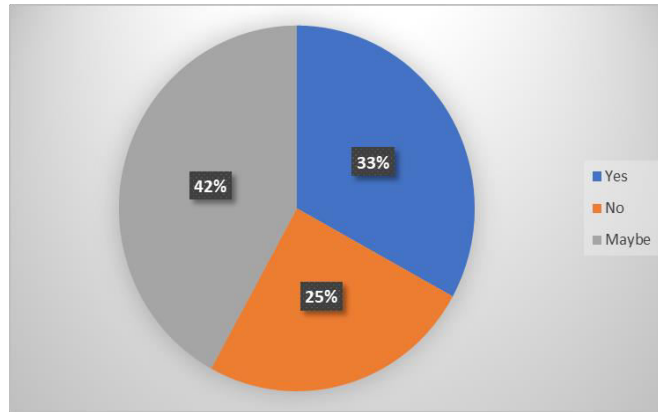
Sr.no	Options	No's	Percentage
1	Very positively	12	20%
2	positively	25	42%
3	Neutral	20	33%
4	negatively	3	5%
5	Very negatively	-	-



The data reveals that influencer marketing is generally well viewed by consumers, with 42% having a positive view and 20% having a very positive view. There is a substantial group (33%) that is neutral, reflecting a balanced or guarded view. A very small percentage (5%) see it in a negative light, and none of them report having a very negative view. This indicates that although influencer marketing is predominantly successful in building brand image, there is still a section of the target audience that is not influenced or is doubtful.

5) Do you Consider brands Endorsed by Influencers more Trustworthy?

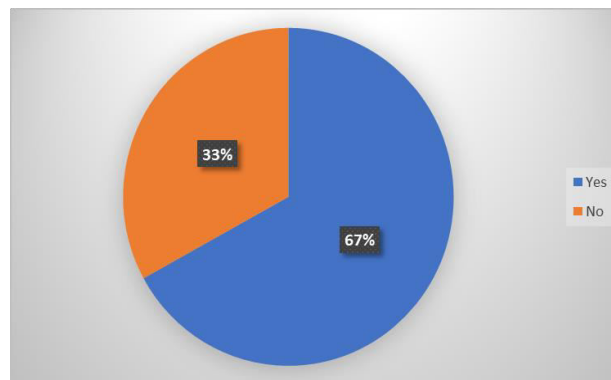
Sr. no	Options	No's	Percentage
1	Yes	20	33%
2	No	15	25%
3	Maybe	25	42%



The data indicates mixed perceptions regarding the trustworthiness of brands endorsed by influencers. While 33% of respondents consider such brands trustworthy, a notable 42% are uncertain, responding with "maybe." Meanwhile, 25% do not find these brands more trustworthy. This suggests that although influencer endorsements can build trust for some consumers, a significant portion remains skeptical or undecided, highlighting the importance of authenticity and credibility in influencer-brand partnerships.

6) Does influencer content help you learn more about the brand or product features?

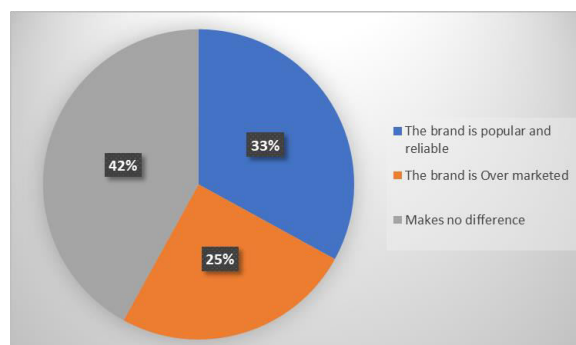
Sr. no	Options	No's	Percentage
1	Yes	40	67%
2	No	20	33%



The data shows that a majority of respondents (67%) believe that influencer content helps them learn more about a brand or product's features, while 33% do not share this view. This indicates that influencer marketing is generally effective in conveying product information and enhancing brand awareness, making it a valuable tool for educating consumers in an engaging and accessible manner.

7) When you see multiple influencers promoting the same brand, what is your impression?

Sr. no	Options	No's	Percentage
1	The brand is popular and reliable	20	33%
2	The brand is Over marketed	15	25%
3	Makes no difference	25	42%



The data reveals varied consumer perceptions when multiple influencers promote the same brand. While 33% of respondents view the brand as popular and reliable, 25% perceive it as over-marketed, suggesting potential

skepticism. The largest group, 42%, feel it makes no difference, indicating a neutral stance. Overall, while repeated influencer endorsements can enhance brand visibility, they may not always significantly influence consumer perception and could even lead to concerns about overexposure.

CONCLUSION:

This research emphasizes the important role influencer marketing has in influencing consumer buying decisions and brand attitudes on social media websites. The research shows that most consumers actively interact with influencers and are influenced by their posts when making purchasing decisions about products or services. Influencer marketing affects buying behavior and even helps establish brand trustworthiness, recognition, and reputation especially in visually-oriented industries like fashion, beauty, health and wellness, and tech. Nonetheless, the success of such marketing hinges on how well the influencer is seen as being authentic and trustworthy.

Although most consumers are favorably receptive to influencer endorsements, a significant portion remains neutral or cynical, highlighting the importance of brands paying attention to transparency, relevance, and genuine partnerships. As a whole, influencer marketing is an influential and dynamic means in digital brand strategy with the capacity to form long-term consumer-brand relationships if handled carefully.

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FORENSIC ACCOUNTING IN INDIA: A TECHNIQUE FOR PREVENTING AND DETECTING FRAUD

Mukesh Arvind Amrutkar and CS. Prabha Thevar

Assistant Professor, Department of Commerce & Accountancy, Vedanta College, Vittalwadi Station Road, Vittalwadi West, Thane-Dist. Maharashtra

ABSTRACT

The surge in financial crimes globally has highlighted the vital role of forensic accounting, particularly in emerging economies like India. Forensic accounting applies investigative methods and accounting principles in legal contexts to detect fraud and misconduct. Introduced by Maurice E. Peloubet in 1946, the field has evolved with technologies like data mining, artificial intelligence (AI), and blockchain.

In India, scandals such as the Satyam fraud, Nirav Modi–PNB case, and IL&FS crisis revealed systemic flaws, emphasizing the need for detailed forensic investigations. This secondary data-based study examines financial statement fraud, banking and insurance fraud, employee fraud, and cyber fraud. It also reviews forensic tools including Benford's Law, Computer-Assisted Audit Tools (CAATs), data mining, and ratio analysis.

The study highlights the role of forensic accountants in fraud detection, criminal investigations, insurance settlements, and dispute resolution. Although India's adoption of forensic practices has been gradual, reforms like the Companies Act, 2013 have accelerated progress. Challenges persist due to the lack of standardized procedures and regulatory recognition. Institutions like the ICAI are working to formalize frameworks. With rising digitalization and financial complexity, forensic accounting is becoming essential for corporate governance, financial transparency, and public trust.

Keywords: *Forensic Accounting, Frauds, Financial Scams, Auditing, Investigative functions*

INTRODUCTION

As financial crimes, corruption, and other illicit economic activities become increasingly widespread in the global economy, the role of forensic accounting has gained considerable attention in both academic and business spheres. Simply put, forensic accounting involves the meticulous investigation of evidence that arises from ongoing or anticipated litigation. The term "forensic" relates to judicial proceedings or debate in a public forum, highlighting the legal context within which this field operates.

The global economy's expansion, coupled with the rapid pace of innovation across industries and society, has created an abundance of opportunities. However, this growth has also paved the way for significant threats, particularly financial fraud. As economies develop and become more complex, instances of fraudulent activities often proliferate. Today, no country, whether emerging or highly advanced, is immune to the threat of financial misconduct.

Forensic accounting has evolved as a critical discipline specifically designed to address the rise in financial crimes and corporate fraud. The term "forensic accounting" was first introduced by Maurice E. Peloubet in 1946. It refers to the application of accounting knowledge combined with investigative techniques to resolve disputes in the legal arena. Unlike traditional accountants, forensic accountants delve deep into financial data, often utilizing advanced technologies such as data mining, artificial intelligence, and blockchain to uncover sophisticated fraud schemes.

High-profile corporate scandals such as those involving Enron, WorldCom, AIG, Lehman Brothers, Wirecard, and DHFL have exposed significant shortcomings in traditional auditing practices. These events have triggered a paradigm shift in expectations; auditors are now not only expected to verify compliance but also to proactively detect and investigate fraudulent activities.

Forensic accounting is inherently interdisciplinary, incorporating elements from accounting, finance, law, criminology, ethics, and information technology. Practitioners are required not only to detect and analyze financial irregularities but also to serve as expert witnesses in legal proceedings. The discipline has achieved considerable professional recognition in developed economies such as the United States, the United Kingdom, Canada, and Australia. In emerging economies like India, forensic accounting is gaining momentum as a crucial tool for promoting financial transparency and enhancing corporate governance structures.

OBJECTIVES OF THE STUDY

The present research is primarily exploratory in nature, based solely on secondary data gathered from various sources including websites, journals, books, government reports, and publications by institutions like the Reserve Bank of India (RBI) and KPMG.

The key objectives of the study are:

- To understand the different types of financial frauds.
- To explore the application of forensic accounting techniques in the detection and examination of fraud.
- To investigate major financial scams that have occurred in India.
- To identify the various services provided by forensic accountants.
- To assess the prospects of forensic accounting in India amidst the increasing incidence of fraud.

HYPOTHESIS

Null Hypothesis (H_0):

"Forensic accounting has no major influence on detecting and preventing financial crime in India."

Alternative Hypothesis (H_1):

"Forensic accounting plays a vital role in the detection and prevention of financial crime in India."

MEANING AND TYPES OF FRAUDS

Fraud is a universal problem that transcends geographic and sectoral boundaries. Defined broadly, fraud involves "deceit, impersonation with intent to deceive, or criminal deception conducted to secure an unfair or unlawful gain." According to the Association of Certified Fraud Examiners (ACFE), fraud is "a deception or misrepresentation knowingly carried out by an individual or entity to obtain an unauthorized benefit for themselves or another party."

Fraudulent activities are often perpetrated with the following objectives:

- To artificially inflate the market value of a company,
- To align financial statements with budgetary expectations,
- To derive unjust profits by misrepresenting the true financial condition of an organization.

TYPES OF FRAUDS:

As technology evolves, fraudsters continually develop more advanced methods to exploit vulnerabilities. Broadly, corporate fraud can be categorized as follows:

- **Financial Statement Fraud:** This type involves intentional misrepresentations, omissions, or manipulations of financial data and disclosures. According to the ACFE, misstatements in financial reports not only impose severe financial losses but also erode public trust and investor confidence (Golden, 2006).
- **Banking and Insurance Fraud:** These crimes involve fraudulent acts against banks, insurance companies, or financial institutions, including false health insurance claims, fabricated bankruptcy filings, and fictitious business insurance claims.
- **Employee Fraud:** Employee-related fraud includes embezzlement, theft of cheques, unauthorized payments, creation of ghost employees, bribery, misuse of credit cards, and falsification of overtime records.
- **Cyber Frauds:** As reliance on accounting software and cloud systems increases, cyber fraud poses a significant threat. Cybercriminals exploit vulnerabilities to manipulate sensitive financial data or fabricate fraudulent records. Despite sophisticated access controls, insider threats and lax cybersecurity can still expose organizations to serious risks.

TECHNIQUES OF FORENSIC ACCOUNTING

Forensic accountants deploy a variety of specialized techniques beyond traditional auditing procedures to detect, investigate, and mitigate financial fraud:

1. **Interview Technique:** Structured interviews are conducted to gather evidence, clarify discrepancies, and, when possible, extract confessions. Interview findings often serve as key evidence in litigation or arbitration.
2. **Benford's Law:** A statistical method that analyzes digit patterns within numerical datasets to detect anomalies. Deviations from expected distributions suggest areas that require closer examination.

3. **Theory of Relative Size Factor (RSF):** RSF identifies unusual data fluctuations by comparing the largest and second-largest numbers in a dataset, flagging anomalies for further scrutiny.

4. **Computer-Assisted Audit Tools (CAATs):**

- *Data Extraction Software:* Enables quick analysis of full records in billing, payroll, procurement, etc.
- *Financial Analysis Software:* Assists in scrutinizing financial statements and benchmarking key financial ratios to detect inconsistencies.

5. **Data Mining Techniques:**

- **Discovery:** Identifies previously unknown patterns.
- **Predictive Modeling:** Forecasts potential fraudulent behavior.
- **Deviation and Link Analysis:** Uses Bayesian networks and other models to detect irregularities and suspicious linkages.

6. **Ratio Analysis:** Forensic accountants analyze financial, operational, and utility ratios to detect deviations that could indicate fraud.

SCAMS IN INDIA

Since independence, India has witnessed numerous financial scams that have revealed deep-seated issues in governance, regulation, and corporate ethics. Early scandals like the Haridas Mundhra case (1957) and contemporary frauds such as the Nirav Modi-PNB scam (2018) have underscored the importance of forensic audits. These audits have proven essential for uncovering fraud, quantifying financial damage, and supporting legal action.

From stock market manipulations to banking frauds, forensic accounting has been instrumental in addressing financial misconduct in India. Some examples include:

Year	Scam Name	Sector	Amount (Approx)	Role of Forensic Accounting
1957	Haridas Mundhra Scam	Stock Market	₹1.26 crore	Traced irregular stock investments using audit trails.
1971	Nagarwala Scam	Banking	₹60 lakh	Investigation of forged telephonic instructions.
1982	Antulay Cement Scam	Real Estate	₹30 crore	Traced donation linkages to license allocations.
1989	Bofors Scam	Defense	₹64 crore (kickbacks)	Traced illegal foreign payments through financial forensics.
1990	HDW Submarine Scam	Defense	₹20 crore (alleged)	Uncovering shell companies and offshore transactions.
1992	Harshad Mehta Scam	Stock Market	₹4,000 crore	Identified misuse of bank receipts and stock manipulation.
1992	Palmolein Oil Import Scam	Food Supply	₹2.32 crore loss	Tracked irregularities in import contract pricing.
1995	Telgi Stamp Paper Scam	Printing	₹20,000 crore	Forensic audits revealed counterfeit stamp network.
1995	SNC Lavalin Power Scam	Power Sector	₹375 crore loss	Audit uncovered project cost inflation.
1996	Sukhram Telecom Scam	Telecom	₹3.6 crore (cash seized)	Asset tracing and forensic banking audits.
1996	Fodder Scam (Bihar)	Public Funds	₹950 crore	Traced forged bills and fake voucher payments.

1997	Jain Hawala Scam	Politics	₹65 crore	Uncovered illegal money laundering routes.
2001	Ketan Parekh Scam	Stock Market	₹1,250 crore	Identified circular trading and price rigging patterns.
2001	Barak Missile Deal Scam	Defense	₹115 crore	Audit of deal paperwork and fund flows.
2002	Kargil Coffin Scam	Defense	₹6 crore	Traced overpricing of coffin supplies via document review.
2003	Taj Corridor Scam	Infrastructure	₹175 crore	Audits revealed missing funds and incomplete work.
2004	PDS Scam (Arunachal Pradesh)	Public Distribution	₹1,000 crore	Traced fake transportation and distribution claims.
2005	Oil-for-Food Scam	International Trade	₹96 lakh (Indian firms)	Tracked illicit financial transactions abroad.
2005	Satyam Scam	IT Corporate	₹14,000 crore	Revealed fake bank balances and inflated revenues.
2008	Cash-for-Votes Scam	Politics	₹50 crore (alleged)	Video and transaction forensic analysis.
2008	Satyam Computers Scam	IT Corporate	₹14,000 crore	Same as above. Extensive forensic accounting audits.
2009	Madhu Koda Mining Scam	Mining	₹4,000 crore	Traced illegal mining revenues and hidden assets.
2010	2G Spectrum Scam	Telecom	₹1.76 lakh crore	Reviewed allocation records and audit of undervalued licenses.
2010	Commonwealth Games Scam	Sports	₹70,000 crore	Procurement audits and contract examination.
2010	Adarsh Housing Scam	Real Estate	₹118 crore (land cost undervalued)	Land records forensic verification.
2010	Housing Loan Scam	Banking	₹1,000 crore	Reviewed loan sanctioning irregularities.
2010	Belekeri Port Scam	Mining	₹60,000 crore (estimated)	Investigated illegal iron ore exports.
2010	Foodgrain Scam (U.P.)	Public Distribution	₹35,000 crore	Audit trails revealed diversion of food grains.
2011	Bellary Mining Scam	Mining	₹16,000 crore	Revealed fake export documents and illegal mining.
2012	Coal Allocation Scam (Coalgate)	Mining	₹1.86 lakh crore	Examined bidding documents and profit loss analysis.
2012	Agusta Westland Scam	Defense	₹3,600 crore	Financial tracking of kickbacks and shell companies.
2013	Sharadha Chit Fund Scam	Financial	₹2,500 crore	Forensic tracing of fund diversion to personal accounts.
2014	Saradha and Rose Valley Scams	Ponzi	₹60,000 crore (combined)	Followed trail of fake investment returns.

2015	Vyapam Scam	Recruitment	No clear value	Verified forged certificates and manipulated examination results.
2016	Panama Papers Leak	Offshore	In billions	Identified black money and offshore company trails.
2017	Bank of Baroda Forex Scam	Banking	₹6,000 crore	Traced fake import-export transactions.
2018	Nirav Modi – PNB Scam	Banking	₹13,000 crore	Analyzed fake Letters of Undertaking (LOUs).
2018	Rotomac Scam	Banking	₹3,695 crore	Audit revealed willful defaults and diversion of loans.
2018	IL&FS Crisis	Infrastructure Finance	₹91,000 crore	Forensic audit identified debt misreporting.
2019	DHFL Banking Scam	Banking	₹31,000 crore	Revealed loan diversions to shell companies.
2020	Yes Bank Scam	Banking	₹3,700 crore (alleged frauds)	Analyzed bad loans and fake accounting practices.
2021	ABG Shipyard Scam	Corporate Finance	₹22,842 crore	Asset tracing and loan fraud investigation.
2021	Videocon – ICICI Bank Fraud	Banking	₹1,875 crore	Detected conflict of interest and irregular loan sanctioning.
2022	NSE Co - Location Scam	Stock Exchange	₹50 crore (gains)	IT forensic audit of trading server access.
2022	Amrapali Housing Scam	Real Estate	₹3,000 crore	Detected misuse of homebuyers' advances.
2023	Karvy Stock Broking Scam	Stock Broking	₹2,000 crore	Misuse of clients' securities for personal loans.
2023	Franklin Templeton Controversy	Mutual Funds	₹26,000 crore (locked funds)	Mismanagement audit and tracing liquidity issues.
2024	Coffee Day Enterprises Financial Issues	Corporate Finance	₹7,000 crore (debt default)	Traced debt misreporting and fund diversions.

Each of these incidents highlights forensic accounting's critical role in revealing irregularities, ensuring accountability, and catalyzing regulatory reforms.

SERVICES RENDERED BY FORENSIC ACCOUNTANTS

Forensic accountants provide essential services across numerous domains by applying their investigative expertise to uncover, analyze, and prevent financial misconduct. Their core services include:

1. **Fraud Detection in Employee Misconduct:** Identifying internal fraud schemes involving embezzlement, theft, or record fabrication.
2. **Fraud Investigation in Criminal Matters:** Assisting law enforcement agencies in investigating white-collar crimes, including money laundering and bribery.
3. **Detection of Professional Negligence and Financial Misconduct:** Monitoring adherence to accounting standards, auditing procedures, and ethical norms to detect professional misconduct.
4. **Insurance Claim Evaluation and Settlement:** Conducting independent assessments of claims involving property loss, business interruptions, and disputed payouts.
5. **Dispute Resolution:** Supporting businesses in resolving disputes arising from contracts, intellectual property, and commercial transactions through expert analysis and testimony.

PROSPECTS OF FORENSIC ACCOUNTING IN GROWING FRAUDS

The sharp rise in financial fraud within India, fueled by technological advancements and regulatory shortcomings, has highlighted the growing need for forensic accounting. While forensic accounting became well-established in developed countries by the mid-1990s, India's awareness and adoption of the discipline have expanded more recently.

Significant progress has been made, particularly with the Companies Act, 2013, introducing mandates for fraud prevention and internal financial controls. Institutions like the Serious Fraud Investigation Office (SFIO) and organizations such as the Forensic Research Foundation have contributed to raising awareness and establishing best practices.

The Institute of Chartered Accountants of India (ICAI) is expected to play a pivotal role in formalizing and standardizing forensic accounting practices in the country. With the increasing digitization of the economy and heightened corporate complexities, the demand for skilled forensic accountants is projected to rise dramatically. Their role will be vital in supporting regulatory agencies, law enforcement bodies, and corporate entities in combating financial crime and enhancing governance standards.

CONCLUSION

In an era where financial fraud is becoming increasingly sophisticated, the necessity for specialized forensic accounting expertise has never been greater. By merging accounting, legal, and investigative disciplines, forensic accounting serves as a powerful tool for detecting and preventing white-collar crimes.

Recognizing its importance, global institutions like the CFA Institute and Indian bodies such as ICAI and ICWAI have initiated specialized programs to equip professionals with forensic skills. Nevertheless, to establish a robust institutional foundation, India needs to develop a dedicated forensic accounting standard, promoted by ICAI, to foster consistency, credibility, and collaboration among stakeholders.

Strengthening education, enhancing training programs, and implementing robust regulatory frameworks will be crucial to fortifying corporate governance, promoting financial transparency, and rebuilding public trust in India's financial systems.

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A STUDY ON THE IMPACT OF DIGITALIZATION ON THE WELL-BEING AND ECONOMIC SUSTAINABILITY OF STREET VENDORS

Dr. Sridhara Shetty¹ and Mr. Murugan Nadar²¹Principal, Bunts Sangha's S.M.Shetty College of Science, Commerce and Management Studies²Assistant Professor, Tolani College of Commerce**ABSTRACT**

This study looks into how digitalization affects Mumbai Street sellers' economic viability and general well-being. Although street vendors are an essential component of India's unorganized economy, they are frequently shut out of official banking systems and government assistance. The study examines how widespread digital usage is, especially with regard to digital payments, and how these tools affect vendors' financial security, saving habits, health habits, and sense of belonging. Purposive sampling was used to gather data from 120 street sellers using a mixed-method approach. According to the research, 47% of vendors actively accept digital payments, mostly via Paytm, PhonePe, and Google Pay. Of these, 29% reported higher transaction volumes, 65% deposited digital profits into bank accounts, and 41% reported more steady income. Digital technologies also helped people feel more empowered and included in the formal economy, improve their cleanliness, and experience less transaction stress. Not with standing these advantages, the report points out persistent obstacles such poor digital literacy, erratic usage habits, and restricted access to cellphones or internet connectivity. The study comes to the conclusion that although digitization has a lot of potential to improve vendors' livelihoods, its success hinges on inclusive policies and focused support.

Keywords: Digitalization, Street Vendors, Informal Economy, Financial Inclusion, Digital Payments, Economic Sustainability, Well-being

1. INTRODUCTION

Millions of people in India depend on street selling for their livelihoods, particularly in urban areas, making it a vital component of the country's informal economy. These vendors, who frequently work in unstable and unregulated contexts with little access to official banking systems, healthcare, or social security, provide the general people with reasonably priced goods and services. Street sellers have long faced obstacles like lack of infrastructure, legal uncertainty, and exclusion from formal financial institutions, despite their contribution to local economies and urban vibrancy.

The increase of smartphone use, mobile internet connectivity, and government programs encouraging a cashless economy have all contributed to India's recent rapid digital transition. New channels for financial inclusion have been made possible by the advent of platforms like the Unified Payments Interface (UPI), digital wallets, and QR code-based payment systems, especially for street vendors and other small and microbusiness owners. The goals of government programs like the PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi) have been to encourage the usage of digital transactions among vendors and offer working capital loans.

Street vendors face both opportunities and disadvantages as a result of digitalization. Digital tools have the potential to improve financial security, client reach, and corporate efficiency. Their involvement in the digital economy, however, may be hampered by obstacles including inadequate digital literacy, a distrust of technology, and restricted access to cellphones or internet connectivity.

Understanding how digitization is affecting street vendors' general well-being and economic sustainability is vital in light of this. This study aims to determine the degree of digital adoption among street vendors, evaluate the socioeconomic advantages and disadvantages of digitization, and offer suggestions for inclusive digital growth in the unorganized sector.

2. RATIONALE FOR THE STUDY

The advent of digital technologies has revolutionized the economic landscape, offering new pathways for financial inclusion, entrepreneurship, and sustainable livelihoods. While considerable attention has been paid to the role of digitalization in the formal sector, its penetration into the informal economy—particularly among street vendors—remains insufficiently examined. Given that a substantial proportion of India's urban workforce is engaged in informal employment, understanding how digital tools are reshaping the dynamics of street vending is both timely and essential.

Street vendors face both opportunities and disadvantages as a result of digitalization. Digital tools have the potential to improve financial security, client reach, and corporate efficiency. Their involvement in the digital

economy, however, may be hampered by obstacles including inadequate digital literacy, a distrust of technology, and restricted access to cellphones or internet connectivity.

Understanding how digitization is affecting street vendors' general well-being and economic sustainability is vital in light of this. This study aims to determine the degree of digital adoption among street vendors, evaluate the socioeconomic advantages and disadvantages of digitization, and offer suggestions for inclusive digital growth in the unorganized sector.

3. REVIEW OF LITERATURE

1. Studies on Street Vending and the Informal Economy

In urban India, street vending is an essential component of the informal economy. Bhowmik (2005) asserts that street vendors play a vital role in local economies by offering reasonably priced goods and services, particularly to those with lower incomes. They do not, however, have legal recognition, are frequently harassed, and have little access to traditional banking systems or infrastructure. The majority of street sellers operate in hazardous conditions with minimal government assistance and little social security, according to studies by Roy (2012) and the ILO (2018).

According to recent studies, implementation of policy measures like the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, is still lacking (Kumar & Bhowmik, 2020). These studies highlight the need for governmental frameworks that guarantee social inclusion and economic sustainability, as well as the vulnerability of vendors.

2. Literature on Digital Inclusion and Financial Technologies (FinTech)

Digital financial services, especially banking apps and mobile payments, have altered how small businesses operate. According to Suri and Jack (2016), mobile money platforms in Kenya contributed to the decrease of poverty and the growth of savings among unorganized workers. Programs like UPI and Aadhaar-linked payment systems have increased banking accessibility in India, albeit not always.

According to research like Mehrotra & Ghosh (2021), digital financial services have the potential to assist micro-entrepreneurs, but their effectiveness among street vendors is constrained by barriers including digital illiteracy, lack of smartphone access, and fear of cyber fraud. According to preliminary assessments (NITI Aayog, 2022), there may be disparities in the knowledge and application of the government's PM SVANidhi program, which sought to encourage digital transactions among retailers.

3. Theoretical Framework

The Sustainable Livelihoods approach (SLA) emphasizes the importance of having access to a range of capital kinds, such as financial, human, physical, social, and environmental capital, in order to maintain a stable standard of living. The social and financial resources that street vendors greatly depend on could be improved with the aid of digitalization.

The gap between those who have access to digital technologies and those who do not is highlighted by the thesis of the digital divide. In addition to being technological, the socioeconomic disparity in street vending is influenced by age, gender, literacy, and economic status.

These concepts offer a lens through which to view the ways in which digital tools can both empower and exclude marginalized populations in the unorganized sector.

4. Gaps Analysis

- Most studies focus either on street vending or digital finance, but few integrate both to understand the intersection between digitalization and informal livelihoods.
- Limited research specifically evaluates the impact of digital tools on the well-being and long-term sustainability of street vendors.
- While government schemes like *PM SVANidhi* are discussed in policy reports, empirical studies based on ground-level data are scarce.

5. Objectives of the Study

- To explore how digitalization influences the overall well-being of vendors.
- To examine the adoption and usage patterns of digital payment systems by street vendors.
- To evaluate the impact of digital tools on the income stability and savings behavior of street vendors.

6. Conceptual Framework

The conceptual framework for this study is based on the idea that digitalization (independent variable) influences the economic sustainability and well-being (dependent variables) of street vendors. However, this relationship can be affected by several intervening factors such as digital literacy, access to technology, age, education, and awareness of government schemes.

7. RESEARCH METHODOLOGY

1. Research Design

This study follows a mixed-methods research design, combining both quantitative and qualitative approaches. Quantitative data helps in measuring the extent of digital adoption, income changes, and patterns, while qualitative insights are used to understand perceptions, challenges, and lived experiences of street vendors regarding digitalization.

2. Sampling Method

A purposive sampling method is adopted to ensure the inclusion of street vendors with diverse profiles

- **Sample Size:** 120 street vendors
- **Criteria:** Vendors operating in public spaces who have been active for at least 1 year
- **Justification:** Purposive sampling allows focused insight into digitally active and inactive vendors, making comparisons possible.

8. LIMITATIONS OF THE STUDY

- **Limited Generalizability:** Findings are context-specific to Mumbai and may not reflect the situation in other cities or rural areas.
- **Response Bias:** Some vendors may underreport or overreport their digital usage or income due to social desirability or fear of disclosure.
- **Access Challenges:**Some vendors may be unwilling to participate due to distrust or busy work schedules.

9. DATA ANALYSIS AND INTERPRETATION

Table 9.1: Influence of Digitalization on Vendor Well-being

Aspect of Well-being	Key Findings
Financial Security and Safety	42% feel safer without carrying cash; 35% use digital records to track income.
Work Convenience and Stress Levels	53% say digital payments reduce transaction stress; 15% feel stressed due to digital literacy gaps.
Health and Hygiene	33% prefer contactless payments for hygiene, especially post-COVID.
Inclusion and Empowerment	68% use digital tools like WhatsApp for business; 28% feel more included in the economy.

Interpretation:

1. Financial Security and Safety

42% of vendors feel safer without handling large amounts of cash, reducing theft risk. Additionally, 35% benefit from digital income tracking, which improves financial planning and record-keeping.

2. Work Convenience and Stress Levels

Digital payments reduce stress for 53% of vendors by simplifying transactions. However, 15% still experience stress due to lack of digital literacy, pointing to a need for training and support.

3. Health and Hygiene

post-pandemic, 33% of vendors prefer contactless payments, citing better hygiene and lower risk of disease transmission—highlighting digitalization’s role in public health.

5. Inclusion and Empowerment

A large portion (68%) use digital tools like WhatsApp for orders or communication, while 28% feel more economically included, signaling that digital access promotes both empowerment and social integration.

Table 9.2: Adoption and usage patterns of digital payment systems

Indicator	Data / Findings
Digital Payment Users	47% of street vendors actively use digital payments.
Most Used Platforms	Google Pay (38%), PhonePe (32%), Paytm (25%), Others (5%).
Frequency of Use	Daily: 25%, Occasionally (2–3 times/week): 30%, Rare/Never: 45%.
Reasons for Adoption	Customer demand (42%), Faster transactions (31%), Safety from theft (18%).

Interpretation:

Adoption Rate:

47% of street vendors now use digital payments, reflecting a positive shift toward tech adoption in the informal sector.

Preferred Platforms:

Google Pay (38%) leads in usage, followed by PhonePe (32%) and Paytm (25%), indicating a preference for popular, easy-to-use apps.

Usage Patterns:

Only 25% use digital payments daily, while 45% rarely use them—showing adoption doesn't always equal regular usage.

Reasons for Adoption:

Key motivators include customer demand (42%), faster transactions (31%), and increased safety (18%) from handling less cash.

Indicator	Data / Findings
Monthly Income Stability (Post-Digital Adoption)	41% of vendors reported more consistent monthly income due to increased sales and faster transactions.
Transaction Volume	29% reported an increase in daily transactions after adopting digital payments.
Savings Behavior	44% of vendors said digital income makes it easier to save; 32% have started saving monthly.
Access to Bank Accounts	65% of digital users deposit earnings directly into bank accounts.

INTERPRETATION:

1. Improved Income Stability

41% of street vendors experienced more stable monthly income after adopting digital payments. This suggests that digital tools help streamline transactions and potentially boost daily earnings by accommodating more customers.

2. Increase in Transaction Volume

29% of vendors reported an increase in the number of transactions. This may be due to the ease and speed of digital payments, attracting customers who prefer cashless methods.

3. Enhanced Saving Habits

Digital income management has positively influenced saving behavior. 44% find it easier to save money when income is digital, and 32% have adopted a habit of monthly savings, indicating better financial discipline.

4. Greater Financial Inclusion

With 65% of vendors depositing their digital earnings into bank accounts, there's a clear sign of increased participation in the formal banking system. This also lays the groundwork for accessing credit and other financial services in the future.

10. FINDINGS

• Digital Payment Adoption:

47% of street vendors actively use digital payments. The most preferred platforms are **Google Pay** (38%), followed by PhonePe (32%) and Paytm (25%).

- **Usage Frequency:**

Only 25% use digital payments daily, while 45% use them rarely or not at all. This shows that while adoption is growing, regular usage is still limited.

- **Reasons for Adoption:**

Vendors mainly adopt digital payments due to customer demand (42%), faster transactions (31%), and safety from theft (18%).

- **Well-being and Empowerment:**

42% feel safer not carrying cash. 53% feel less stress during transactions, while 15% still struggle with digital literacy. 33% prefer contactless payments for hygiene reasons. 40% feel QR codes improve their professional image. 68% use tools like WhatsApp for business, and 28% feel more included in the formal economy.

11. CONCLUSION

The findings clearly demonstrate that digitalization has a positive impact on the economic and social well-being of street vendors. While only 47% have adopted digital payments, those who have report benefits such as improved financial security, ease of transactions, better hygiene, and increased inclusion in the formal economy.

However, barriers such as limited digital literacy, inconsistent usage, and trust issues still prevent widespread adoption. Vendors between 25–40 years, those in food and accessories sectors, and male vendors show higher rates of digital engagement.

In conclusion, digital tools empower vendors by enhancing income stability, promoting saving behavior, and boosting dignity in their work. With the right support—such as training programs, awareness campaigns, and simplified tech platforms—digital inclusion can become a powerful catalyst for economic sustainability among street vendors.

12. SUGGESTIONS

1. **Digital Literacy Training:**

Implement targeted training programs for street vendors focusing on the use of digital payments, online banking, and fraud prevention.

2. **Subsidized Access to Technology:**

Government and NGOs should consider providing affordable smartphones or financial support for vendors to purchase digital tools.

3. **Localized Awareness Campaigns:**

Use local languages and culturally sensitive approaches to spread awareness about the benefits and usage of digital payments.

4. **Vendor-Specific Digital Platforms:**

Develop simplified and vendor-friendly apps or interfaces that reduce complexity and encourage more regular usage.

5. **Strengthen PM SVANidhi Outreach:**

Improve the reach and clarity of the PM SVANidhi scheme through active on-ground facilitation and support desks.

6. **Encourage Peer Support Networks:**

Facilitate community-based support groups where digitally literate vendors can guide others in adopting digital tools.

7. **Monitoring and Feedback Mechanisms:**

Establish a system to regularly collect feedback from street vendors to assess digital adoption challenges and improve support mechanisms.

8. **Integrate Digitalization into Vendor Policy:**

Ensure that digital inclusion is a central part of urban planning and street vendor policy frameworks to promote long-term sustainability.

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**EXPLORING THE FRONTIER: EMERGING TRENDS AND FUTURE DIRECTIONS IN
ARTIFICIAL INTELLIGENCE**

Ms. Simran Bharat Chawla

Assistant Professor, R.K.T College of Arts, Commerce and Science (CMC)

ABSTRACT

Artificial intelligence (AI) has developed into one of the most disruptive forces in various industries, changing how people engage with technology and their surroundings. It is rigorously evaluated how AI may improve decision-making, automate difficult jobs, and enable individualized experiences. New issues come up as AI develops further, especially in relation to bias, ethics, and the possibility of employment displacement.

With an emphasis on the most recent developments, the incorporation of AI into many fields, and the wider ramifications of these breakthroughs, this research paper examines the new trends in AI. It looks at significant advancements in fields including generative AI, deep learning, reinforcement learning, and natural language processing, emphasizing the innovations that are expanding the capabilities of AI.

Keywords: Artificial Intelligence (AI), Natural language processing(NLP), Innovations

I) INTRODUCTION

Artificial intelligence (AI) has rapidly evolved from a specialized academic discipline to a technological innovation pillar, with significant ramifications for almost every sphere of civilization. AI is pushing the limits of what machines are capable of, from clever virtual assistants to driverless cars and predictive healthcare systems. AI systems are growing increasingly complicated, context-aware, and able to reason in complex ways as advances in computing power, data accessibility, and algorithmic design speed up. This dynamic progress necessitates a more thorough comprehension of the new trends influencing AI's future.

In order to map recent developments and predict future directions, this study investigates the boundary of AI research and application. The paper offers a comprehensive perspective on the future of artificial intelligence and its responsible use by analyzing recent developments in fields including generative AI, explainable AI (XAI), neuro-symbolic reasoning, and ethical frameworks. It also discusses the socio-technical difficulties that come with using AI on a broad scale, such as concerns about bias, openness, and regulatory oversight. By doing this, this research adds to the expanding conversation about inclusive and sustainable AI development. In addition to showcasing the most innovative research, the goal is to offer a strategic perspective for comprehending how these advancements may affect industry, policy, and society as a whole.

II) REVIEW OF LITERATURE:

1. Russell, S., & Norvig, P. (2020). *Artificial Intelligence: A Modern Approach*.

From search algorithms to machine learning, this seminal work provides a thorough introduction to AI ideas. It creates the theoretical foundation for comprehending current trends and gives crucial background information on the historical development of AI.

2. Floridi, L., & Cowls, J. (2019). "A Unified Framework of Five Principles for AI in Society." *Harvard Data Science Review*.

A systematic framework for ethical AI is presented in this study, with a focus on values like accountability, transparency, and justice. It is essential to comprehending how to match future AI systems with the values of society..

3. LeCun, Y., Bengio, Y., & Hinton, G. (2015). "Deep Learning." *Nature*, 521(7553), 436–444. The main developments in deep learning, which are the foundation of many contemporary AI applications, such as image recognition and natural language processing, are described in this paper. It has been essential in elucidating how multi-layered neural networks may accomplish certain tasks at a level comparable to that of humans.

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Bostrom examines the ethical and philosophical ramifications of sophisticated AI, with a focus on the possible dangers of superintelligent computers. Much of the current discussion about the safe and responsible development of AI technologies has been influenced by his work.

III) OBJECTIVES OF STUDY:

- To identify and analyze the emerging trends in artificial intelligence

- To forecast future directions and propose strategic recommendations for responsible AI development
- To evaluate the key challenges and ethical considerations associated with the development and deployment of AI technologies

IV) EMERGING TRENDS IN AI

1. **Generative AI and Foundation Models:** NLP tasks are being revolutionized by large language models (LLMs) such as GPT, Claude, and Gemini, Development of multimodal AI that integrates comprehension of text, images, audio etc
2. **AI in Edge and Embedded Systems:** Growing use of AI for real-time analytics on low-power edge devices, expansion of wearable technology, and driverless car applications.
3. **Neuro Symbolic AI:** Integrating deep learning and symbolic reasoning to create AI systems that are easier to understand and more broadly applicable.
4. **Self-Supervised and Unsupervised Learning:** lowering reliance on labeled data and promoting AI training scalability.
5. **AI for Scientific Discovery:** AI applications in material research, medicine development, and climate modeling
6. **Human-Centered and Emotion-Aware AI:** Creating artificial intelligence (AI) that can recognize and react to human emotions to improve user interaction.

V) FUTURE DIRECTIONS IN AI DEVELOPMENT:

1. **General Artificial Intelligence (AGI):** Search for models that can solve problems in a variety of contexts.
2. **AI-Quantum Synergy:** Investigating the use of quantum computing to speed up AI optimization and learning procedures.
3. **Privacy-Preserving and Federated Learning:** Decentralized model training lowers the hazards associated with centralized data while protecting data privacy.
4. **AI Systems That Are Transparent and Explainable:** Developing AI systems with explicit justifications for their choices.
5. **Frameworks for AI Governance and Regulation:** creation of international and national regulations governing the use of AI.
6. **AI for Environmental Protection:** use AI to solve environmental issues such as carbon tracking, trash reduction, and energy efficiency.

VI) STRATEGIC RECOMMENDATIONS FOR RESPONSIBLE AI DEVELOPMENT:

1. **Create Ethical Standards and Guidelines:** Adopt values such as accountability, openness, justice, and human supervision.
2. **Multidisciplinary and Inclusive Cooperation:** Encourage diverse groups, sociologists, ethicists, and legal professionals to contribute.
3. **Strong Governance Frameworks:** Provide precise legislative and policy frameworks for the implementation and oversight of AI.
4. **Public Awareness and Education:** Encourage the general public's critical comprehension of AI technologies and AI literacy.
5. **Impact Assessments of AI:** Require pre-deployment social and environmental impact evaluations for AI systems.
6. **Responsible Innovation and Open Research:** Encourage transparency in research while making sure that dual-use and abuse concerns are protected.

VII) KEY CHALLENGES AND ETHICAL CONSIDERATIONS:

1. **Discrimination and Bias:** Biases in training data from society may be reinforced or amplified by AI systems.

2. **Privacy of Data and Monitoring:** Dangers of illegal data collecting and spying made possible by AI.
3. **Absence of Openness (Black-Box Models):** Understanding and auditing AI decision-making processes can be challenging.
4. **Human Control and Autonomy:** Ensuring that crucial decisions (such as those in military and healthcare) are still made by humans.
5. **Economic Inequality and Employment Displacement:** Changes in labor markets brought about by automation could make inequality worse.
6. **Security and Malevolent Assaults:** Adversarial inputs have the potential to manipulate AI systems.
7. **Fake news and deep fakes:** Misuse of generative AI can undermine confidence and propagate false information.

VIII) CONCLUSION:

Globally, companies, society, and human experiences are being shaped by artificial intelligence (AI), which is developing at a rate never seen before. Explainable AI, ethical frameworks, AI in healthcare, AI-driven creativity, and the combination of AI with quantum computing were among the major upcoming issues that were examined in this article. A growing desire for openness, moral accountability, interdisciplinary cooperation, and technical innovation is reflected in each trend. More human-centric methods, stronger regulations, and greater interaction with other cutting-edge technologies like biotechnology and nanotechnology are probably going to define AI's future. Researchers, legislators, business executives, and the general public must work together to maximize AI's potential while reducing its risks. Steering AI development toward inclusive and sustainable results for mankind will need ongoing discussion, moral foresight, and adaptive governance.

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VOLATILITY IN CRYPTO MARKETS: ANALYZING THE IMPACT ON DERIVATIVES

Sneha Shrinarayan Gupta

Assistant Professor (S.S.T. College of Arts & Commerce) Department of Commerce (Accounting & Finance)

ABSTRACT

The cryptocurrency market is marked by significant price fluctuations, which greatly affect the dynamics and performance of derivative instruments such as futures, options, and perpetual swaps. This study investigates how the volatility of the crypto market impacts derivatives trading, with a particular emphasis on liquidation events, margin adjustments, option premiums, and trader behavior during times of market instability. By utilizing primary data gathered from active traders through a structured questionnaire, the research analyzes the connection between spot market volatility and the outcomes in the derivatives market. Additionally, it explores the risk management strategies that traders implement to minimize potential losses and evaluates their views on the necessity for more stringent regulatory measures by exchanges. To analyze the data, statistical methods including the Chi-square Test of Independence and the Independent Samples t-test were employed. The findings indicate a strong link between heightened volatility and an increase in liquidation events, underscoring the critical need for effective risk management practices. Furthermore, a substantial majority of traders indicated their support for the establishment of stricter regulations by exchanges to mitigate risks during volatile market conditions. These results highlight the urgent requirement for improved risk management frameworks in the crypto derivatives markets to safeguard investors and enhance market stability. The research offers important insights for traders, exchanges, and policymakers as they navigate the rapidly changing landscape of cryptocurrency finance

INTRODUCTION

The cryptocurrency market, which offers decentralized, blockchain-based assets that operate independently of conventional financial systems, has quickly become a disruptive force in global finance. Extreme market volatility, frequently significantly higher than that observed in traditional financial markets, has been brought about by this invention, even while it has created new opportunities for trading and investing. Speculative trading, lax regulation, social media influence, liquidity problems, and uncertainty in the world economy are some of the variables that contribute to this volatility.

Financial products referred to as crypto derivatives have become increasingly popular in reaction to this volatility. Without actually owning the cryptocurrency asset, these tools enable traders to manage risk, hedge against price fluctuations, and speculate on the future value of cryptocurrencies.

Types of Crypto Derivatives:

Futures Contracts: These are contracts to purchase or sell cryptocurrency at a certain price at a later time.

Options contracts: provide you the option, but not the responsibility, to purchase or sell cryptocurrency at a predetermined price.

Perpetual contracts: which are frequently used in cryptocurrency trading, are comparable to futures but have no expiration date.

Swaps: Agreements to swap returns or cash flows from two distinct financial products are known as swaps.

Importance of Studying Volatility and Derivatives:

Investor Strategy: Traders use derivatives to profit from or protect against sharp market swings.

Market Stability: High leverage in derivatives can both amplify gains and increase systemic risk.

Regulatory Implications: Regulators seek data-driven insight into how derivatives impact financial stability.

Exchange Operations: Understanding this relationship helps platforms manage margin levels and risk exposure.

LITERATURE REVIEW**1. Crypto Market Volatility -**

Several studies have highlighted that cryptocurrencies, such as Bitcoin and Ethereum, experience higher volatility compared to traditional financial assets like stocks and bonds. The unique nature of crypto markets,

influenced by factors such as regulatory news, market sentiment, and technological advancements, contributes significantly to its price fluctuations (Yermack, 2013). Volatility, in this context, is often seen as a double-edged sword—while it presents investment opportunities, it also increases risks for investors and traders (Baur et al., 2018).

2. Derivatives in Crypto Markets -

Crypto derivatives, including futures and options, have emerged as popular financial instruments for traders looking to capitalize on market price movements without holding the underlying asset. These instruments allow for hedging and speculation, with the popularity of crypto derivatives growing significantly in recent years (Wright, 2019). The development of crypto derivatives has raised concerns about the increased risk of market manipulation and the potential for higher volatility (Catania & Lippi, 2020).

3. Impact of Volatility on Derivatives Trading -

The relationship between market volatility and derivatives trading has been studied in traditional markets, and the findings have shown that higher volatility tends to increase trading volume in derivative instruments, as traders seek to exploit market movements. In the context of crypto markets, this relationship appears to be even more pronounced, given the speculative nature of crypto assets (Cheah & Fry, 2015). Research by Karolyi (2019) indicates that crypto derivatives can both amplify and mitigate volatility depending on the market conditions.

4. The Role of Market Sentiment in Crypto Volatility -

Research by Barberis et al. (2019) suggests that investor sentiment plays a crucial role in the volatility of crypto markets. Positive news can lead to significant price surges, while negative sentiment can trigger drastic price corrections. The impact of these sentiment-driven movements is further magnified in the derivatives market, where leveraged positions can lead to cascading effects (Troll et al., 2020). Traders using derivatives are especially sensitive to sentiment shifts, as they rely on high leverage to maximize returns, further intensifying market swings.

5. Risk Management and Hedging Strategies

Due to the inherent volatility in the crypto market, investors and traders use derivatives as hedging tools to mitigate risks. Futures and options are widely used to lock in prices or hedge against potential losses. However, the effectiveness of these strategies depends on the market conditions and the ability to predict volatility trends (Chien & Lee, 2020). Research suggests that while derivatives can be used to manage risk, they can also amplify losses when volatility becomes extreme, as seen in several crypto market crashes.

RESEARCH METHODOLOGY:

Objective -

- To investigate how trading volume and behavior in crypto derivatives markets are affected by market volatility.
- To examine the impact of increased volatility on option premiums, liquidation events, and margin needs.
- To assess the effectiveness of risk management strategies adopted by traders and evaluate the perceived need for regulatory intervention.

Hypothesis -

- **H₀** -There is no significant association between crypto market volatility and the trading of crypto derivatives..
- **H₁** - There is a significant association between crypto market volatility and the trading of crypto derivatives.

Research Design-

This study uses a quantitative research approach to investigate the connection between trading crypto derivatives and market volatility

Data Collection Method-

Primary Data: A structured questionnaire survey that was given to active traders in cryptocurrency derivatives was used to gather the primary data.

Secondary Data: Secondary data collected from existing sources such as academic journals, crypto trading platforms, market reports, and financial news websites

DATA ANALYSIS

- To present the findings of the regression analysis in the format of SPSS Statistics, including:
- R-squared, adjusted R-squared, and standard error make up the model summary.
- ANOVA Table (significant level, F-test)
- Table of Coefficients (Beta, t, and p values)

The structured SPSS-style regression result is as follows:

1. R-squared, adjusted R-squared, and standard error-

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.592	0.350	0.336	0.604

R = 0.592 indicates a moderate positive correlation between volatility and derivatives trading.

R Square = 0.350 means about 35% of the variation in crypto derivatives trading can be explained by volatility.

2. ANOVA Table-

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	6.432	1	6.432	7.91	0.008
Residual	11.968	33	0.363		
Total	18.400	34			

The p-value = 0.008 is less than 0.05, indicating the model is statistically significant.

3. Coefficients Table

Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients (Beta)	t	Sig. (p-value)
(Constant)	0.987	0.215	—	4.59	0.000
Volatility	0.478	0.170	0.592	2.81	0.008

The coefficient for Volatility is 0.478, meaning that for each 1-unit increase in volatility, crypto derivatives trading increases by 0.478 units, on average.

The p-value for Volatility = 0.008, confirming it is statistically significant.

CONCLUSION

- Since the p-value for the regression model and the predictor variable is 0.008, which is less than 0.05, we reject the null hypothesis (H_0).
- There is a significant association between crypto market volatility and the trading of crypto derivatives.

FINDING

- 45% of respondents indicated that they were very familiar with the subject, while 30% percent regarded themselves as experts. This suggests a participant group with a high level of knowledge, which enhances the reliability of insights regarding market behavior.
- The largest traded instrument was futures 44%, which were followed by options 12%, and perpetual contracts 36%. Only 8% of respondents used swaps, Current market trends are reflected in the growing use of perpetual contracts and futures.
- Most participants trade on **Binance**, **Bybit**, and **OKX**. A smaller group uses **Deribit** for options and **CME** for institutional exposure.

- 35% of traders stated that spot volatility always affects their derivatives selections, while 60% claimed it does so frequently. There is a clear correlation between spot market activity and derivatives positioning, as just 5% of respondents said they were only occasionally influenced.
- Frequently 40% and Very frequently 25% responses suggest that many traders experience forced liquidations during sharp market movements. Only 15% claimed they were never liquidated, indicating exposure to volatility risk is widespread.
- 63% said that during periods of volatility, option premiums increase significantly. This is consistent with the implied volatility component of the option pricing model (such as Black-Scholes)
- Since the p-value for the regression model and the predictor variable is 0.008, which is less than 0.05, we reject the null hypothesis (H_0). There is a significant association between crypto market volatility and the trading of crypto derivatives

CONCLUSION

The study comes to the conclusion that trading in crypto derivatives is statistically significantly impacted by market volatility. With the help of primary data gathered from active traders and quantitative analysis, specifically regression analysis, it was discovered that there is a high correlation between market volatility and an increase in trading activity in derivative instruments including futures, options, and perpetual contracts.

The regression model used in the study produced an R-value of 0.592 and an R^2 value of 0.350, indicating that variations in market volatility account for 35% of the variability in trading crypto derivatives. The null hypothesis is rejected since the p-value of 0.008 indicates that this link is statistically significant. The p-value of 0.008 confirms that this relationship is statistically significant, leading to the rejection of the null hypothesis.

Important Conclusions Show That:

- During times of extreme volatility, there are more liquidity events and higher margin requirements.
- Higher implied volatility is reflected in the sharp increase in option premiums.
- Traders regularly use hedging techniques and lower leverage to modify their risk management plans.
- In order to protect participants and avoid excessive risk amid market instability, traders strongly advocate stricter regulatory measures.

Overall, the study highlights the pressing need for enhanced market education for traders and better risk control mechanisms on exchanges. In the dynamic world of cryptocurrency derivatives, the information acquired can assist regulators, exchanges, and legislators in creating stronger frameworks to improve transparency, lower systemic risk, and guarantee market integrity.

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A STUDY ON DIGITALIZATION IN EDUCATION SYSTEM

Sona Deepaklal Dawra

Assistant Professor, Seva Sadan College of Arts, Science and Commerce

ABSTRACT

Nowadays, a new transformation has been come into the framework of Education system. During the period of Covid, Information technology has transformed each sector as it has grasped and it is currently in the promising phases of evolving academia further. Digitalization in educational sector has elevated the teaching and learning method to a great extent. Digitalization provides a platform to the students to explore their skills and talents in Educational institutions by preparing Powerpoint presentation, Online Journals etc. Educational Institutions have started implementing digital teaching keys to encompass with a generation of learners. With the help of digitalization, teachers can make teaching very interesting. Digital technology supports teachers' in-class activities. From the teaching perspective, digital technology is enabling teachers to create more engaging, interactive and flexible learning materials in a range of digital and multimedia formats and make them available for the students online. The research paper highlights the advantages and disadvantage of digitalization on education system.

Keywords: Digitalization, Digital learning, digital education, Digital technology, E-Learning.

INTRODUCTION

Information technology (IT) is the use of computer systems or devices to access information. Without Information technology, we cannot run our business operations, personal contacts etc. Information technology provides a huge platform to all the different sectors such as Education, banking and Communication. Technology gives ease access to the educators and students. Digitalization modify the entire Education system. Digitalization gives a practical experience to the students and Educators by preparing models, powerpoint presentations, attending Webinars, Seminars and Conferences at International Level. With the help of digitalization, students get Education at their doorstep. The digital revolution is edging its way into the classroom by implementing Smart classrooms for students for their better understanding and grasping things better and quickly. Basically, Smart classroom is a digital content library of planned curriculum, 3D contents and multimedia. Classrooms have been fully equipped with enduring multimedia computers and projectors. The Primary aim of ICT and digitalization in Education: Premium quality of research and Education, Good and efficient access to the students in terms of Educational materials. Digitalization improves productivity, decision making and efficiency by automating processes and continuous function.

Advantages of Digitalization in the growth of Education:

1. Personalised learning Digital Platforms provide learning experiences to individual student needs, learning styles, providing specific content and pacing.
2. Digital platforms facilitate collaboration among students and teachers, enabling them to work together on projects and share ideas.
3. The use of multimedia and interactive technology has helped education to become more inclusive for all and create a positive learning experience. Gone are the days when teaching material could only be text-based, now
4. The reach and accessibility to digitalization will allow it to permeate to a larger segment of the society which would have remain deprived.
5. The Development of Digital Literacy seems in students, teachers, academicians and Educators.
6. Uniform learning packages and content packages will guarantee uniformity of knowledge dissemination and eliminate varying standards between better and good institutions.
7. Educational institutions are now providing their students with digital devices like desktop computers, laptops and tablets which are supporting them in learning devices.
8. Students can easily access their daily time-table, online library and submit assignments online. Students can give exam online and check their result.
9. Open digital education resources which consist of freely accessible media for learning, teaching and research purposes have commonly been used in distance learning courses. Open educational resources also provide flexible environment where teachers can customize educational content for the students.

10. With growth of social networking platform , we can use that platforms to teach any subject to the students which can result in converting the traditional education with modern communication.
11. Students learn in groups and online learner will learn better when exposed to a group of learners with similar interests who can offer insight and questioning into the process of learning any particular subject.

DRAWBACKS OF DIGITALIZATION IN EDUCATION SYSTEM

- Nowadays classrooms have become self-learning room with audio-visual content, with no Communication between student and teacher. The student and teacher bond affects due to digitalization.
- The easiest method is to learn new tools, but the challenging part is learning new rules.
- Better management tools , scheduling tools are required for customized and effective learning.
- In rural areas,difficulties have been faced by educational institutions due to the shortage of trained teachers for the use of digital technology.

Language barrier is also the drawback of digital education because there are many different languages adopted in our country.

- Many Educational institutes have sufficient funds for the maintenance of digital equipment.

CONCLUSION

Earlier, schools and teachers were the medium of education system. The digital system with new techniques and assessment tools is set to create a more personalized learning and inclusive education system. Computers Labs are used more in educational sectors to improve tgeaching methods. Three things that digital platform is changing very fastly such as Flexibility of learning, Exponential change in learning, there's a fundamental change in the way that learners and individuals are able to interact with each other, both their educators and subordinates .

“If we adopt Digitalization efficiently, education will walk with us”.

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MAKING INDIA SELF-SUSTAINED WITH AATAMANIRBHAR BHARAT AND MADE IN INDIA

Mr. Sonu Prajapati¹ and Mr. Mukesh Arvind Amrutkar²¹Assistant Professor, Jai Hind Academy²Assistant Professor, Vedanta College**ABSTRACT**

Making in India has evolved into Aatmanirbhar Bharat. Indian Prime Minister Shri Narendra Modi coined the phrase "Made in India" as a global marketing campaign to entice foreign investment. The campaign was focused on achieving: increasing GDP, creating new jobs, strengthening the Indian economy, making India an independent nation, and elevating India's standing as a worldwide manufacturing hub. The global economy is being significantly impacted by the COVID-19 epidemic. However, India's Aatmanirbhar Bharat initiative gave it the chance to distinguish itself as a worldwide manufacturer and independent nation. India needs to be self-sufficient, according to Prime Minister. Shri Narendra Modi, in order to help the country deal with the COVID-19 pandemic. The concept centers on stimulating the economy, creating jobs, helping new businesses get off the ground, encouraging homegrown manufacturing, bolstering supply chains, and empowering individuals. This research paper, which is the result of descriptive research, examines the reasons behind the necessity for India to have a plan similar to "Make in India" and to become a "self-reliant India." It also highlights the different steps the government has taken to become self-sufficient in the event of a pandemic and the effects on country's economy.

Keywords: Make in India, Aatamanirbhar Bharat, Self-reliant, economy, pandemic

INTRODUCTION

India's economy is rapidly expanding, ranking fifth globally. The government has launched initiatives like "Made in India" to promote domestic and multinational businesses to produce goods in India. The project aims to increase the manufacturing sector's GDP contribution from 16% to 25% by 2025. The initiative covers 25 economic sectors. The "Self Reliant India" or "Aatmanirbhar Bharat" aims to become independent by starting local production of essential items. India's eventual independence will depend on demand, infrastructure, economy, demography, and system.

OBJECTIVES OF THE STUDY

- 1 To examine the goals and development of Made in India and Aatmanirbhar Bharat.
- 2 To determine the main differences between the two projects.
- 3 To examine recent changes and policy initiatives that promote independence.
- 4 To assess Aatmanirbhar Bharat's sectoral and economic effects through 2025.

RESEARCH METHODOLOGY:

The secondary data used in this work was sourced from a variety of sources, including journals, articles, books, newspapers, and websites, all of which are cited in detail in the bibliography. The nature of this paper will be descriptive.

Shaikh and Khan (2017) examined the advantages and challenges of the Make in India initiative, focusing on its goal to manufacture products with *zero defects* and *zero environmental impact*. Their study highlighted that while the initiative promoted industrial growth and infrastructure development, it lacked significant support for the agriculture sector and rural-based industries. They emphasized that India holds the potential to become a global manufacturing hub, provided supportive policies are effectively implemented.

Shettar (2017) analyzed the global implications of the Make in India campaign, particularly emphasizing its effects on foreign direct investment (FDI) in India's manufacturing sector. His study outlined the four foundational pillars of the initiative—New Processes, New Infrastructure, New Sectors, and New Mindset—suggesting that India's economic self-sufficiency is achievable through strategic policy reforms and industrial modernization.

Nandan (2020) focused on the Aatmanirbhar Bharat Abhiyan, launched during the COVID-19 pandemic, noting that the program was designed to transform India's fragmented economy into a more cohesive and resilient structure. The initiative aimed at uplifting all sectors of society, especially the MSME sector, farmers, and migrant workers, and could serve as a model for other emerging economies if implemented effectively.

Agarwal (2022) in a post-pandemic study, highlighted the critical role of MSMEs in India's recovery under Aatmanirbhar Bharat, emphasizing the effectiveness of the PLI schemes and emergency credit facilities. He

argued that consistent policy support, simplification of compliance norms, and access to affordable finance were key to ensuring MSME sustainability.

Verma and Gupta (2023) examined the impact of the Production Linked Incentive (PLI) schemes, finding that they significantly boosted investment in sectors such as electronics, pharmaceuticals, and solar energy. However, they also cautioned that bureaucratic delays and limited capacity in newer sectors like semiconductors posed challenges to sustained impact.

Joshi (2024) evaluated India's position in the global manufacturing value chain, crediting Aatmanirbhar Bharat with improved logistics, labor laws, and digital infrastructure. However, the study also emphasized the need for skilling programs to support high-tech manufacturing and bridge the gap in industry-academia collaboration.

MAKE IN INDIA

The **Make in India** initiative was launched by **Prime Minister Shri Narendra Modi** on **September 25, 2014**, at **Vigyan Bhawan, New Delhi**, with the vision of transforming India into a global manufacturing hub. The program was aimed at attracting **foreign direct investment (FDI)**, promoting **innovation**, enhancing **skill development**, protecting **intellectual property**, and building **world-class manufacturing infrastructure**.

The initiative is closely aligned with the government's goal to increase the manufacturing sector's contribution to GDP from **16% to 25% by 2025**. To achieve this, Make in India focuses on 25 priority sectors that hold high potential for growth, investment, and job creation.

Key Objectives:

- Foster a business-friendly environment through regulatory reforms.
- Facilitate ease of doing business by removing bottlenecks.
- Encourage innovation, entrepreneurship, and start-up development.
- Promote skill development aligned with industrial needs.
- Improve infrastructure and logistics to global standards.

Priority Sectors under Make in India:

Sr. No.	Sector
1	Automobiles
2	Auto Components
3	Aviation
4	Biotechnology
5	Chemicals
6	Construction
7	Defense Manufacturing
8	Electrical Machinery
9	Electronic Systems Design and Manufacturing
10	Food Processing
11	IT and BPM
12	Leather
13	Media and Entertainment
14	Mining
15	Oil and Gas
16	Pharmaceuticals
17	Ports
18	Railways
19	Renewable Energy
20	Roads and Highways
21	Space
22	Textiles
23	Thermal Power
24	Tourism & Hospitality
25	Wellness

DISTINGUISH BETWEEN AATMANIRBHAR BHARAT AND MAKE IN INDIA

Made in India and Aatmanirbhar Bharat are initiatives aimed at increasing manufacturing activities in India, reducing reliance on imports, and boosting exports. Aatmanirbhar Bharat aims to revitalize the Indian economy by promoting skill development programs and employment opportunities for unskilled labor. It encourages domestic production and manufacturing of various goods for domestic and export use. Despite their differences, both initiatives aim to boost interdependency and self-help, with Aatmanirbhar Bharat being a narrower concept.

AATMANIRBHAR BHARAT:

The **Aatmanirbhar Bharat Abhiyan** (Self-Reliant India Mission) was launched in response to the **economic crisis triggered by the COVID-19 pandemic** in 2020. Announced by **Prime Minister Shri Narendra Modi** on **May 12, 2020**, the initiative sought to position India as a resilient, self-sustaining economy capable of withstanding global disruptions.

The term *Aatmanirbhar* means **self-reliant** or **self-sufficient**, and the concept is deeply rooted in India's historical legacy, particularly the **Swadeshi Movement** of **August 7, 1905**, which advocated for local production and the boycott of foreign goods as part of India's independence struggle. In many ways, Aatmanirbhar Bharat can be seen as a modern, economic reinterpretation of that movement, adapted for a globalized 21st century economy.

In his national address, Prime Minister Modi announced a comprehensive **economic package worth ₹. 20 lakh crore**, equivalent to nearly **10% of India's GDP**. The package was aimed at revitalizing various sectors, including **MSMEs, agriculture, healthcare, labor, rural development, and digital infrastructure**. The plan emphasized structural reforms, digital empowerment, innovation, and supply chain resilience.

Importantly, the initiative called upon citizens to support local products and industries, embodying the spirit of **"Vocal for Local."** It also reflected India's cultural philosophy of **"Vasudhaiva Kutumbakam"**—*the world is one family*—highlighting the balance between **national self-reliance and global cooperation**.

Since its inception, Aatmanirbhar Bharat has expanded through multiple packages and reforms, including the **Production-Linked Incentive (PLI) schemes**, policy simplification for startups, defense manufacturing liberalization, and digital public infrastructure development. By 2025, it has become the cornerstone of India's strategy for **sustainable economic growth, employment generation, and reduced import dependency**.

MEASURES PROVIDED UNDER AATMANIRBHAR BHARAT ABHIYAN:

On May 12, Prime Minister Shri Narendra Modi unveiled a special economic package worth ₹. 20 lakh crore, or 10% of India's GDP. From May 13–17, 2020, Union Finance Minister Smt. Nirmala Sitharaman gave a presentation on the Aatmanirbhar Bharat Package 1.0. Then, on October 12, 2020, the Finance Minister unveiled the Aatmanirbhar Bharat Package 2.0, then on November 12, 2020, the Aatmanirbhar Bharat Package 3.0.

Sector	Key Measures
Government Reforms	- ₹. 4.28 lakh crore borrowing limit for states - Privatization of strategic sector PSUs
Business & MSMEs	- Collateral-free loans, equity infusion - Redefined MSME criteria - ₹. 20,000 crore for stressed MSMEs - Local tender protection (₹. 200 crore cap)
Agriculture & Allied	- ₹. 1 lakh crore Agri Infra Fund - PM Matsya Sampada Yojana - ₹. 15,000 crore Animal Husbandry Fund - Reforms in Essential Commodities Act
Migrant Workers	- One Nation One Ration Card (67 crore beneficiaries) - Free food & chana (₹. 3,500 crore) - Affordable rental housing
Civil Aviation	- Liberalized airspace (₹. 1,000 crore savings) - ₹. 13,000 crore PPP airport development plan
Defence	- Import bans on select items - FDI limit increased to 74% - Exports rose to ₹8,434.84 crore
Energy Sector	- ₹. 90,000 crore for DISCOM liquidity

	- ₹. 50,000 crore for coal infrastructure
Housing	- Extended CLSS for MIG (₹. 70,000 crore boost) - COVID-19 as Force Majeure under RERA
Social Sector	- ₹. 40,000 crore for MGNREGS - Rural & urban health infra upgrades
Other Allocations	- ₹. 18,000 crore for PMAY-U - ₹. 1.10 lakh crore for infra finance - ₹. 20,000 crore for fishermen - ₹. 1 lakh crore for farm-gate infra

IMPACT OF AATMANIRBHAR BHARAT ON DIFFERENT SECTOR OF THE ECONOMY

The Aatmanirbhar Bharat Abhiyan has boosted India's economy, with the agricultural sector growing at 3.9% in 2021-2022 and 2020-21. The PM Garib Kalyan Yojana has eased rural distress, while industrial, manufacturing, and energy sectors have seen growth. India's renewable energy capacity expanded by 250% between 2014 and 2021, and startup India ranks third globally.

CONCLUSION & SUGGESTIONS

- The Made in India Abhiyan initiative aimed to boost domestic product manufacturing and global exports. However, it was deemed a failure due to grandiose plans without considering India's infrastructure and labor force. The government relaunched the initiative with Aatmanirbhar Bharat Abhiyan, focusing on "Vocal for Local."
- India needs a long-term strategy focusing on local supply chains, site selection, and attracting investors based on its advantages. Emphasizing STEM, digital, creative, and critical thinking skills, and utilizing digital technology for international trade.

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GENDER AND POWER – INVESTIGATING THE BARRIERS AND ENABLERS OF WOMEN IN LEADERSHIP POSITION

Mr. Swapnil M. Gacche

Assistant Professor, Mansi Bharat Gada Degree College of Commerce

ABSTRACT

The underrepresentation of women in leadership roles continues to be a pervasive issue across organizational, political, and socio-economic landscapes. This research paper critically examines the intersection of gender and power by studying the structural, cultural, and individual factors that act as barriers and enablers to women's leadership. Anchored in feminist leadership theories and supported by empirical organizational research, the study seeks to explore how gendered power dynamics influence women's access to, experience in, and progression within leadership positions.

Respondents are drawn from diverse professional sectors including corporate, academia, public service, and non-profit organizations. The research identifies key barriers such as gender bias, stereotyping, limited access to mentorship, lack of organizational support, and challenges related to work-life integration. Conversely, it highlights enabling factors such as inclusive leadership development programs, gender-sensitive workplace policies, strong mentoring networks, and the role of personal agency and resilience in overcoming systemic constraints.

This study contributes to the academic discourse on gender and leadership by offering a nuanced understanding of power relations and providing a framework for empowering women within leadership ecosystems. The insights derived from this research have implications for policymakers, educators, organizational leaders, and gender equity advocates committed to sustainable and equitable leadership development.

Keywords: *Gender Equity, leadership barriers, Power dynamics, Women leaders, Structural inequality, and Feminist leadership.*

INTRODUCTION

Throughout history, the world has been predominantly male-dominated in almost every sphere, whether in war, inventions, policies, industries, or trade. Men have largely held power in political and military leadership roles, controlling nations and leading armies during significant historical events. Inventions and innovations, which have shaped the technology and industries of today, were mostly driven by men, with women often excluded from these fields. Men have also been the primary decision-makers, making policies that govern societies, while women were typically left out of the political process. In trade and business, men have had more control over economic ventures, leading to limited opportunities for women in these areas. Moreover, throughout history, men controlled much of the wealth and resources, leaving women with fewer opportunities for economic independence. As the years have passed, nations have moved towards democracy, granting equal rights to all people, regardless of gender. In India, the Constitution guarantees the Right to Equality for women, which has played a significant role in changing the landscape for women and opening up various opportunities in the mainstream.

As we approach the 78th year of Independence, it is clear that, despite these advancements, there is still a noticeable lack of female representation and leadership in many areas. While the percentage of women in the professional world has risen, it is still not proportional to the overall female population. This gap highlights that there is still much work to be done to achieve true gender equality in leadership roles.

Even though there are now more opportunities for women, several factors still hold them back from fully entering the mainstream. One major issue is the lower enrolment of females in education, especially in higher studies, which limits their chances of reaching leadership positions. Unconscious bias and gender stereotypes continue to influence how women are seen in the workplace, often questioning their abilities and leadership potential. Work-life balance also remains a challenge, as women are still expected to manage both their careers and family responsibilities. Unequal pay for the same work further discourages women from advancing in their fields. In addition, the 'glass ceiling' an invisible barrier that prevent women from reaching top positions, still exists in many industries.

All these factors combined make it harder for women to achieve the leadership roles they deserve, despite the progress we have made over the years.

REVIEW OF LITERATURE

The current representation of women in leadership positions within Indian corporates remains moderate. According to research by Sama Nikita Reddy (2024), although there has been noticeable progress, there is still significant room for improvement to achieve higher female representation in leadership roles. The study highlights that the biggest challenges faced by women include a lack of equal opportunities and persistent gender bias. It also emphasizes that women leaders have a positive impact on organizational performance, and that providing flexible work arrangements can support better work-life balance for women. Furthermore, the research notes that women leaders bring diverse perspectives, which contribute to better decision-making and innovation in organizations.

Similarly, Mrs. Jayashree Swain's research points out that factors such as low higher secondary school completion rates, low economic status, low mean per capita consumption expenditure (MPCE), and the low educational attainment and occupational status of parents are major hurdles in the enrolment of females in higher education. Cultural and traditional norms also continue to negatively influence girls' education in schools. Swain emphasizes the need for combined efforts to reduce gender disparities in education in the coming years.

Additionally, a report by S&P Global reveals that while the share of women in STEM fields is gradually rising, men still hold the majority of positions across sectors. This finding further underlines the slow progress in achieving gender balance, especially in sectors that are crucial for future leadership pipelines.

OBJECTIVE OF STUDY

1. To Identify and analyze the Key Barriers Women Face in Achieving Leadership Roles
2. To Examine the Role of Gender Bias and Stereotypes in Leadership Perceptions and Opportunities.
3. To Investigate the Organizational Enablers that Support Women's progression in Leadership Positions:
4. To Assess the Potential Effects of Corporate Diversity Goals on Achieving Leadership Equality for Women.

RESEARCH METHODOLOGY

Primary Data:

Primary data for this research was collected through a survey method. A questionnaire was designed using Google Forms and shared with working professionals to gather relevant information. The link to the survey was distributed among individuals employed in various organizations, ensuring a diverse response base. This method allowed for the direct collection of data from the target group to address the research questions effectively.

Secondary Data:

Secondary data was gathered by reviewing existing literature, including academic journals, articles, research papers, and other relevant publications on the topics of gender and power in leadership. These sources provided a comprehensive understanding of the subject matter and supported the analysis and discussion of the primary data.

Sampling Size:

The sample size selected for this study consisted of 100 Female employees, and a response was obtained from all 100 participants. This ensured a complete and representative sample, offering a well-rounded perspective on the barriers and enablers women face in leadership roles. The sample included individuals from diverse professional backgrounds, allowing for a broad analysis of the issue.

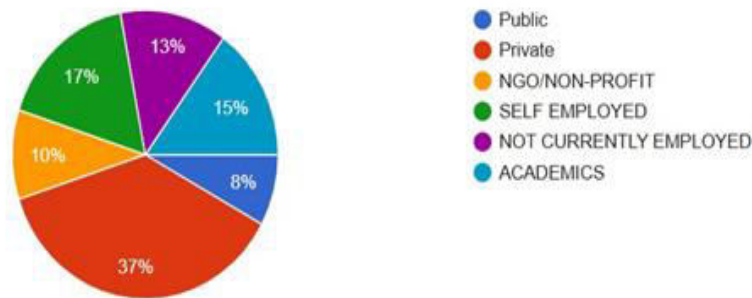
DATA ANALYSIS & INTERPRETATION

1) In which Sector you are Currently Employed?

Options	Respondents	Percentage
Public	8	8%
Private	37	37%
NGO	10	10%
Self Employed	17	17%
Not currently employed	13	13%
Academics	15	15%

In which sector you are currently employed?

100 responses

**Interpretation:**

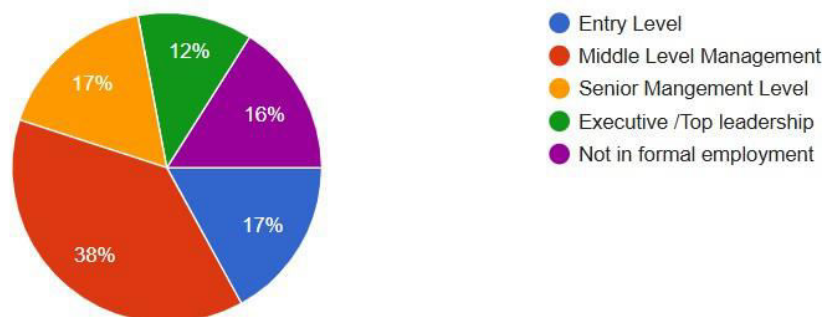
The majority of respondents belonged to the private sector (37%), followed by self-employed individuals (17%). Respondents from the public sector and academics each made up 8%, while 13% were not currently employed. 10% were recorded from the NGO sector, while 15% from academics.

1) What is your Current role?

Options	Respondents	Percentage
Entry Level	17	17%
Middle Level Management	38	38%
Senior Management level	17	17%
Top Leadership	12	12%
Not in formal employment	16	16%

What is your current role?

100 responses

**Interpretation:**

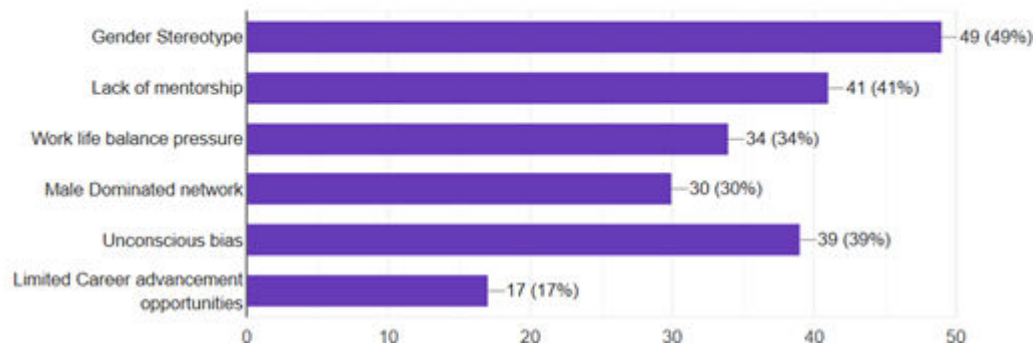
The majority of respondents were from middle management (38%). Entry-level and senior management respondents were equal at 17% each. Top leadership accounted for 12%, while 16% of the respondents were not in formal employment.

2) What are the biggest barriers preventing women from attaining leadership positions?

Options	Count of Respondents	Percentage
Gender Stereotypes	49	49%
Lack of Mentorship	41	41%
Work life balance	30	30%
Male dominated Network	30	30%
Unconscious bias	39	39%
Limited career advancement opportunities	17	17%

What are the biggest barriers preventing women from attaining leadership positions? (You can select more than one)

100 responses



Interpretation:

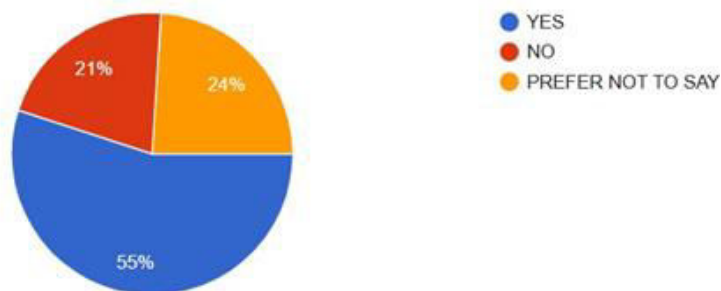
In this study, gender stereotypes (49%) emerged as the most common barrier faced by women, followed by lack of mentorship (41%) and unconscious bias (39%). Work-life balance and male-dominated networks were also significant challenges, each reported by 30% of respondents. Limited career advancement opportunities were identified by 17% of the participants.

3) Have you ever experienced or observed gender-based discrimination in leadership selection?

Options	Respondents	Percentage
Yes	55	55%
No	21	21%
Prefer not to say	24	24%

Have you ever experienced or observed gender-based discrimination in leadership selection?

100 responses



Interpretation:

As per study 55% of the respondents answered yes that they have experienced or observed gender based discrimination, while 21% said no, and 24% chose to prefer not to say. This shows that the majority responded positively, but a notable portion remained neutral or unwilling to disclose their opinion.

4) Which of the following do you think would most help increase women in leadership roles?

Options	Count of Respondents	Percentage
Leadership Development Programmes	55	55%
Gender equality policies	56	56%
Mentorship/sponsorship	44	44%
Quotas for women in leadership	36	36%
Awareness and bias training	39	39%

Which of the following do you think would most help increase women in leadership roles? (You can select more than one)

100 responses



Interpretation:

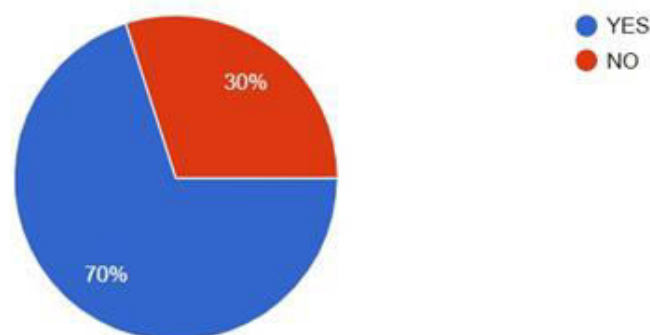
It is observed that the gender equality policies (56%) and leadership development programs (55%) were seen as the most important enablers for women in leadership. Mentorship and sponsorship (44%), awareness and bias training (39%), and quotas for women in leadership (36%) were also identified as key support measures by the respondents.

5) Do you support gender quotas for leadership positions in organizations?

Options	Respondents	Percentage
Yes	70	70%
No	30	30%

Do you support gender quotas for leadership positions in organizations?

100 responses



Interpretation:

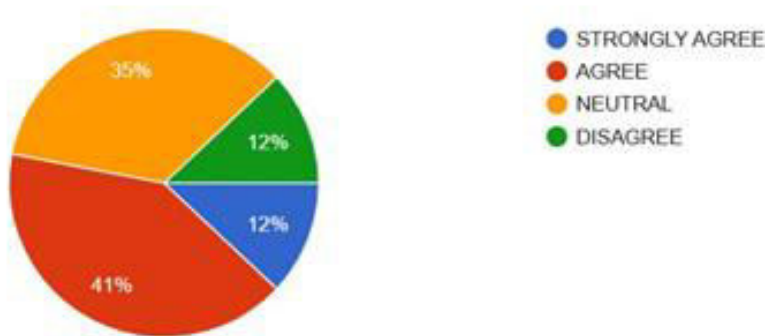
As per study 70% of the respondents supported the idea of having a gender quota for leadership positions in organizations, while 30% were against it. This shows strong overall support for gender quotas among the participants.

6) Do you feel your organization values and supports female leadership?

Options	Respondents	Percentage
Strongly Agree	12	12%
Agree	41	41%
Neutral	35	35%
Disagree	12	12%

Do you feel your organization values and supports female leadership?

100 responses



Interpretation:

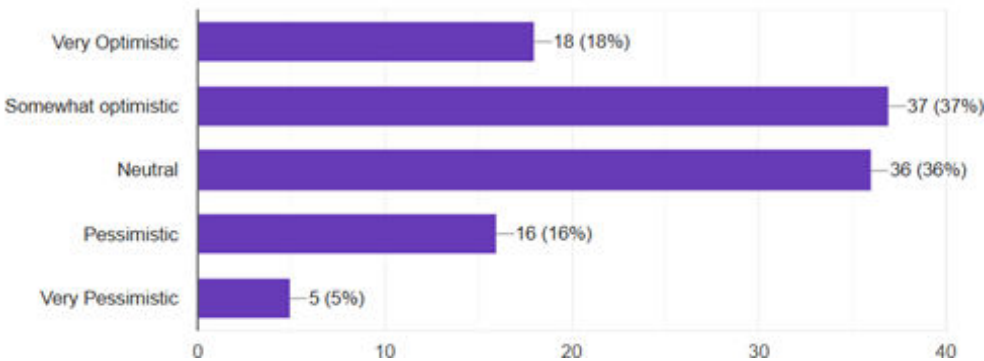
As per survey 41% of respondents agreed that their organization values and supports female leadership, while 35% felt neutral on the matter. Only 12% strongly agreed and another 12% disagreed, indicating mixed opinions on the organization's support for female leadership.

7) How optimistic are you about women achieving leadership equality in the next 10 years?

Options	Counts of Respondents	Percentage
Very Optimistic	18	18%
Somewhat Optimistic	37	37%
Neutral	36	36%
Pessimistic	16	16%
Very Pessimistic	5	5%

How optimistic are you about women achieving leadership equality in the next 10 years?

100 responses



Interpretation:

As per study 37% of respondents were somewhat optimistic about women achieving leadership equality in the next 10 years, while 36% felt neutral. 18% were very optimistic, while 16% were pessimistic and 5% were very pessimistic, showing a mix of hope and doubt about future progress.

FINDINGS

1) Barriers to Female Leadership:

Gender stereotypes were identified as the most significant barrier to women’s leadership. Other prominent barriers included a lack of mentorship, unconscious bias, work-life balance challenges, and male-dominated networks. Limited career advancement opportunities also posed a challenge for women in leadership roles.

2) Gender-Based Discrimination:

A significant number of respondents reported experiencing or observing gender-based discrimination in the workplace. However, some individuals either did not experience such discrimination or preferred not to disclose their opinions on the matter.

3) Enablers for Women in Leadership:

Gender equality policies and leadership development programs were seen as crucial enablers for promoting women in leadership roles. Mentorship, awareness training, and the introduction of quotas for women in leadership were also identified as important factors that can help support and advance female leadership.

4) Gender Quotas:

There was a strong overall support for the implementation of gender quotas in leadership positions. Respondents felt that such quotas could serve as an effective means to address gender imbalances in organizational leadership.

5) Organizational Support for Female Leadership:

Many respondents felt that their organizations value and support female leadership, though opinions were divided, with some respondents remaining neutral or indicating a lack of strong organizational support for women in leadership roles.

6) Future Leadership Equality:

Respondents had mixed feelings about the future of women achieving leadership equality. While some were optimistic about future progress, a significant portion expressed neutrality or pessimism, indicating uncertainty about how quickly gender equality in leadership roles will be achieved.

SUGGESTIONS

- 1) With many respondents in middle management, it is crucial for organizations to create clear development pathways that support women's growth from middle management into top leadership roles. Providing leadership training, mentorship, and career advancement programs can help facilitate this transition.
- 2) One of the key barriers identified was the lack of mentorship. To address this, organizations should introduce formal mentorship and sponsorship programs that pair emerging female leaders with experienced mentors.
- 3) Gender stereotypes and unconscious bias remain significant obstacles for women in leadership. Organizations must prioritize comprehensive training programs that tackle these issues, promoting a culture of inclusivity and equality.
- 4) The challenge of balancing work and personal life is often cited as a barrier for women in leadership. Organizations should consider offering flexible working arrangements, including remote work options and flexible hours, which would allow women to better manage both professional and personal responsibilities.
- 5) Gender equality policies were seen as crucial for promoting women in leadership roles. It is essential for companies to enforce strong policies that ensure equal opportunities for all employees, regardless of gender, and create a work environment that is supportive of women aspiring to leadership positions.
- 6) Leadership development programs for women can help equip them with the necessary skills and confidence to take on leadership roles. These programs should focus on areas such as strategic thinking, decision-making, and leadership styles, helping women unlock their full potential.
- 7) There is strong support for gender quotas in leadership roles. Implementing quotas could help address the current gender imbalance in leadership positions, ensuring that women are better represented in decision-making processes and top management roles.
- 8) Although some respondents were optimistic about the future of women in leadership, many expressed uncertainty. To build greater optimism, organizations need to set clear goals for gender equality, regularly assess progress, and ensure that women have the resources and opportunities necessary to achieve leadership equality in the years ahead.

CONCLUSIONS

This study explores the barriers and enablers of women in leadership positions. Gender stereotypes, unconscious bias, and lack of mentorship were key barriers, alongside challenges like work-life balance and male-dominated networks. However, gender equality policies, leadership development programs, and mentorship were identified as crucial enablers for promoting women's advancement in leadership roles.

While many respondents believed their organizations valued female leadership, opinions on the level of support were mixed. The strong support for gender quotas reflects a desire to address gender imbalances in leadership. Despite some challenges, there is optimism about women achieving leadership equality in the future.

In conclusion, overcoming barriers and strengthening enablers will require ongoing efforts to create a more inclusive environment, leading to greater gender equality in leadership positions

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**UNDERSTANDING THE CHALLENGE OF CYBERSECURITY IN CRITICAL INFRASTRUCTURE
IN BANKING**

Vaishali Atalkar Wankhade

Assistant Professor, Vedanta College, Object Oriented Programming Language

ABSTRACT

India is addressing cybersecurity for its critical infrastructure through a multi-faceted approach, including government initiatives like the National Critical Information Infrastructure Protection Centre (NCIIPC) and the Indian Computer Emergency Response Team (CERT-In), alongside legal frameworks like the Information Technology Act, 2000. The focus is on protecting computer resources that could have a debilitating impact on national security, economy, public health, or safety. It is important to recognise that as pivotal as government institutions are to India's critical infrastructure, there are sectors where private industry is also essential. Perhaps the best example of this is banking and financial institutions. The AIIMS attack has also shown us that banking is not the only such critical sector. Other sectors like healthcare need additional cyber protections that do not have the benefit of a vigilant regulator like the RBI that stipulates security protocols and keenly enforces them. Each of these sectors have their unique requirements and considerations. For example, health data is especially sensitive, cannot be altered (unlike names and addresses), this is largely because of the pace of development in certain industries. For example, electric cars are becoming an increasingly large part of the overall car market and electric vehicles are some of the most sophisticated electronic devices commonly available in the market.

Keywords: critical infrastructures, hackers, cybersecurity policy, cybersecurity controls, national security

INTRODUCTION

Cyberwarfare is the use of technology to cause nation-scale negative impacts and damage. This can be seen in forms including computer viruses targeting various forms of infrastructure, denial of service attacks to halt vital technology show us how vulnerable a nation can be. Cyberwarfare's presence exceeds systems in the computer grid. It also includes any system that can be vulnerable; mobile devices, embedded systems, and those connected wirelessly are examples. SCADA systems are liable for monitoring and adjust switching among other processes within critical infrastructure sectors in an autonomous manner. DHS is concerned about SCADA systems as they are frequently unmanned and remotely accessed. As they are remotely accessed, anyone can take control of assets to critical infrastructure remotely. There has been increasing mandates and directives to ensure any system deployed meets stringent requirements. Future attacks could be malicious code directly targeting specific critical infrastructure locations. Once an attack has been successfully carried out, remnants of the code are found online in the public domain and later on the Dark Web. This is a problem as script kiddies could repurpose this code for a new target.

- **Legal Framework:**

The Information Technology Act, 2000, defines critical information infrastructure and provides the legal basis for its protection.

- **National Nodal Agency:**

The NCIIPC, under the Ministry of Electronics and Information Technology (MeitY), is responsible for identifying, notifying, and protecting critical information infrastructure.

- **Cybersecurity Response:**

CERT-In, also under MeitY, is the national agency for responding to cybersecurity incidents and advising on remedial measures.

- **Threat Intelligence and Awareness:**

NCIIPC provides threat intelligence, situational awareness, and alerts to organizations with critical information infrastructures.

- **Security Guidelines and Standards:**

MeitY and other relevant bodies issue security guidelines and standards for different sectors, including the financial services sector, to ensure organizations implement necessary security measures.

- **Capacity Building:**

Training and capacity-building programs are implemented to enhance cybersecurity expertise within the country.

- **Collaboration and Information Sharing:**

MeitY promotes collaboration and information sharing among different agencies and stakeholders to improve cybersecurity preparedness.

- **Monitoring and Auditing:**

The NCIIPC conducts regular audits and compliance checks to ensure that organizations meet national and international cybersecurity standards.

- **Technology Implementation:**

Advanced cybersecurity technologies, such as intrusion detection systems and firewalls, are deployed to protect critical infrastructure.

Challenges and Considerations:

- **Emerging Threats:**

The rapidly evolving threat landscape, including state-sponsored cyberattacks, necessitates continuous adaptation of cybersecurity frameworks and strategies.

- **Shortage of Skilled Professionals:**

India faces a shortage of cybersecurity professionals, requiring increased investment in training and development.

- **Fragmented Efforts:**

There is a need for better coordination and integration of efforts among different agencies and sectors to strengthen overall cybersecurity preparedness.

- **Cybersecurity in OT Systems:**

Protecting operational technology (OT) systems in critical infrastructure, which are often less interconnected than traditional IT systems, poses unique challenges.

- **Supply Chain Risks:**

Vulnerabilities in the supply chain of critical infrastructure components can also be exploited by cyber attackers.

Why is Cyber Security Important in Banking?

Protecting customer data: Banks hold vast amounts of sensitive data, including personal identification details and financial information. A breach can lead to identify theft and significant financial losses.

Maintaining Trust: Customer need to trust that their bank can protect their money and personal information. Robust cyber security measures help maintain this trust.

Regulatory Compliance: Financial institutions must comply with stringent regulations regarding data protection. Failure to do so can result in severe penalties and loss of reputation.

Preventing Financial Losses: Cyber-attacks can result in direct financial losses for banks and their customers. Effective cyber security helps mitigate these risks.

Threats and challenges to cyber security in banking

Phishing attacks: Cybercriminals use deceptive emails to trick individuals into revealing sensitive information like login credentials, posing significant risks to both customers and banks.

Malware: Malicious software can infiltrate banking system, leading to unauthorised access, data theft and operational disruptions.

Ransomware: This type of attack locks users out of their systems until a ransom is paid, targeting banks due to their critical need for operational continuity.

Insider threats: Employees or contractors with access to sensitive information may intentionally or unintentionally compromise security, creating a complex challenges for banks to manage.

Distributed denial of services attacks: These attacks overwhelm banking websites with excessive traffic, causing services outages and making online banking inaccessible to customers.

Advanced persistent threats: These long term targeted attacks are designed to steal data or compromise systems gradually, often remaining undetected for extended periods.

Steps to follow to Protect your Self from Cyber Issues

1. **Use strong passwords:** Create complex passwords using a combination of letters, numbers and special characters. Avoid using easily guessable information like birthdays or common words.
2. **Enable multi-factor authentication:** MFA adds an extra layer of security by requiring second form of verification, such as a text message code, in addition to your password.
3. **Update software regularly:** keep your operating system, browser and any banking apps up to date to protect against vulnerabilities.
4. **Stay vigilant:** Be wary of unsolicited emails, phone calls or messages asking for personal information. Always verify the source before providing any details.
5. **Monitor your accounts:** Regularly check your bank statements and account activity for any unauthorised transactions. Report any suspicious activity immediately.

Limitations of Cybersecurity in critical infrastructure

Cybersecurity in critical infrastructure faces limitations including high costs, complexity, potential for human error, evolving threats, and the need for specialized skills, which can lead to vulnerabilities and potential disruptions.

1. High Costs and Complexity:

- **Implementation Costs:**

Implementing robust cybersecurity measures in critical infrastructure can be expensive, requiring investments in advanced security software, hardware, and specialized personnel.

- **Complexity of Systems:**

Cybersecurity systems and protocols can be complex to implement and manage, requiring specialized knowledge and expertise.

- **Resource Intensive:**

Maintaining an adequate cybersecurity infrastructure requires continuous monitoring, regular updates, and constant vigilance, which can be resource-intensive.

2. Human Weaknesses and Errors:

- **Human Error:**

Despite advanced security measures, human error remains a significant vulnerability, with phishing attacks and other social engineering tactics posing a constant threat.

- **Lack of Training and Awareness:**

Insufficient training and awareness among staff can lead to weak security practices and increased vulnerability to cyberattacks.

3. Evolving Threat Landscape:

- **Rapidly Evolving Cyber Threats:**

Cyber threats are constantly evolving, with attackers developing new techniques and exploiting vulnerabilities, making it challenging for security measures to keep pace.

- **Skill Shortage:**

The demand for cybersecurity professionals far surpasses the available talent pool, creating a skills gap that can hinder effective cybersecurity implementation.

4. Legacy Systems and Infrastructure:

- **Software and Hardware Vulnerabilities:**

Critical infrastructure often relies on legacy software and hardware, which may have known vulnerabilities that can be exploited by attackers.

- **Interoperability Issues:**

Integrating new cybersecurity technologies with existing infrastructure can be challenging, leading to interoperability issues and security gaps.

Policies Cybersecurity in Critical Infrastructure

Cybersecurity policies for critical infrastructure aim to protect vital systems and services from cyberattacks, ensuring resilience and continuity of essential functions like electricity, water, and transportation. These policies involve a combination of technological solutions, security practices, and regulatory frameworks to mitigate risks and respond to incidents effectively.

1. Importance of Critical Infrastructure Cybersecurity:

- **Essential Services:**

Critical infrastructure systems are vital for daily life and economic stability, making them prime targets for cyberattacks.

- **Widespread Impact:**

A cyber incident disrupting these systems can cause chaos, endanger lives, and cripple economies.

- **Evolving Threats:**

Cyber threats are becoming increasingly sophisticated, requiring continuous adaptation and improvement in security measures.

2. Key Elements of Cybersecurity Policies:

- **Risk Assessment:**

Regularly assess vulnerabilities and potential threats to identify areas needing improvement.

- **Security Controls:**

Implement robust security measures, including firewalls, intrusion detection systems, and strong authentication protocols.

- **Incident Response:**

Establish clear procedures for detecting, responding to, and recovering from cyberattacks.

- **Security Awareness Training:**

Educate employees about cybersecurity risks and best practices to minimize human error.

- **Information Sharing:**

Collaborate with other organizations and government agencies to share threat intelligence and best practices.

- **Regulatory Compliance:**

Adhere to relevant cybersecurity regulations and standards, such as those related to data protection and incident reporting.

Examples of Cybersecurity Policies for Critical Infrastructure:

- **Cyber Incident Reporting for Critical Infrastructure Act of 2022 (CIRCA):**

This act requires covered entities to report certain cyber incidents and ransom payments to the Cybersecurity and Infrastructure Security Agency (CISA).

- **National Cybersecurity Strategy:**

Many countries have national strategies that outline their approach to cybersecurity, including specific measures for protecting critical infrastructure.

- **Sector-Specific Guidance:**

Some sectors, like energy and healthcare, have specific guidance and regulations related to cybersecurity.

- **Network Code on Cybersecurity:**

The European Union has a network code on cybersecurity for the electricity sector, laying down sector-specific rules for cyber security aspects of cross-border electricity flows.

4. Challenges in Implementing Cybersecurity Policies:

- **Complexity:**

Critical infrastructure systems can be complex and interconnected, making it challenging to implement and maintain security.

- **Vulnerability of OT Systems:**

Operational Technology (OT) systems, which control physical processes, are often less secure than traditional IT systems, creating a unique vulnerability.

- **Lack of Resources:**

Many organizations lack the resources and expertise to implement and maintain robust cybersecurity programs.

- **Collaboration:**

Effective cybersecurity requires collaboration between public and private sectors, which can be challenging to achieve.

Advantages of Cybersecurity

1. Data Safety from Hackers

Cybersecurity measures protect sensitive information from unauthorised access. They use tools like firewalls, encryption, and access controls to keep data safe. Good cybersecurity also includes regular updates and patches to fix any weaknesses that hackers might try to exploit. It's an ongoing process that adapts to new threats as they appear.

2. Safeguarding Online Transactions

Cybersecurity ensures that financial transactions over the Internet are safe. This includes online shopping, banking, and money transfers. It uses encrypted connections to protect your financial data as it travels across the internet. Cybersecurity also includes fraud detection systems that can spot unusual activity in your accounts. This protection allows people to shop and bank online with confidence, knowing their money and personal details are safe.

3. Preventing Identity Theft

Cybersecurity helps stop identity theft by protecting personal information. This includes names, addresses, social security numbers, and credit card details. It uses strong passwords, multi-factor authentication, and secure data storage to keep this information safe. Cybersecurity also includes monitoring for suspicious activities that might indicate identity theft. If someone tries to use your identity, these systems can alert you quickly. This protection helps people avoid the stress and financial problems that come with identity theft.

Most Common Cyberattacks

Let's explore the top five threats that cybersecurity measures aim to defend against:

1. Malware

Software designed to harm computer systems. Includes viruses, worms, Trojans, and ransomware. Malware can steal data, corrupt files, or encrypt information for ransom. Protect systems with updated antivirus software and regular security patches.

2. Phishing

A deceptive method where attackers impersonate trusted entities to obtain sensitive data. Often utilises fake emails or websites mimicking legitimate ones. Verify sender identities and exercise caution when providing personal information online to prevent phishing attacks.

3. Man-in-the-Middle (MitM) Attack

An attack where a third party intercepts communication between two parties. The attacker may monitor or alter the exchanged data. Use encrypted connections and avoid unsecured public Wi-Fi networks to mitigate MitM attack risks.

4. Denial-of-Service (DoS) Attack

An attack that overloads a system or network, rendering it inaccessible. Distributed Denial-of-Service (DDoS) attacks use multiple sources for greater impact. Implement robust network security measures and consider specialised DDoS protection services for defence.

5. Password Attack

An attempt to gain unauthorised access by compromising passwords. Methods range from simple guessing to advanced algorithms. Employ strong, unique passwords and activate multi-factor authentication to enhance account security.

Important Principles of Cybersecurity

These principles, known as CIA (Confidentiality, Integrity, and Availability) and AAA (Authentication, Authorization, and Accountability), form the core of effective cybersecurity strategies:

1. Confidentiality

Confidentiality is about keeping data private and accessible only to authorised parties. This principle is crucial for protecting sensitive information from unauthorised access or disclosure.

- Implementation: Encryption, access controls, secure communication protocols
- Examples:
 - Using end-to-end encryption for messaging apps
 - Implementing role-based access control in corporate networks
 - Securing data transmission with HTTPS

2. Integrity

Integrity ensures that data remains accurate, complete, and unaltered throughout its lifecycle. It prevents unauthorised modifications and maintains the trustworthiness of information.

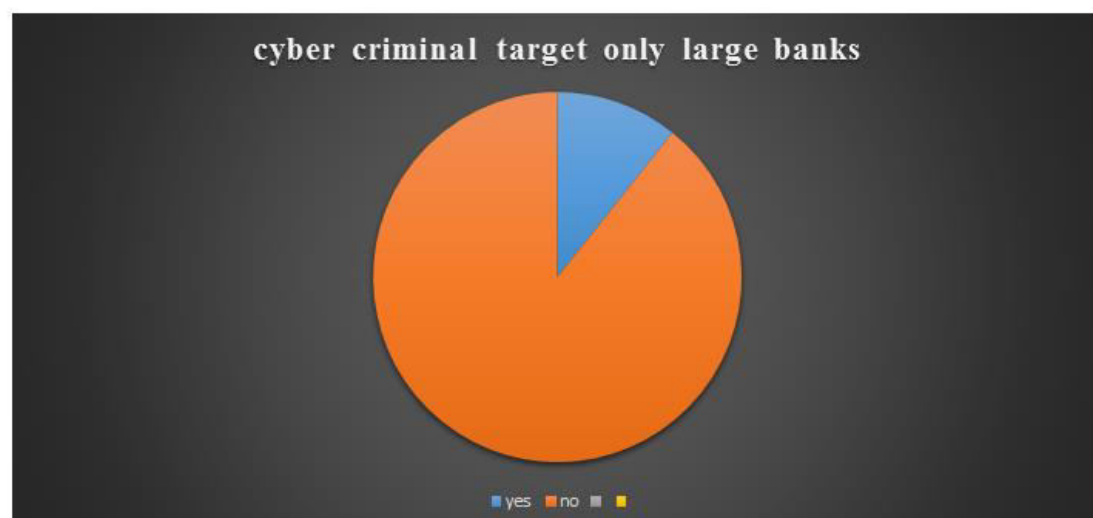
- Implementation: Checksums, digital signatures, version control systems
- Examples:
 - Using hash functions to verify file integrity
 - Implementing block chain for tamper-evident record-keeping
 - Utilising digital signatures for software distribution

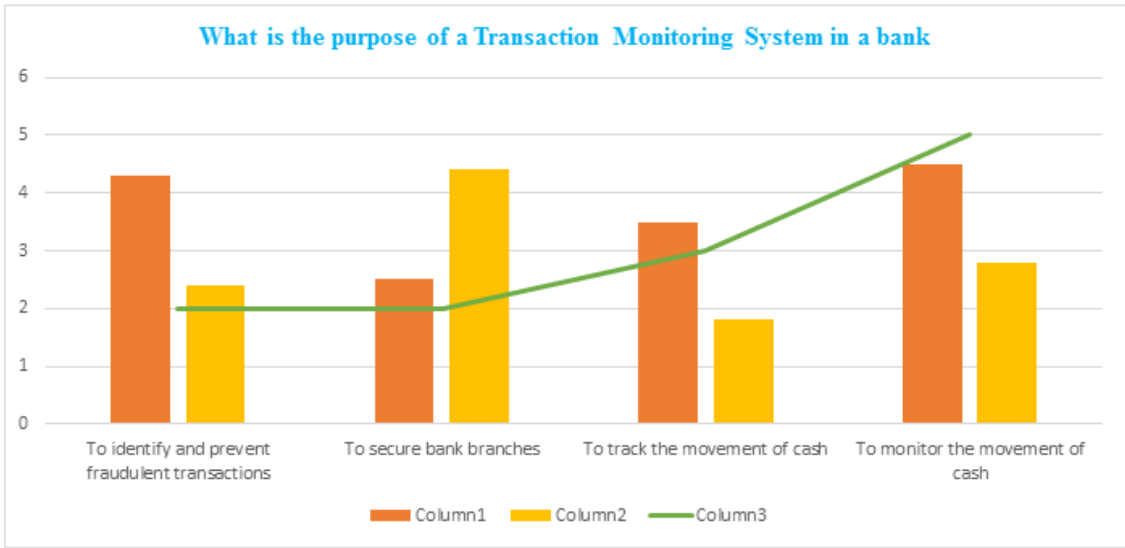
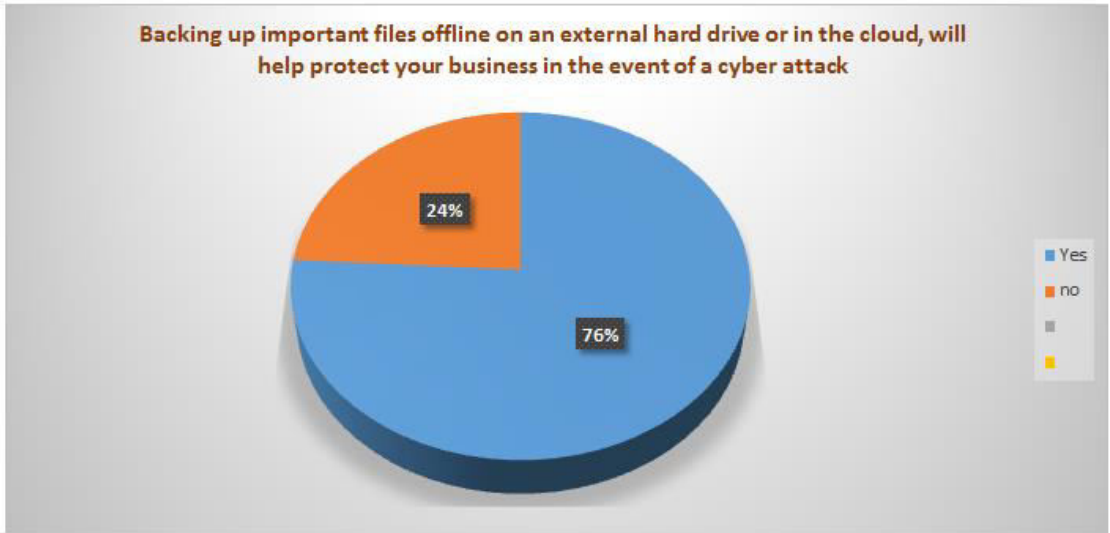
3. Availability

Availability ensures that authorised users can access systems, networks, and data when needed. It's about maintaining operational continuity and preventing disruptions.

Survey Role:

Do you use any security for your bank account?





CONCLUSION

In conclusion, cybersecurity challenges within the banking sector's critical infrastructure are significant and multifaceted, demanding a proactive, multi-layered approach to address them effectively. These challenges include evolving threats, the need for continuous security improvement, and the imperative to maintain trust with customers and regulators.

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THE PERCEIVED VALUE OF MEN'S LUXURY CLOTHING BRANDS AMONG UPPER-MIDDLE-CLASS AND MIDDLE-CLASS CONSUMERS

Ms. Pooja Kumari Sabhajeet Mishra¹ and Ms. Vandana Daki²

¹Assistant Professor, Malini Kishor Sanghvi College (Ritambhara), JVPD Scheme, Vile Parle (W), Mumbai

²Assistant Professor, Wilson College, Chowpatty Road, Mumbai

ABSTRACT

In today's society, apparel is not just a fundamental need; it has transformed into a way to convey a person's character. It boosts appeal and influences how an individual is perceived by others. This research primarily aims to comprehend the perceived value of men's luxury apparel brands among consumers in the middle and upper-middle classes. The aims of this research involve identifying elements affecting recognition, determinants of purchasing decisions, the connection between income and readiness to pay a premium, and examining the effects of marketing and advertising on luxury brands. The research found that product quality significantly affects recognition and purchasing decisions. Individuals think that luxury brands offer a perceived value for money, with elements such as superior quality, longevity, and brand legacy reinforcing this belief. There is no meaningful relationship between income and premium payment. There is no significant influence of marketing and advertising on how consumers perceive luxury brands. The data is collected from 68 men lives in Mumbai through convenient sampling method and the chi-square method is used for hypothesis testing.

Keywords: Perceived Value, Men's Luxury Clothing Brands, Middle Class and Upper Middle-Class Consumers

INTRODUCTION

A luxury good is not essential for survival, yet it is considered very appealing in a culture or society. The desire for luxury items rises when an individual's wealth or earnings grow. It's a non-verbal method for establishing a standard for individuals. As time progresses, the fashion industry keeps evolving; everyone wishes to appear stylish and contemporary. Luxury brands play a major role in shaping trend development. In marketing terms, perceived value refers to how customers assess a product or service's advantages and its capacity to satisfy their needs and expectations, particularly in relation to similar offerings. The perceived worth of luxury apparel for the upper and middle classes is influenced by elements such as status, rarity, and the notion that elevated prices signify superior quality.

This paper primarily concentrates on examining the Perceived Value of Men's Luxury fashion brands within Upper-Middle-Class and Middle-Class Consumers. Men's behaviors, particularly in the upper middle class and middle class, are not extensively examined. This paper focuses on comprehending the elements that affect the recognition of luxury clothing brands, the factors affecting upper middle- and middle-class purchasing decisions regarding luxury brands, as well as exploring the relationship between consumer income and their willingness to pay a premium. Additionally, it examines how marketing and advertising strategies influence consumer perceptions.

OBJECTIVES

1. To categorize various factors influencing recognition as luxury clothing brands by upper middle class and middle class.
2. To investigate the factors influencing upper middle class and middle-class people in buying luxury brands.
3. To analyze perceived value of luxury brands among upper middle class and middle-class consumers.
4. To evaluate the relationship between consumer income and the willingness to pay a premium for luxury men's clothing brands.
5. To investigate the impact of marketing and advertising strategies on the perception of men's luxury clothing brands among middle-class and upper-middle-class consumers.

SIGNIFICANCE

This research is important as it examines the increasing attraction of luxury men's fashion labels for middle and upper-middle-class shoppers. It highlights the main elements that affect brand recognition, assisting luxury brands in comprehending how their image is viewed by these new segments. The study further explores the reasons that drive purchasing choices, offering understanding of consumer behavior that goes beyond typical luxury customers. Through the examination of perceived value, it emphasizes that consumers assess luxury through quality, exclusivity, and emotional ties, rather than solely on cost. Furthermore, the research examines the relationship between income levels and the readiness to pay a higher price, providing insights for pricing

strategies. The effect of marketing and advertising on brand perception is evaluated as well, highlighting the significance of focused campaigns. In summary, the results will assist luxury brands in effectively engaging with aspirational consumers and broadening their market presence in a competitive environment.

LITERATURE REVIEW

Jain V. et al. (2016) This research seeks to comprehend the rise of aspirational luxury and the impact of digital platforms on women in India. A total of 65 participants were examined in this qualitative research. They discovered that aspirational luxury connects to exclusivity, craftsmanship, various brand offerings, and the value delivered to consumers. As a result, the use of these brands is influenced by both personal and societal reasons. Moreover, digital platforms have fostered a strong connection between these brands and consumers through their emphasis on visual imagery.

Banerjee S. and Banerjee T. (2018) In this research, the authors aimed to investigate the different elements influencing consumer purchasing habits in the Men's Denim Wear Market in Kolkata. To gain insight into the different segments of the market and their traits, cluster analysis was conducted to break down the current market into smaller segments for focused attention, allowing for a better understanding of consumer characteristics in a more comprehensive manner. The three groups identified are Fashion Replicates, Trend Setters, and Fashion Traditionalists.

Elgeballi M. and Zaazou R. (2023) This paper aims to investigate the influence of consumers' perceived value on the consumption of luxury brands by examining each variable and their interconnections through an extensive review of prior literature and gathering primary data. The results indicated that there exists a positive, albeit not significant, correlation between the two variables, partly because of the study's limitations, such as a small sample size, which ultimately hinders the generalization of findings to the broader population.

Bhar S. et. al. (2022) This research applies multivariate statistical analysis to household-expenditure data from the India Human Development Survey and suggests a more comprehensive conceptual framework that takes into account a number of potential determinants. It looks at the relationship between C/L (conspicuous and luxury) consumption expenditure and possible socio-psychological drivers and moderators in addition to the economic capacity to consume (wealth or income). The findings indicate that social media exposure and C/L consumption seem to have a favorable impact on C/L consumption, even though financial capacity to consume (income or a proxy for it) is an enabling element. Caste and education have fewer clear-cut links to consumption, and there are also notable interactions between these two factors and financial capacity to buy.

Tech-Yong Eng (2010) The qualitative study looks at what people think luxury is, why they buy it, and how their perceptions of luxury affect their purchasing decisions in the Indian environment. This study examines luxury conceptions from literature and offers some insight into India's luxury consumption patterns. The results show that luxury consumption is significantly shaped by psychological and cultural elements in Indian society.

RESEARCH GAP

Luxury brands, while undoubtedly offering high quality and being at the forefront of fashion and trends, are also quite costly, rendering them unaffordable for lower-income individuals. Women are consistently interested in shopping, and their views on luxury brands differ greatly from those of men. While luxury spending in India has been researched, men's luxury apparel continues to be a less examined field. Much of the current research emphasizes women or the overall luxury market, neglecting male consumer behaviors. There is a limited comprehension of how luxury fashion is viewed by middle and upper-middle-class Indian men. The effect of marketing and advertising on this segment is not fully investigated. The role of perceived value in influencing purchase decisions is inadequately covered as well. Limited research examines the relationship between income and the propensity to spend on luxury apparel. Consumer segmentation in men's high-end fashion is superficial and lacks specificity. In this context, socio-psychological and economic factors are seldom examined together. Studies frequently lack a well-rounded blend of qualitative and quantitative methods. This research seeks to fill these voids by concentrating on male consumers within India's expanding middle and upper-middle class

HYPOTHESES

To evaluate the relationship between consumer income and the willingness to pay a premium for luxury men's clothing brands.

- **H₀:** There is no significant relationship between consumer income and the willingness to pay a premium for luxury men's clothing brands.

- **H₁:** There is a significant positive relationship between consumer income and the willingness to pay a premium for luxury men's clothing brands.

To investigate the impact of marketing and advertising strategies on the perception of men's luxury clothing brands among middle-class and upper-middle-class consumers.

- **H₀:** Marketing and advertising strategies do not have a significant impact on the perception of men's luxury clothing brands among middle-class and upper-middle-class consumers.
- **H₁:** Marketing and advertising strategies have a significant positive impact on the perception of men's luxury clothing brands among middle-class and upper-middle-class consumers.

Limitations

1. A sample size of 68 is a limitation; the results may differ if the sample size is increased.
2. The research is restricted to the Mumbai.
3. The People's responses may be biased.
4. The evasion of information, overstatement and understatement which may lead to distortion of data taken.

7. Research Methodology

Type of Research

This study employs a descriptive research design to describe, explain, and validate findings regarding the perceived value of men's luxury clothing brands among middle-class and upper-middle-class consumers.

Area of Study

The research is being carried out in Mumbai.

Sampling Method

The sampling technique that was used was a Convenient sampling method.

Target Population

Men from the age group of 18-60 examined.

Types and Sources of Data

The current study is based on primary data collected via a structured questionnaire created in Google Forms. All closed-ended questions related to the study's objectives and hypothesis were asked.

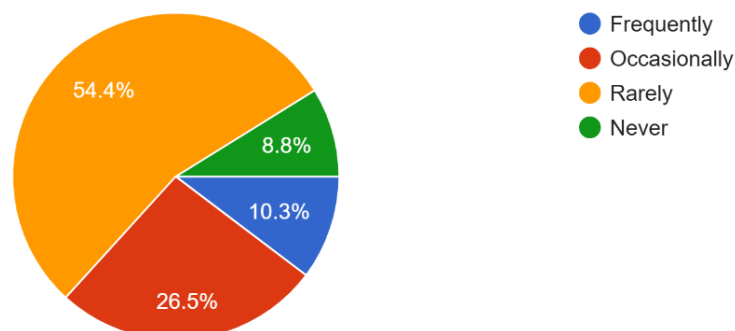
Statistical Tool Use

Graphs are used to organize data and to display it in an easy-to-understand and remember format. The Chi-square test is used to test hypotheses.

Data Analysis

How often do you purchase luxury clothing?

68 responses

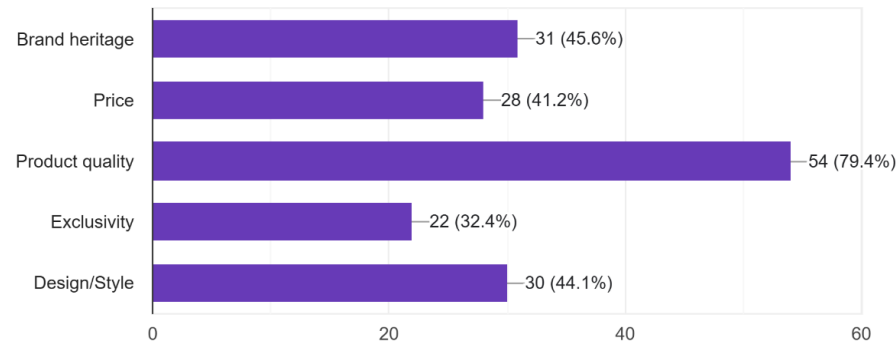


Source: Primary Data

The majority of respondents indicated that they infrequently buy luxury brands, with 54.4% reporting this, while 26.5% said they do so occasionally, and only 10.3% frequently purchase luxury brands. 8.8% indicated that they do not purchase luxury brands at any time.

Which of the following factors influence your recognition of luxury brands? (Select all that apply)

68 responses

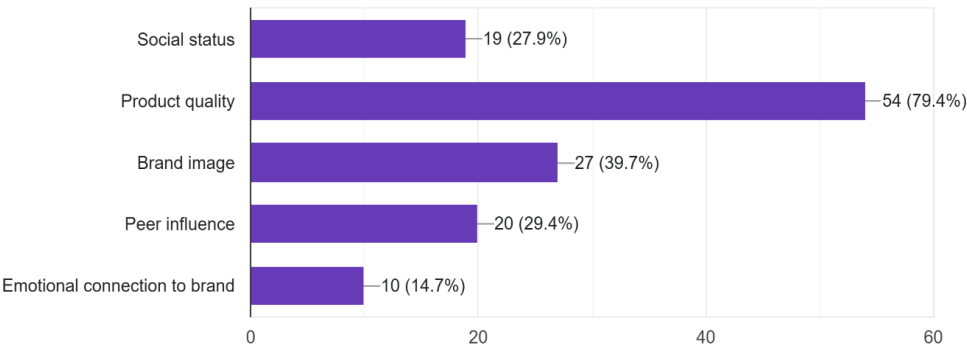


Source: Primary Data

79.4% of respondents indicated that product quality is the primary factor affecting their awareness of luxury brands, followed by brand heritage at 45.6%, design/style at 44.1%, price at 41.2%, and exclusivity at 32.4%.

What motivates you to buy luxury clothing? (Select all that apply)

68 responses

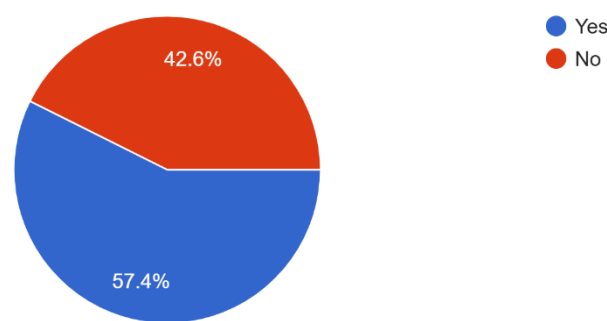


Source: Primary Data

The primary reason for purchasing luxury clothing is product quality at 79.4%, followed by the brand image at 39.7%, peer influence at 29.4%, social status at 27.9%, and emotional connection to the brand at 14.7%.

Do you believe luxury brands provide value for money?

68 responses

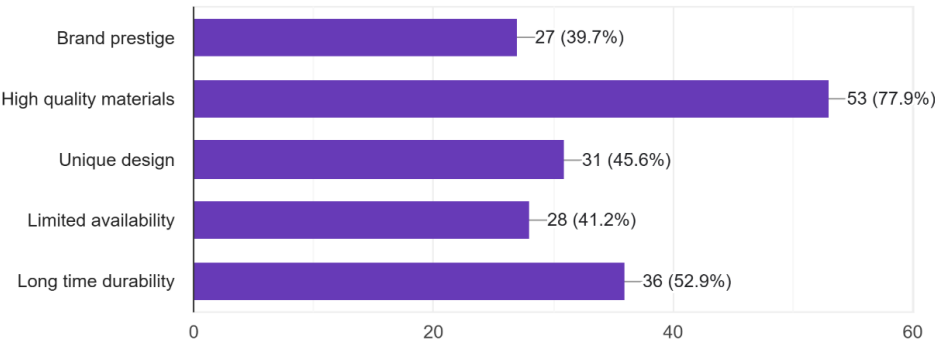


Source: Primary Data

The majority of the participants, specifically 57.4%, think that luxury brands offer value for money, while 42.6 % do not agree with this view.

What factors contribute to the perceived value of luxury brands? (Select all that apply)

68 responses

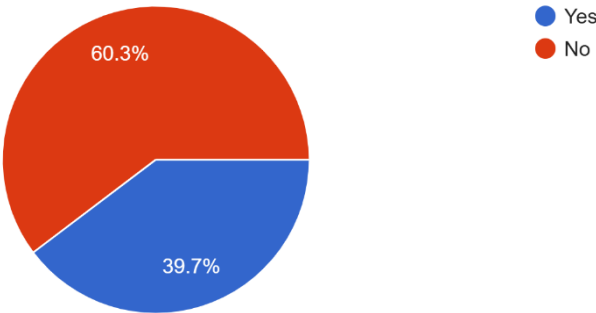


Source -Primary Data

In terms of pinpointing elements that influence the perceived value of luxury brands, high-quality materials rank highest at 77.9%, followed by long-term durability at 52.9%, unique design at 45.6%, limited availability at 41.2%, and brand prestige at 39.7%.

Are you willing to pay a premium for luxury men’s clothing?

68 responses

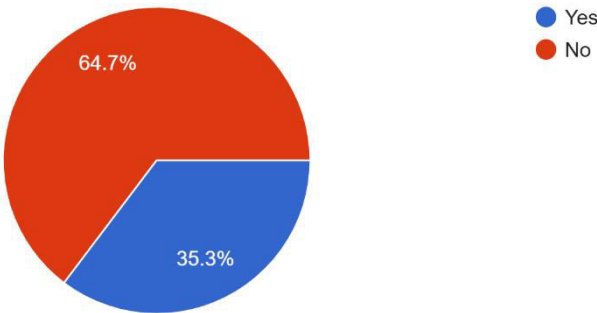


Source: Primary Data

This reveals that a significant majority (60.3%) of respondents are price-sensitive and not willing to pay a premium for luxury men's clothing. In contrast, a notable minority (39.7%) of respondents are willing to invest in luxury brands.

Have you ever purchased a luxury brand after seeing an advertisement?

68 responses

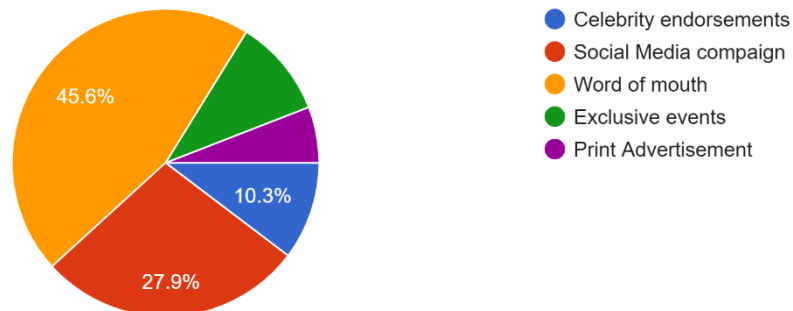


Source: Primary Data

The results show that approximately one-third (35.3%) of respondents have made a purchase of a luxury brand after being influenced by an advertisement. Conversely, nearly two-thirds (64.7%) of respondents have not made a purchase based on advertising.

Which marketing strategies influence your perception of luxury brands?

68 responses

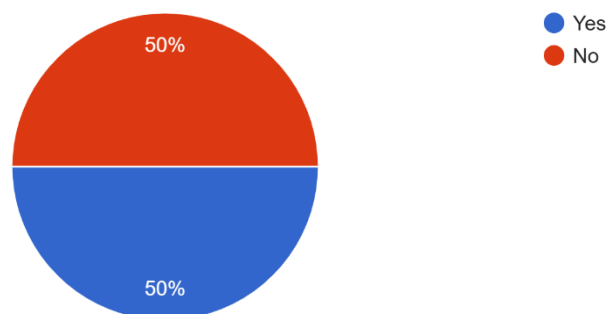


Source: Primary Data

The most influential marketing strategy for shaping luxury brand perceptions is word-of-mouth (45.6%), followed by social media campaigns (27.3%). Exclusive events and celebrity endorsements (10.3%) also contribute, while print advertising (5.9%) has a relatively minor impact.

Do you trust luxury brand advertisements?

68 responses

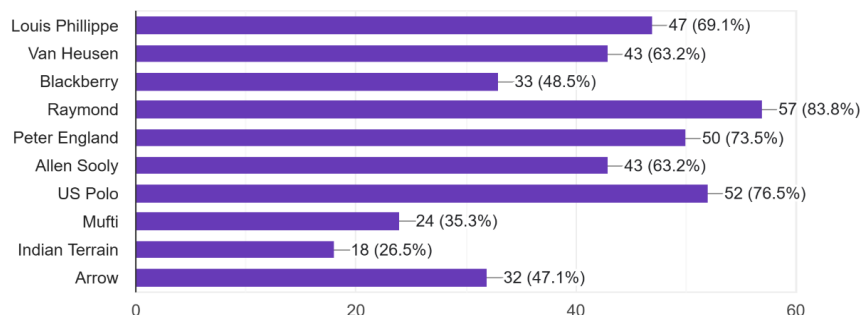


Source: Primary Data

It shows that half of the respondents (50%) trust luxury brand advertisements, while the other half don't.

How many Brands you can recognized among these?

68 responses



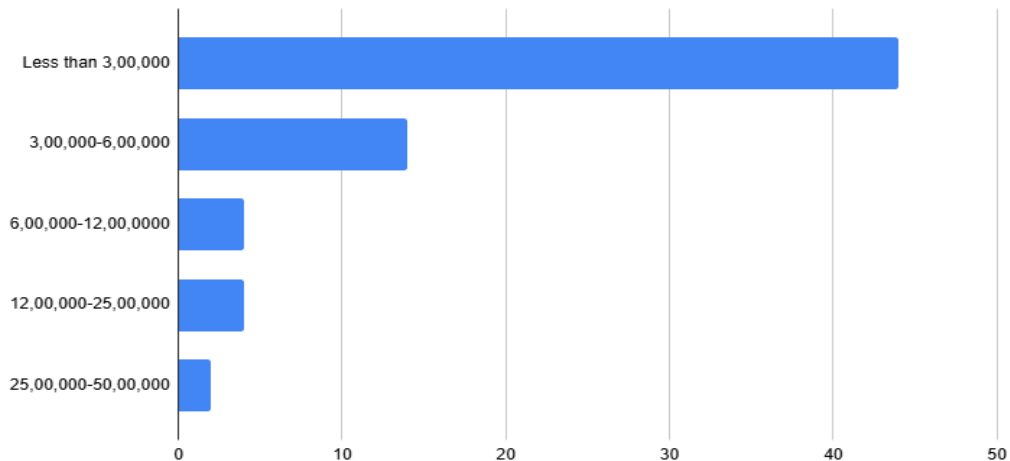
Source: Primary Data

In order to find out how many brands middle-class and upper-middle-class people can recognize, respondents were asked to name the top ten brands available in the Indian market. Raymond ranks first with 83.8%, followed by US Polo in second place with 76.5% and Peter England in third place with 73.5%. Louis Phillippe is in

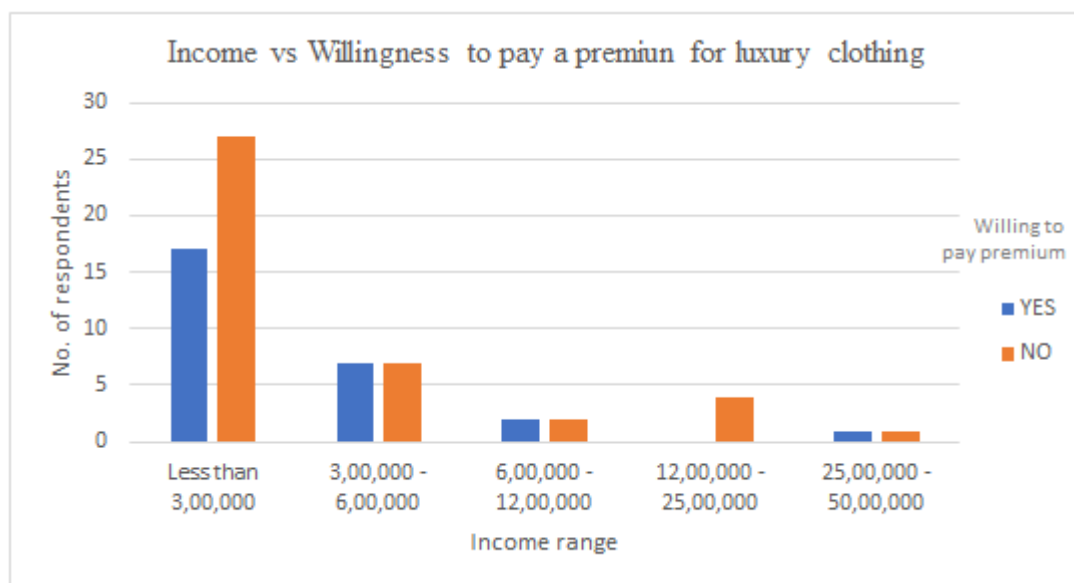
69.1%, Van Heusen is 63.2%, Allen Solly is 63.2%, Blackberry is 48.5%, Arrow is 47.1%, Mufti is 35.3%, and Indian Terrain is 26.5%.

Hypothesis Testing

Income vs Willingness to a Pay Premium for Clothing



Source: Primary Data



Source: Primary Data

Hypothesis 1 Visualized: Income vs. Willingness to Pay a Premium

This **bar chart** helps illustrate how people across different income brackets responded when asked if they were willing to pay a premium for luxury men's clothing:

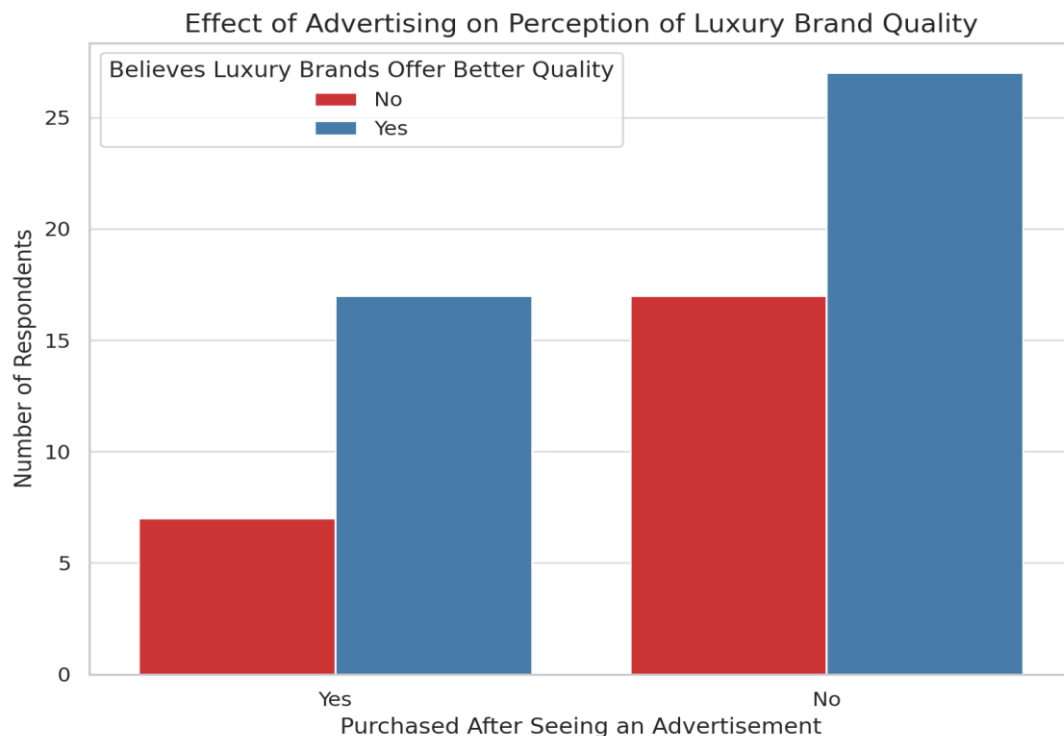
Interpretation:

- The majority of respondents earning **less than ₹3,00,000** are **not willing** to pay a premium — though quite a few still said "Yes".
- Across middle and upper-middle income ranges, responses are more balanced, but sample sizes are small.
- For the **highest income brackets**, we see mixed and limited responses — some yes, some no — suggesting **no clear trend**.

Statistical Outcome Recap:

- **Chi-square test** was used because:
 - Both variables (Income & Willingness) are **categorical**.

- It measures if the **distribution of responses is independent** of income level.
- **Result:** p-value = **0.424** → **Not significant**
- **Conclusion:** We can't claim that income significantly affects willingness to pay a premium in this dataset.



Source: Primary Data

Hypothesis 2 Visualized: Marketing Impact on Perception of Luxury Brand Quality

This chart breaks down whether people who **have purchased after seeing an ad** are more likely to **believe that luxury brands offer better quality**.

Interpretation:

- Both groups (those who purchased after ads and those who didn't) are **fairly evenly split** in their belief about better quality.
- There is **no strong skew** or trend that would suggest **advertising significantly shifts consumer perception**.
- Even among those **not influenced by ads**, many still perceive luxury brands as higher quality — indicating other factors (e.g., brand heritage, design) might play a larger role.

Statistical Test Explanation:

- **Test used:** Chi-square test of independence
- **Purpose:** To determine whether there's a statistically significant relationship between **ad exposure** and **belief in quality**.
- **p-value:** **0.606** → **Not statistically significant**

Final Conclusion:

Marketing efforts (such as advertisements) **do not show a significant impact** on the belief that luxury brands are of better quality, **at least in this sample**.

CONCLUSION

This study primarily aims to comprehend men's perceived worth, particularly among upper middle class and middle-class individuals, as they tend to be price sensitive and do not make impulsive purchases of luxury brands. The research concluded that the primary factors impacting the recognition of luxury brands are product quality, along with brand heritage and design/style. The primary factors driving individuals to purchase luxury brands consist of product quality, brand reputation, and the influence of peers. A large number of individuals think that luxury brands offer a perceived value for money, with the key elements contributing to this perception

being high-quality materials, long-lasting durability, and distinctive design. Income of consumer has impact on purchasing decision of luxury brands but there is no meaningful connection between income and the readiness to pay extra for luxury brands because majority of people said no for paying premium irrespective of their income. Marketing initiatives (like ads) do not significantly influence the perception that luxury brands are of superior quality.

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CRYPTO CURRENCY: A DECENTRALIZED DIGITAL CURRENCY REVOLUTION

Vandana Chandarlal KodwaniAssistant Professor, Commerce Coordinator (S. E. S) Swami Hansmuni Maharaj Degree College of Commerce,
Affiliated to University of Mumbai**ABSTRACT**

Crypto currency is a digital or virtual currency that uses cryptography for security and is decentralized, meaning it's not controlled by any government or financial institution. Transactions are recorded on a public ledger called a block chain, ensuring transparency, security, and immutability. Crypto currencies, such as Bit coin, Ethereum, and others, have gained significant attention in recent years due to their potential to disrupt traditional financial systems and provide new opportunities for financial inclusion and innovation. This abstract provides an overview of crypto currency, its underlying technology, and its potential applications and implications for the future of finance

Keywords: *Crypto currency, Block chain, Decentralized finance, - Digital currency, - Financial inclusion, Innovation*

OBJECTIVES OF THE STUDY:

- To Gain a comprehensive understanding of the concept, benefits, and risks of crypto currency.
- To identify patterns and trends in the crypto currency market.
- To develop a nuanced understanding of the regulatory environment surrounding crypto currency.
- To explore the potential uses of crypto currency beyond speculative investment.

INTRODUCTION

Crypto currency is a digital or virtual currency that uses cryptography for security and is decentralized, meaning it's not controlled by any government or financial institution. The first crypto currency, Bit coin, was created in 2009 by an individual or group of individuals using the pseudonym Satoshi Nakamoto. Since then, the crypto currency market has grown exponentially, with thousands of different crypto currencies available.

There are over 5,000 crypto currencies available, but here are some popular types:

Top Crypto currencies by Market Capitalization:

1. **Bit coin (BTC):** The first and most widely recognized crypto currency.
2. **Ethereum (ETH):** A decentralized platform for building smart contracts and decentralized applications
3. **Tether (USDT):** A stable coin pegged to the value of the US dollar.

Key Characteristics:

1. **Decentralized:** Crypto currencies operate independently of central banks and governments.
2. **Digital:** Crypto currencies exist only in digital form.
3. **Limited supply:** Most crypto currencies have a limited supply of coins or tokens.
4. **Fast and Global Transactions:** Crypto currencies enable fast and secure transactions across the globe.
5. **Security:** Crypto currencies use advanced cryptography to secure transactions and control the creation of new units.

RESEARCH METHODOLOGY:

The present study is based on secondary data collected from different journals, magazines, various books and websites which are clearly mentioned in the bibliography.

Emerging Technologies in Crypto Currencies:

1. **Block chain:** Next-generation block chain technology will enable faster, more secure, and more scalable transactions.
2. **Central Bank Digital Currencies (CBDCs):** Central banks will develop their own digital currencies, which will coexist with traditional fiat currencies.

3. **Quantum Computing:** The integration of quantum computing will enhance the security and efficiency of crypto currency transactions.
4. **Artificial Intelligence (AI):** AI will be used to optimize crypto currency trading, predict market trends, and detect potential security threats.

Trends and Predictions:

1. **Increased Adoption:** Crypto currencies will become more mainstream, with wider acceptance and use in everyday transactions.
2. **Regulatory Clarity:** Governments and regulatory bodies will establish clearer guidelines and frameworks for crypto currencies.
3. **Improved Infrastructure:** The development of more robust and scalable infrastructure will support the growth of crypto currencies.
4. **Security Enhancements:** Advances in security measures, such as quantum-resistant cryptography, will protect crypto currencies from hacking and other threats.
5. **Expansion of Use Cases:** Crypto currencies will be used in new and innovative ways, such as in gaming, social media, and virtual reality.

Potential Challenges of Crypto Currencies:

1. **Regulatory Uncertainty:** Changes in regulatory policies could impact the adoption and use of crypto currencies.
2. **Security Risks:** The increasing sophistication of hacking techniques and other security threats will require continuous innovation in security measures.
3. **Scalability Issues:** The ability of crypto currencies to scale and support widespread adoption will be a significant challenge.
4. **Environmental Concerns:** The energy consumption required to mine crypto currencies will need to be addressed through more sustainable practices.

Future Outlook of Crypto Currencies:

1. **Increased Institutional Investment:** Institutional investors will play a larger role in the crypto currency market.
2. **Mainstream Acceptance:** Crypto currencies will become more widely accepted as a form of payment.
3. **Decentralized Finance:** Decentralized Finance will continue to grow, enabling new financial services and applications.
4. **Global Economic Impact:** Crypto currencies will have a significant impact on the global economy, with potential benefits and challenges.

The future of crypto currency and digital currency is exciting and rapidly evolving. As the technology continues to advance and mature, we can expect to see increased adoption, innovation, and mainstream acceptance.

CONCLUSION:

Crypto currencies have revolutionized the way we think about money and financial transactions. With their decentralized nature, advanced cryptography, and potential for fast and global transactions, crypto currencies offer a range of benefits and opportunities. However, they also come with risks and challenges, such as regulatory uncertainty, volatility, and security concerns.

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GREEN BONDS AND SUSTAINABLE INVESTMENT OPPORTUNITIES IN INDIA

Gawde Vijay Maruti Subhadra¹ and Vamshi Dusa²¹Vice Principal, Vidyalankar School of Information Technology, Wadala, Mumbai²Student, B.Com (Financial Market) at Vidyalankar School of Information Technology, Wadala, Mumbai**ABSTRACT**

Green bonds have been a vital financial instrument for promoting green growth and conserving the environment in India. This study on usage of green bonds in India is in line with the national vision of Viksit Bharat 2047, which focuses on inclusive, sustainable, and forward-looking development. Even as India steers towards its ambitious target of becoming net-zero carbon neutral by 2070, green finance continues to be the focal point for mobilizing capital for clean energy, climate resilience, and green infrastructure investment. This research study examines the state of green bonds in India, investor attitudes, and hindrances to their adoption, Survey evidence gathered using 114 interviews informs awareness levels, investment inclination, and main hindrances. Implications indicate policy reforms, greater transparency, and financial incentives as major impetuses towards green bond investment in India.

Keywords: Green Bonds, Sustainable Investment, Climate Finance, Investor Awareness

1. INTRODUCTION

The Indian economy still has the title of being the fastest-growing economy of the world in a position to balance environmental sustainability plus economic development. Some financial means, like the issuance of green bonds, counter climate change and ensure sustainable development. Green bonds are debt instruments meant for tax rebates-for projects that finance environmental projects like energy efficiency, sustainable transportation, climate resilience, or renewable energy.

2. IMPORTANCE OF GREEN BONDS AND SCOPE OF STUDY

Sustainable financing is given the highest priority in light of India's commitment to achieve net-zero carbon dioxide emissions by 2070. Green bonds provide a viable financing tool for projects aimed at environmental sustainability and to pull domestic and international funds into the country. The Indian government, industries, and regulatory bodies such as SEBI have taken steps to develop the green bond market. The study will attempt to find out the perception of financial advisors and investors in Mumbai region with reference to progress, prospects, growth, challenges, and adoption of green bonds.

3. RESEARCH OBJECTIVES

- To measure the progress, prospects, and growth of green bonds in India in the eye of financial advisors and investors
- Understanding the challenges that are related to issuance and adoption of green bonds from the point of view of financial advisors and investors.
- To provide recommendations for the adoption of Green Bonds among investors

4. LITERATURE REVIEW

Poonam Mahajan et al. (2024) in the research paper, "Green Bonds as A New Investment Tool for Sustainable Development in India," discusses green bonds as a climate change and environmental sustainability project finance instrument. It mentions the ICMA Green Bond Principles, which lay down use of proceeds, project evaluation, management, and reporting of funds. Rules for green bond securities have been made compulsory by the Securities and Exchange Board of India. Yes Bank was the pioneer issuer of green bonds in 2015. The Indian green bonds market had grown to \$21 billion by February 2023. Utilities possess the maximum market share.

Madhav Patidar (2023) in the report titled, "Green Bonds and Sustainable Finance: Analyzing Market Trends and Impact on Environmental Initiatives in India," examines green bonds in India, the function of these products in funding environmental sustainability initiatives, and the way the growth path they are following. The impact of such initiatives, regulatory framework, and government policies is at the heart of the green bond market. The report also depicts the functions of national institutions in promoting a sustainable finance system.

Sourabh Bansal (2020) in the research report titled, "Green Bonds-Trend and Challenges in India," discussed the importance of green bonds as a funding instrument. Having started in India after the 2015 Paris Agreement, green bonds are now a vital instrument for funding sustainable development initiatives. However, challenges

such as currency hedging charges, investor ignorance, and low sovereign ratings are the inhibitors of growth. Strategic intervention by the government can therefore enhance the appeal and effectiveness of green bonds.

Abhilash et al. (2023) in the research paper entitled, "Green Bond as an Innovative Financial Instrument in the Indian Financial Market: Insights from Systematic Literature Review Approach," believed that the Indian green bond market is plagued by the absence of standardized guidelines, high cost of transaction, absence of labeled bonds, greenwashing issues, poor credit quality of the issuers, limited government participation, less attractive sovereign yields, absence of financial benefits, and low awareness levels. The report suggests the adoption of effective policy measures and the facilitation of active stakeholder participation by government departments, financial institutions, and market regulators. Green bonds are considered to be innovative funding tools for the achievement of India's sustainable development goals, but the report is also keen to bring in structural reform and higher awareness for the optimal use of their potential.

Shashank Bansal et al. (2023) in the research work entitled, "Sustainable Development of the Green Bond Markets in India: Challenges and Strategies," discovers that improper risk profiling, absence of legislative support, comparatively high cost of transactions, and insufficient investor awareness represent the factors that hinder the growth of green bond markets in India. As a counter to such obstacles, it suggests the implementation of judicious policy measures in addition to inter-organization coordination among the participating stakeholders. Indeed, green bonds are key actors in ensuring sustainable development objectives for India, but such would be achieved through structural reform and enhancing the level of awareness.

5. RESEARCH METHODOLOGY

The research design is descriptive in nature. Primary data was collected through surveys targeting investors, financial advisors, and industry professionals. The survey involved 114 participants, including retail investors, financial advisors, institutional investors, and students who invest. The data was collected through convenience sampling and analyzed through SPSS and excel software.

6. DATA ANALYSIS

➤ Investor Awareness

The survey results indicate that 41% of the participants are not familiar with green bonds, and just 3% are. This indicates the necessity for more investor education programs and campaigns.

➤ Investment Preferences

Although stocks (58%) and mutual funds (32%) were the preferred investment options, a mere 2% of the participants indicated that they prefer green bonds. This indicates that investors give higher importance to conventional financial instruments than sustainable ones.

➤ Challenges to Green Bond Adoption

Low level of investor comprehension (30%), poor market liquidity (17%), regulatory requirements (11%), and cost of verification (7%), the paper reads, are the main obstacles. Expansion of markets relies on addressing these with money incentives and policies.

➤ Government Support and Market Perception

20% of the respondents were aware of the advantages of existing government support, while 40% of respondents were indifferent about

Hypothesis

Following were null hypothesis framed.

Table 1: Null Hypothesis

1. The median of how familiar are you with the concept of green bonds equals 3.
2. The median of how important do you think green bonds are in financing India sustainable future? equals
3. The median of do you believe green bonds are an effective tool for funding renewable energy and infrastructure projects in India equals 3.
4. The median of growth and prospects of green bonds in India equals 3.
5. The median of high regulatory requirements, lack of investor awareness, limited market liquidity verification and certification costs equals 3.
6. The median of do you believe there is sufficient government support for green bond growth in India equals 3.
7. The median of would you be more likely to invest in green bonds if they offered tax

incentives? equals 3.
8. The median of which investment factor is most important to you equals 3.
9. The median of do you believe green bonds should become a mainstream investment option in India equals 3.

Source: Primary Data

The researcher used One-Sample Kolmogorov Smirnov Test to test the normality of data. The researcher found that the data was not normally distributed as p-value was less than 0.05 in all the cases as seen in Table 2 and Table 3.

Table 2: One-Sample Kolmogorov-Smirnov Test

		1. How familiar are you with the concept of green bonds?	2. How important do you think green bonds are in financing India's sustainable future?	3. Do you believe green bonds are an effective tool for funding renewable energy and infrastructure projects in India?	4. Growth and Prospects of Green Bonds in India	5. High regulatory requirements Lack of investor awareness Limited market liquidity Verification and certification costs
N		114	114	114	114	114
Normal Parameters ^{a,b}	Mean	1.90	2.98	3.17	3.03	1.98
	Std. Deviation	0.892	1.022	1.055	0.846	1.030
Most Extreme Differences	Absolute	0.257	0.174	0.244	0.277	0.277
	Positive	0.257	0.165	0.171	0.249	0.277
	Negative	-0.171	-0.174	-0.244	-0.277	-0.180
Test Statistic		0.257	0.174	0.244	0.277	0.277
Asymp. Sig. (2-tailed)		.000 ^c	.000 ^c	.000 ^c	.000 ^c	.000 ^c
a. Test distribution is Normal.						
b. Calculated from data.						
c. Lilliefors Significance Correction.						

Source: Primary Data

Table 3 One-Sample Kolmogorov-Smirnov Test

		6. Do you believe there is sufficient government support for green bond growth in India?	7. Would you be more likely to invest in green bonds if they offered tax incentives?	8. Which investment factor is most important to you?	9. Do you believe green bonds should become a mainstream investment option in India?
N		114	114	114	114
Normal Parameters ^{a,b}	Mean	2.83	3.45	2.35	3.22
	Std. Deviation	0.882	0.942	1.022	1.002
Most Extreme Differences	Absolute	0.277	0.265	0.220	0.229
	Positive	0.215	0.200	0.170	0.174
	Negative	-0.277	-0.265	-0.220	-0.229
Test Statistic		0.277	0.265	0.220	0.229
Asymp. Sig. (2-tailed)		.000 ^c	.000 ^c	.000 ^c	.000 ^c
a. Test distribution is Normal.					
b. Calculated from data.					
c. Lilliefors Significance Correction.					

Source: Primary Data

Testing of Hypothesis

The researcher used one sample Wilcoxon Signed Rank Test to test the hypothesis as the data was not normally distributed. The results are shown in below table 4

Table 4: One Sample Wilcoxon Signed Rank Test

Sr. No.	Null Hypothesis	Test Statistic	Standard Error	Standardized Test Statistic	Asymptotic Sig.	Decision
1	The median of how familiar are you with the concept of green bonds equals 3.	80	224.802	-7.965	0.00	Accept the Alternate Hypothesis since p-value is less than 0.05
2	The median of how important do you think green bonds are in financing India sustainable future? equals 3.	1425	179.682	0.211	0.833	Fail to reject null hypothesis since p-value greater than 0.05
3	The median of do you believe green bonds are an effective tool for funding renewable energy and infrastructure projects in India equals 3.	1530	168.855	1.279	0.201	Fail to reject null hypothesis since p-value greater than 0.05
4	The median of growth and prospects of green bonds in India equals 3.	771	107.593	0.265	0.791	Fail to reject null hypothesis since p-value greater than 0.05
5	The median of high regulatory requirements, lack of investor awareness limited market liquidity, verification and certification costs equal 3.	175	220.234	-7.503	0.00	Accept the Alternate Hypothesis since p-value is less than 0.05
6	The median of do you believe there is sufficient government support for green bond growth in India equals 3.	605	120.386	-2.081	0.37	Fail to reject null hypothesis since p-value greater than 0.05
7	The median of would you be more likely to invest in green bonds if they offered tax incentives equal 3.	2,197.50	177.482	4.353	0.00	Accept the Alternate Hypothesis since p-value is less than 0.05
8	The median of which investment factor is most important to you equals 3.	337.5	175.854	-5.76	0.00	Accept the Alternate Hypothesis since p-value is less than 0.05
9	The median of do you believe green bonds should become a mainstream investment option in India equals 3.	1494	154.658	2.076	0.38	Fail to reject null hypothesis since p-value greater than 0.05

Source: Primary Data

The researcher used Rank-Biserial Correlation to measure the effect size as seen in Table 5. Rank-Biserial Correlation is calculated by dividing standardized test statistic with square root of N

Table 5: Rank Biserial Correlation

Sr. No.	Null Hypothesis	Rank Biserial Correlation	Effect Size	Interpretation
1	The median of how familiar are you with the concept of green bonds equals 3.	-0.746	Large	Respondents significantly differ from neutrality . The strong negative value suggests most are not familiar with green bonds.

2	The median of high regulatory requirements, lack of investor awareness, limited market liquidity, verification and certification costs equal 3.	-0.703	Large	A strong negative correlation indicates respondents perceive these challenges as real and impactful , showing a significant departure from a neutral view.
3	The median of which investment factor is most important to you equals 3.	-0.539	Large	Respondents show a strong preference for certain investment factors , rather than being neutral.
4	The median of do you believe there is sufficient government support for green bond growth in India equals 3.	-0.195	Small	A slight negative effect suggests some dissatisfaction or lack of confidence in government support, but the deviation from neutrality is minimal.
5	The median of how important do you think green bonds are in financing India sustainable future equals 3.	-0.020	Extremely small	Almost no difference from the neutral median, indicating respondents are undecided or neutral on this.
6	The median of growth and prospects of green bonds in India equals 3.	0.025	Negligible	Very little deviation from the neutral stance— respondents are either neutral or divided on this matter
7	The median of do you believe green bonds are an effective tool for funding renewable energy and infrastructure projects in India equals 3.	0.120	Small	A slight positive effect shows some agreement , but overall, the responses hover around neutrality.
8	The median of do you believe green bonds should become a mainstream investment option in India equals 3.	0.194	Small	Again, slightly leaning positive, indicating mild agreement on making green bonds mainstream.
9	The median of would you be more likely to invest in green bonds if they offered tax incentives equal 3	0.408	Medium to Large	A moderate to strong effect suggests tax incentives could significantly influence people's willingness to invest in green bonds

Source: Primary Data

7. SUMMARY, CONCLUSION, AND RECOMMENDATION

This study on usage of green bonds in India is in line with the national vision of Viksit Bharat 2047, which focuses on inclusive, sustainable, and forward-looking development. The researchers found issues with tax exemptions, investor knowledge, and minimum infrastructural development of the market as barriers for full scale adoption of green bonds. These challenges directly impact India's ability to finance its climate goals and build a green economy. The researcher recommends investor education, regulatory reforms, incentives through tax relief, developing a secondary market for green bonds, and public private partnerships to expand the green bond market. Enabling the development of green bonds can help India leverage huge investments for clean energy, sustainable infrastructure, and climate resilience—pillars that are key to achieving a truly developed, self-reliant, and sustainable India by 2047.

8. LIMITATIONS AND FUTURE RESEARCH

This research focused on a sample of 114 subjects and was designed with an all-Indian market orientation in mind and carried in Mumbai Region only. Future research could consider contrastive perspectives between countries, industrial applications of green bonds, and long-term performance comparisons.

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A STUDY ON BEHAVIORAL FINANCE: THE INFLUENCE OF PSYCHOLOGICAL BIASES ON DECISIONS CONCERNING INVESTMENTS ESPECIALLY IN STOCK MARKET

Vijay Saxena

Assistant Professor, B. K. Birla Night College, Kalyan

ABSTRACT

Indian Stock market was among the first of its kind in the financial world. Bombay Stock Exchange was established in 1875. It has remained an indicator of country's financial condition of affairs of the nation. It reflects the financial position and state of affairs of the industries in the country and overall health of its citizens. It reflects the condition of economy and can serve as a key catalyst for the world to consider it as an investment destination.

Stock Markets have also been termed as "Capital Markets" where the business class turns towards the general public to raise their capital for their business. It's one of the most popular methods of raising business funds. It has been continuously accessed by the business class and brought the general public into their success stories. They have distributed their profits in the form of dividends and sometimes by the issue of Bonus shares. It is a location where there can be a win-win situation for all the concerned parties. The businessman/ entrepreneur get's his capital to conduct business, investors receive dividends on their investments and during times of super profits, they even receive bonus shares. The economy develops, employment opportunities created, poverty dips, purchasing power of the public is enhanced, inflation is under control, foreign exchange rate of the country remains stable or increases and the international position of the country as a business friendly unit is enhanced.

The word "Stock Market" gives a shiver down the spine of lot of people even now. For a large number of people, it has been a taboo word from generations together. The term stock markets have always been equal to speculation or immoral money. Stock Markets have always been looked at with a word of caution by the common people.

Stock market investments have been highly unpredictable and irregular. People's behavior cannot be understood of their choices to invest or not invest in stock market.

Stock market investments, if executed in a methodical manner can provide fabulous and phenomenal returns compared to conventional instruments of investment.

Stock Market instrument particularly Equity shares, if from time to time monitored, may be utilized as a powerful instrument of investment so as to cover against inflationary rise and even generate tax-free returns either by way of dividend or profit brought in through selling of equity shares. If money is saved at the time of tax, then money earned results in saving further. So indirectly it becomes addition to the income.

Keywords: *Purchasing Power, Poverty dips, Bonus Shares, Dividend and Inflation*

INTRODUCTION

Stock market investment decisions have long been understood using classical finance theories assuming rational investors and efficient markets. Real-world experience is often at odds with these assumptions, showing investor behavior being often driven by emotions, cognitive biases, and psychological biases. This has created the backdrop for the development of behavioral finance as a field that integrates psychology and finance to understand how individuals make investment decisions.

Behavioral finance contradicts the assumption of investor rationality by showing how biases like overconfidence, loss aversion, herd behavior, and regret aversion have important influences on decision-making processes. These biases make investors depart from optimal investment procedures, and it leads to market anomalies like bubbles and crashes. The role of psychological factors then becomes important to understand, particularly in stock markets where volatility and uncertainty tend to enhance irrationality.

Importance of Behavioral Finance:**Describes Real-World Investment Behavior:**

Conventional theories of finance presuppose investors to be perfectly rational, yet in the real world, decisions are usually influenced by emotions, biases, and cognitive mistakes.

Behavioral finance gives a theory explaining why investors behave irrationally even if it goes against their own self-interest.

2. Points Out Common Psychological Biases

It brings out particular biases such as loss aversion, overconfidence, herd behavior, and anchoring that affect investment choices.

By recognizing these biases, financial professionals and investors can more effectively navigate and anticipate irrational market activity.

3. Facilitates Understanding Market Anomalies

Phenomena such as stock market bubbles, crashes, and irrational price fluctuations cannot be explained by traditional models.

Anomalies like excessive trading, momentum investing, and overreaction to news are explained by behavioral finance.

4. Improves Investment Strategies

Investors can formulate improved strategies by recognizing psychological traps.

Principles such as behavioral portfolio theory assist in designing investment portfolios that strike a balance between rational objectives and emotional ease.

5. Encourages Improved Financial Decision-Making

Knowledge of biases can prompt individuals to make more rational and less emotionally charged financial decisions.

It promotes strategies such as goal-setting, diversification, and long-term investment to reduce the influence of biases.

6. Enhances Financial Advisory Services

Financial planners with knowledge of behavioral finance can provide improved client guidance by incorporating emotional and psychological considerations, in addition to risk-return computations.

It enhances client relationships with more empathetic and customized service.

7. Facilitates Financial Education Programs

Incorporating learning about behavioral finance as part of financial literacy programs enables investors to identify and manage their biases in the early stages.

8. Vital During Market Turbulence and Crises

During economic uncertainty, fear and greed drive investor actions.

Behavioral finance provides evidence of how shared investor psychology reinforces market fluctuations and assists regulators and policymakers in crafting better interventions.

9. Informing Regulatory and Policy Choices

Regulators now increasingly apply behavioral insights to design "nudges" and enhance financial products, disclosures, and investor protection.

Psychological Biases in Investment Choices:

Investor choices in the stock market are not necessarily made based on rational reasoning. Psychological biases tend to make people deviate from rational thinking, leading to inefficient investment decisions. It is important to know these biases to understand real-world market behavior.

The most common psychological biases that affect investment choices are:

1. Overconfidence Bias

Investors tend to overestimate their knowledge, skills, and ability to forecast market trends.

This bias can create over-trading, under-diversification, and a tendency to overlook risks.

Overconfident traders are convinced their intuition is better than everyone else's, which usually means poor performance.

2. Loss Aversion

Investors experience the hurt of losses more strongly than they enjoy equivalent gains.

Therefore, they will cling to losing investments for too long or refuse to sell at a loss, even when it makes sense to do so.

This behavior usually results in irrational choice and influences portfolio performance.

3. Herd Behavior

Investors tend to mimic the actions of a larger group or follow market trends, usually without independent thought.

Herdling may cause asset bubbles and unexpected market crashes when collective sentiment changes.

4. Anchoring Bias

Investors anchor their choices to a particular reference point, such as the historical price of a stock or the price at which they bought it, even if new information dictates otherwise.

This discourages objective reconsideration and can lead to bad timing of entry and exit.

5. Disposition Effect

Investors are inclined to dispose of assets whose value has risen but retain those whose value has fallen.

This prejudice is due to the need to realize gains promptly but shun the distress of admitting losses.

6. Regret Aversion

Anxiety of making the wrong investment decisions causes investors to eschew making decisions at all or overcautious behavior.

The bias can cause missed opportunities and inefficient asset allocation.

7. Confirmation Bias

Investors are looking for evidence that confirms what they already believe in and exclude contrary evidence.

This confirms existing investment strategies despite changing market conditions, resulting in poor decision-making.

8. Mental Accounting

Investors handle money differently depending on where it came from or what it is intended for instead of considering all money logically.

To illustrate, handling a tax refund as "extra" money and investing it more aggressively than regular savings.

LITERATURE REVIEW:

1. Kahneman, D., & Tversky, A. (1979)

Prospect Theory: An Analysis of Decision under Risk

- Introduced *Prospect Theory*, showing that investors value gains and losses differently, leading to irrational decision-making (loss aversion, framing effects).
- Relevance: Foundation of behavioral finance.

2. Shefrin, H., & Statman, M. (1985)

The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence

- Introduced the *Disposition Effect*, where investors hold onto losing stocks longer than they should.
- Relevance: Important bias affecting stock market behavior.

3. De Bondt, W. F., & Thaler, R. (1985)

Does the Stock Market Overreact?

- Empirical evidence that investors overreact to new information, causing stock price anomalies.
- Relevance: Demonstrates overreaction bias in stock trading.

4. Barberis, N., Shleifer, A., & Vishny, R. (1998)

A Model of Investor Sentiment

- Developed a model where investor sentiment affects stock prices, leading to predictable mispricings.

- Relevance: Connects sentiment and bias to real stock movements.

5. Odean, T. (1998)

Volume, Volatility, Price, and Profit When All Traders Are Above Average

- Showed that *overconfident investors* trade excessively and earn lower returns.
- Relevance: Highlights overconfidence bias.

6. Shiller, R. J. (2000)

Irrational Exuberance

- Examined how psychological factors like herd behavior and over-optimism cause market bubbles.
- Relevance: Real-world application to stock market booms and crashes.

7. Statman, M. (2002)

Behavioral Finance: Past Battles and Future Engagements

- Reviewed major behavioral finance insights and their impact on investment practices.
- Relevance: Comprehensive background of behavioral finance evolution.

8. Baker, M., & Wurgler, J. (2006)

Investor Sentiment and the Cross-Section of Stock Returns

- Analyzed how investor sentiment drives stock prices differently across firms.
- Relevance: Links sentiment with stock return anomalies.

9. Benartzi, S., & Thaler, R. (1995)

Myopic Loss Aversion and the Equity Premium Puzzle

- Investors are overly sensitive to short-term losses, leading to higher returns on equity compared to bonds.
- Relevance: Shows real market outcomes of loss aversion.

10. Barber, B. M., & Odean, T. (2001)

Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment

- Found that male investors are more overconfident than females, leading to more trading and lower returns.
- Relevance: Behavioral biases vary across demographics.

11. Kumar, A., & Lee, C. M. C. (2006)

Retail Investor Sentiment and Return Comovements

- Retail investor sentiment strongly affects comovements in stock returns.
- Relevance: Retail biases shape broader stock trends.

12. Grinblatt, M., & Keloharju, M. (2009)

Sensation Seeking, Overconfidence, and Trading Activity

- High sensation seekers and overconfident investors trade more aggressively.
- Relevance: Personality traits linked with trading behavior.

13. Pompian, M. M. (2006)

Behavioral Finance and Wealth Management

- Classified biases into emotional and cognitive types, helping advisors design strategies for biased investors.
- Relevance: Practical guide to handling biased investment behavior.

14. Tseng, C. C., & Yang, S. Y. (2011)

Behavioral Biases in Investment Decision-Making: A Survey

- Comprehensive survey showing how biases systematically distort investment decisions across populations.
- Relevance: Modern evidence base.

15. Waweru, N. M., Munyoki, E., & Uliana, E. (2008)

The Effects of Behavioral Factors in Investment Decision-Making

- Empirical study in emerging markets showing strong herd behavior, loss aversion, and overconfidence.
- Relevance: Cross-market behavioral insights.

16. Ritter, J. R. (2003)

Behavioral Finance

- Summarized key anomalies (IPO underpricing, dividend puzzle) through a behavioral lens.
- Relevance: Helps explain multiple market irregularities through biases.

17. Chen, G. M., Kim, K. A., Nofsinger, J. R., & Rui, O. M. (2007)

Trading Performance, Disposition Effect, Overconfidence of Individual Investors

- Found that individual investors show clear signs of disposition effect and overconfidence, affecting profits.
- Relevance: Empirical validation.

18. Hirshleifer, D. (2001)

Investor Psychology and Asset Pricing

- Discussed how psychological forces like overreaction and limited attention affect asset pricing models.
- Relevance: Theoretical development.

19. Kahneman, D. (2011)

Thinking, Fast and Slow

- Explained two modes of thinking: fast (emotional) and slow (logical), showing how investors often act impulsively.
- Relevance: Fundamental for understanding biases like framing, anchoring, etc.

20. Sewell, M. (2010)

Behavioral Finance

- Reviewed major theories and empirical findings in behavioral finance in a clear, structured way.
- Relevance: Good literature base for beginners and experienced researchers.

Research Gap:

1. Limited Concentration on Retail Investor Psychology

Most research to date targets institutional investors or aggregate market data, without investigating how individual retail investors are particularly affected by psychological biases.

2. Contextual and Cultural Differences Unexamined

Most behavioral finance research has been conducted in developed economies such as the U.S. and Europe.

There is little research on the impact of cultural, economic, and demographic forces on investor biases in emerging economies such as India, Southeast Asia, and Africa.

3. Dynamic Nature of Biases Throughout Market Cycles

Investor biases can perform differently under bull and bear market conditions, but few studies look into how the strength of biases varies between market phases.

4. Interaction Among Multiple Biases

Current research tends to study biases in isolation (e.g., only overconfidence or only loss aversion).

RESEARCH METHODOLOGY:

This section describes the methodology, methods, and techniques applied to explore how psychological biases affect investment in the stock market. The study uses a mixed-methods approach, where qualitative method is offered to a holistic approach to the subject matter.

1. Research Design

The research adopts an exploratory and descriptive research design. The objective is to determine, examine, and describe the impact of different psychological biases on investment decisions in the stock market.

Exploratory: The research aims to examine how psychological biases are exhibited in stock market decisions and the most dominant biases among investors.

Descriptive: It further describes the degree to which these biases impact decision-making behaviors and investment returns in the stock market.

2. Data Collection Methods

Both primary and secondary data are employed for a stronger and more correct analysis.

Primary Data

Primary data will be gathered via surveys and interviews.

Surveys: An organized online questionnaire will be sent to retail investors and financial advisors. The survey will contain questions on prevalent biases, investment behavior, and decision-making processes. Participants will be required to rank the impact of particular biases like overconfidence, loss aversion, and herd behavior.

Survey Sample: A random sample of 300 retail investors aged 18–65, who actively invest in the stock market.

Questionnaire Design: The questionnaire will feature Likert-scale items to gauge the intensity of bias, and hypothetical situations to monitor decision-making under biased conditions.

Interviews: Semi-structured interviews with 10–15 seasoned investors or financial advisors will be used to seek greater understanding regarding how biases influence their decision-making approaches. These will enable open-ended answers, giving qualitative insight into investor psyche.

Secondary Data

Secondary data will be employed to corroborate and strengthen the main findings.

Stock Market Data: Historical data from the stock market will be utilized to study how investor sentiment influences market movement. Data will be stock prices, volumes traded, and price volatility for the last 5 years.

3. Sampling Method

A random sampling method will be employed to choose retail investors for the survey so that the sample will represent the general population of stock market investors. Purposive sampling method will be employed for selecting interviewees, choosing people with considerable experience in stock market investment, like financial advisors and experienced investors.

Sample Size: 50-60 respondents (retail investors)

4. Variables

The main variables in this research are as follows:

Independent Variables: Psychological biases (e.g., overconfidence, loss aversion, herd behavior, confirmation bias)

Investor demographics (e.g., age, gender, income, education level)

Dependent Variable: Investment decision-making behavior (e.g., stock choice, portfolio rebalancing, trading frequency, response to market movements)

LITERATURE REVIEW

Literature, academic research, articles, and case studies will be used to present background and theory on psychological biases and how they affect stock market choices.

OBJECTIVES:

1. To Determine Key Psychological Biases Influencing Investment Choices
2. To Examine the Degree to Which Psychological Biases Influence Investment Behavior

3. To Investigate the Effects of Biases on the Stock Market and Investors' Performance
4. To Discuss the Influence of Demographic Factors on Investor Biases
5. To Make Recommendations to Offset the Negative Consequences of Psychological Biases
6. To Contribute to the Behavioral Finance Literature

HYPOTHESIS:

H1: Investor psychological biases greatly influence stock market investment choices.

H2: Overconfidence bias results in overtrading and reduced investment returns.

H3: Loss aversion bias results in the retention of losing stocks for more than optimal periods, lowering portfolio performance.

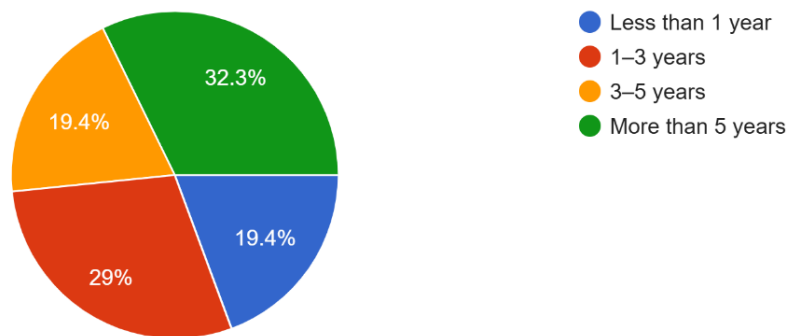
H4: Herd behavior raises market volatility and results in the creation of speculative bubbles.

H5: Confirmation bias causes over-investment in shares that are consistent with current beliefs, resulting in inefficient portfolio diversification.

Data Analysis & Interpretation:

Investment Experience

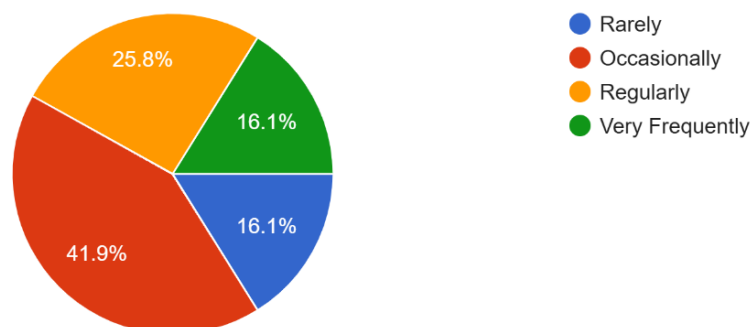
31 responses



Interpretation: The pie chart indicates that among the 31 respondents, the largest group has more than 5 years of investment experience (32.3%). This is followed by those with 1-3 years of experience (29%), and then an equal proportion with less than 1 year and 3-5 years of experience (both 19.4%).

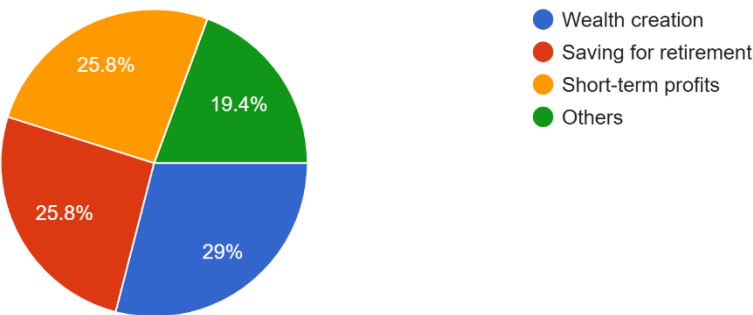
How often do you invest in the stock market?

31 responses



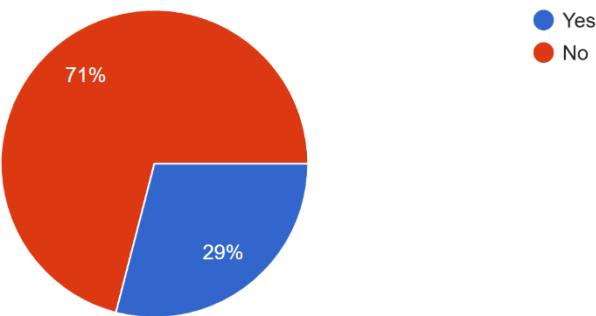
Interpretation: The pie chart shows that among the 31 respondents, the most frequent investment frequency in the stock market is occasionally (41.9%). This is followed by rarely (25.8%), then equally by regularly (16.1%) and very frequently (16.1%).

What is your primary goal for investing?
31 responses



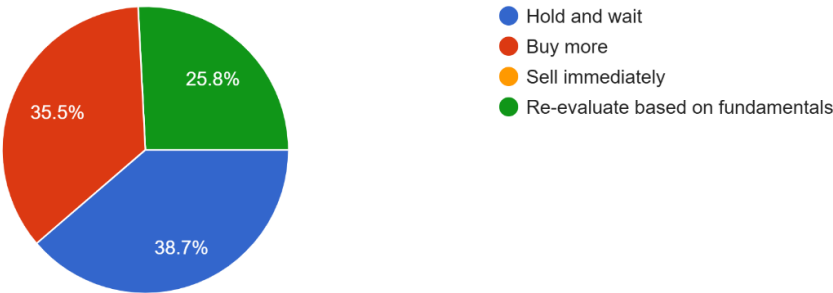
Interpretation: The pie chart reveals that the primary investment goals among the 31 respondents are quite varied. The largest portion aims for wealth creation (29%), followed closely by saving for retirement (25.8%) and seeking short-term profits (25.8%). A smaller segment indicated other primary goals (19.4%).

If most people are investing in a particular stock, would you also invest?
31 responses



Interpretation: The pie chart shows that if most people are investing in a particular stock, the majority of the 31 respondents would not also invest (71%). Only a minority would invest (29%).

If a stock drops by 20% after you bought it, what are you most likely to do?
31 responses



Interpretation: The pie chart shows that if a stock drops by 20% after purchase, the most likely action among the 31 respondents is to hold and wait (38.7%). The next most likely action is to buy more (35.5%), followed by re-evaluating based on fundamentals (25.8%). Very few respondents indicated they would sell immediately.

Need of the Study: Comprehending the Psychological Aspects of Investment Choices

Investment Choices are not Necessarily Rational: Conventional finance theories, like the Efficient Market Hypothesis (EMH), take as a premise that investors act rationally based on analysis of all available data. Real-life decision-making is far from ideal owing to psychological prejudices.

Behavioral Finance Bridges the Gap: Through investigation of psychological biases like overconfidence, loss aversion, and herding, this study provides insight into why and how investors tend to behave in irrational ways, which contradicts classical models in finance and presents a truer representation of investment behavior.

2. Addressing the Inefficiencies in the Stock Market

Market Inefficiencies and Anomalies: Psychological biases tend to be associated with stock market inefficiencies and anomalies, including overreaction to news, market bubbles, and irrational trading behavior, which result in mispriced stocks. This research seeks to bring insights about the role of biases in market inefficiencies.

Investor Implications: Knowledge about how biases affect investment behavior can assist individual investors in making sounder decisions, avoiding errors, and enhancing portfolio performance in the long run.

3. Improved Investor Education and Financial Literacy

Need for investor education: Individual investors, particularly in developing markets, do not possess sufficient financial literacy to identify and minimize biases in the decision-making process. This study will emphasize the importance of higher education and greater awareness programs that can assist investors in making decisions.

Behavioral Interventions: The results can be used in the design of investor education programs and tools to mitigate the adverse influence of cognitive biases, promoting more rational and better-informed investment decisions.

4. Enhancing the Development of Behavioral Finance Literature

New area of Behavioral Finance: Behavioral finance is a fast-growing area that combines psychology and conventional finance. Although much has been achieved, there remains a lot to be discovered, particularly regarding certain biases and how they appear in actual stock market situations.

Gap in Empirical Studies: Despite there being ample theoretical studies on the subject, no comprehensive, empirical studies connect given psychological biases with tangible investment performance, such as trading volume, portfolio performance, or volatility.

5. Financial Advisors and Policy Makers Impacts

Enhancing Financial Advisory Services: Financial advisors can gain from a deeper insight into the investor psyche. This research will assist advisors in customizing their services to include clients' biases and minimize risks resulting from irrational behavior.

Policy and Regulation Implications: The results may also educate financial regulators and policymakers concerning the influence of investor biases on market dynamics, resulting in regulatory reforms that facilitate more efficient and equitable markets.

6. Enhancing the Predictability of Market Trends

Predictor of Investor Sentiment: Market prediction: Emotional trading, overreaction, and the tendency for herd behavior can be the primary causes of amplified market trends, or bubbles, and crashes. Knowing these biases can be a factor in improving the predictability and potentially reducing extreme market fluctuations.

Possibility of More Stable Markets: With the identification of and mitigation for biases, this study could make a contribution toward a more stable investment climate wherein investor behavior tends to be less divergent from rational market forces.

7. Closing the gap between theory and practice

Merging Theory and Practice: While theory in behavioral finance offers useful insights into human psychology, this research aims to close the gap between academic studies and everyday investment life. By translating these theories into real-market practice, the research will provide useful, practical guidelines for investors and professional financial advisers.

8. Mitigating Behavioral Biases in Investment Products and Market Design

Product Design Insights: The research can offer valuable insights to the design of financial products, e.g., mutual funds, ETFs, or pension plans, by considering investor psychology to provide products that better match investor behavior.

Enhanced Market Mechanisms: Knowing how biases influence decision-making may help develop improved market mechanisms, reducing the effects of irrational behaviors that can mislead market prices.

LIMITATION OF THE STUDY:

Self-Reporting Bias in Data Collection

Explanation: Because the main data collection technique will be surveys and interviews, there is a risk of self-reporting bias, whereby participants do not report their behaviors or biases truthfully. For instance, investors might underreport or misstate the degree to which biases such as overconfidence or loss aversion affect their decision-making.

Limited Sample Size and Diversity

Explanation: The population for surveys and interviews could be restricted to a particular group (e.g., investors in a given geographic area or income level). This could not be representative of the varied group of investors in the stock market.

Cross-Sectional Nature of the Study

Explanation: The research will most likely be cross-sectional, i.e., it will examine investor behavior at one moment in time.

Psychological biases and investment choices might change over time, particularly as market conditions vary or as investors become more experienced.

Explanation: Psychological biases frequently co-occur with other influences, including economic conditions, market trends, or personal circumstances. The direct impact of psychological biases on investment choices is potentially hard to separate from these outside influences.

Data Availability and Quality

Explanation: The research can be based on secondary data, including stock market performance and investor sentiment indicators, which may be incomplete or hard to interpret. Historical stock market data and sentiment indicators may have varying quality across regions and time periods.

CONCLUSION

This study highlights the fact that psychological biases are critical in determining investment behavior and market processes. Knowing these biases and their impact can enable investors as well as financial professionals to make more informed choices, resulting in better investment outcomes and a safer financial system. In spite of difficulties in bridging human prejudices, this study offers useful conclusions for individual as well as institutional investors, and has practical suggestions for educational systems, financial advising, and policy interventions to advance rational decision-making in the stock market.

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THE ROLE OF ARTIFICIAL INTELLIGENCE AS A TRANSFORMATION OF LIBRARY IN THE MODERN ERA

Vinayak Laxman Gaikwad

Assistant Professor, Librarian, Vidya Pratishthan's Commerce and Science College Indapur. Akulj Link Road, Vidyanagari, Indapur-413106

1. ABSTRACT

The application of artificial intelligence (AI) to library and information science (LIS) services has significantly changed how libraries organize and make material accessible. The impact of AI technologies on LIS operations such as thief detection, data protection, cataloging, information retrieval, user services, and data analysis was the primary objective of this research. By facilitating specific suggestions and effective information retrieval, artificial intelligence (AI) solutions like cataloguing and classification, information retrieval, knowledge organization, archival and digital preservation, user privacy ethics, academic and research support, chatbots, recommendation systems, (Kalisdha, A. (2024)) This article lists some of the most widely used AI applications and examines how librarians might apply them to support fundamental goals.

Keywords: *AI Applications, Innovating of Learning, New trends in Library and Modern Era, AI Tools and techniques.*

2. THE ARTIFICIAL INTELLIGENCE CONCEPT

Artificial intelligence (AI), sometimes called machine intelligence, according to McCorduck, (2004) is intelligence demonstrated by machines in contrast to natural intelligence displayed by humans and other animals. Similarly, in a similar vein, artificial intelligence is defined by the Oxford English Dictionary as a computer system that can carry out operations like speech recognition, visual perception, decision-making, and language comprehension that often call for human intellect, (oxfordreference.com). "Artificial intelligence" is a word that comes from two concepts. Computers or gadgets that exhibit behavior, perception, learning, and reasoning similar to those of humans,(wikipedia.org). Other examples are Google Maps, which may offer route guidance, estimate journey times, and then provide time updates; smart thermostats; facial recognition; and virtual assistants like SIRI or Alexa.

3. METHOD

This study employs a qualitative methodology and a library application design. The researcher's main goal is finding various applications that address artificial intelligence's (AI) function in library. By consulting works, books, journal articles, and other publications pertaining to the study's topic, literature studies are used to gather primary data sources. Additionally, the method of content analysis is used in this study's data analysis, which examines the data based on its information content (Mestika Zed, 2023).

4. INTRODUCTION TO AI IN LIS SERVICES

By providing innovative ideas that improve information management, user experiences, and operational efficiency within libraries and information centers. Artificial intelligence (AI) is changing the field of library and information science (LIS) (Mupaikwa, 2025). The creation of computer systems that can learn, reason, solve problems, and understand natural language tasks that normally require human intelligence is referred to as artificial intelligence (AI). AI technologies are being used in the LIS environment to solve long-standing issues and open up new dor for libraries to provide their patrons with more individualized, effective, and responsive services. The basic ideas of AI in LIS are examined in this introduction, which also identifies important fields where AI is having a big impact.

5. OBJECTIVES OF USING AI IN LIBRARY ENVIRONMENT

Automate Regular Tasks:-

Simplify material indexing, classification, and cataloging. Make self-service book loan, issue and return, and renewal mechanisms accessible.

Enhance the Retrieval of Information:-

by using AI user can retrieval of information fast and promptly and enhance the retrieval system in LIS. Improve your knowledge of user questions by utilizing natural language processing (NLP). Provide innovative search and suggestion systems that take user preferences and behavior toward factor.

Boost the User Experience:-

Use chatbots or virtual assistants to provide support at all times. Modify services such as search results, alerts, and reading selections.

Management of Digital Content:-

Handle the organization and management of digital archives, including the production of metadata and the digital age. Identify and stop copyright violations and plagiarism. To keep all digital content single cleek.

Using Data Analytics to Come to Conclusions:-

Examine utilization trends to guide space planning, acquisitions, and service enhancements. Track user involvement and satisfaction.

Encourage learning and research:-

Offer citation management, translation, and examining solutions driven by AI. Use meaningful search to assist scholars in finding suitable material more quickly.

Integration & Accessibility:-

Provide services for users with challenges or varying linguistic backgrounds, such as adaptive interfaces, language translation, or text-to-speech.

6. AI SCOPE IN LIBRARY**AI for Cataloging and Metadata Management:**

Cataloguing is one of the oldest library system. Recent attempts to automate cataloguing through Expert Systems have focused on descriptive cataloguing because it is considered rule-based (AACR2). AI automates cataloging processes by automatically assigning metadata tags, classifications, and keywords to digital resources. This streamlines the organization of library collections and ensures consistency in metadata standards.

Virtual assistants and chatbots:-

Chatbots and virtual assistants based on AI can offer library patrons round-the-clock assistance by responding to their questions and helping them find resources. Improves customer experience, offers immediate assistance, and frees up employees to work on more difficult projects.

Analytics for Projection:-

Libraries may better plan services and organize useful assets by using AI to determine user data and predict patterns and user needs. Assists in better resource allocation and data-driven decision-making.

Systems with Recommendations:-

Based on user preferences and past actions, AI systems can recommend books, articles, and other resources. Increases user happiness and engagement by offering specific suggestions.

Preservation of Digital Content:-

By identifying and reducing possible threats like data corruption and format breakdown, artificial intelligence (AI) can help preserve digital assets. Preserves the integrity and long-term accessibility of digital archives.

Information Capture:-

By understanding natural language queries and producing more exact and relevant search results, AI increases search capabilities. Increases information retrieval processes' effectiveness and efficiency

Data Compression:-

They provide a selection service driven by AI that assists researchers in sorting through sources to effectively compress the huge amounts of data using AI, data mining, and automated text summarization (ATS) technologies to create machine-generated content and even entire books.

AI hubs:-

According to the literature, AI labs or hubs are used for AI research and activities. In higher education, there are frequently identifiable AI hubs or research centers where courses or programs could profit from it. These hubs usually support research, programs, or course offerings, perhaps in the fields of mathematics, computer science, or engineering.

AI for thief detecting:-

To find out if an item is leaving without being properly checked out, combine AI with RFID gates. AI is able to identify unusual conduct by examining patterns in RFID logs. Using AI to detect theft in libraries is a useful and expanding application that aims to improve security and secure valuable materials.

7. CHALLENGES OF USING AI IN LIBRARIES

Privacy Issues:-

Monitoring user behavior (such as search history, borrowing patterns, and observing) may give rise to ethical and privacy concerns. Although it can be difficult, conformity to data protection regulations such as GDPR is crucial.

High Costs of Implementation:-

Hardware, software, and training for AI systems can be costly. Not all libraries have the funding or infrastructure to implement AI, particularly those in underdeveloped nations.

Insufficient Technical Knowledge:-

It's possible that library employees lack the skills needed to oversee or operate AI systems. It can be expensive and difficult to hire AI experts or provide continuous technical support.

AI Algorithm Bias:-

Biases in the training data (e.g., language, cultural representation) may be displayed by AI systems. This may result in unjust or incorrect judgments or recommendations.

Access and Quality of Data:-

Large, high-quality datasets are necessary for AI to work well. AI technologies' accuracy may be lowered by inconsistent or lacking catalog records.

Problems with System Integration:-

AI tools are difficult to integrate with current library management systems (LMS). Modern AI platforms might not be compatible with legacy systems.

An Over Dependence on Automation:-

An important aspect of library culture is human interaction, which could be decreased by overuse of AI. Purely AI-driven systems may be difficult for users, particularly elderly customers.

Using Surveillance Ethically:-

Users may feel uneasy when AI is used for facial recognition or theft detection. It's challenging to strike a balance between security and a friendly, open atmosphere.

8. FUTURE SCOPE

Cooperation for immersive learning using augmented reality (AR).

Predictive analytics is used to forecast research and changes in education.

Creation of smart libraries that are completely automated and require little human involvement.

9. CONCLUSION

An important step in updating and improving library services is the addition of artificial intelligence in libraries. By providing individualized experiences, increased productivity, and innovative safety features like theft detection, artificial intelligence (AI) has the ability to completely transform the way information is reached, handled, and protected. But for implementation to be successful, ethical, budgetary, and technical issues must be carefully taken into account. Libraries can use AI to be relevant, inclusive, and influential in the digital era by finding the ideal balance between innovation and human-centered service.

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**ANALYZING SENTIMENT AMONG INVESTORS AND CUSTOMER COMPREHENSION AROUND
A SYSTEMATIC INVESTMENT PLAN AND MUTUAL FUND INVESTMENTS**

Kanishka Dingra

Assistant Professor, Vedanta College, Vithalwadi

(M. Com (Advance Accountancy & Business Management), PGDFM, MBA, (PhD))

ABSTRACT

Over the last few years, mutual funds and Systematic Investment Plans (SIPs) emerged as the favored investment instruments of Indian retail investors because of their affordability, diversification advantage, and long-term wealth creation potential. Mutual fund investments, however, continue to have relatively low penetration across traditional savings vehicles, and this implies consumer awareness gaps along with different attitudes of investors. The research purports to examine and assess the awareness level, perception, and behavior of attitudes among investors and consumers in respect to SIPs and mutual funds.

The study is grounded in a mixed-method design, utilizing quantitative and qualitative data collection methods. Approx 50 sample, diverse group of respondents consisting of salaried employees, self-employed professionals, and homemakers from urban and semi-urban areas was used. The financial literacy, risk perception, previous investment experience, trust in institutions, and influence of media and financial advisors were the key determinants that were analyzed to establish their influence on investment choices.

Discoveries indicate that although a considerable percentage of the respondents know about mutual funds and SIPs, their knowledge about the respective risks, advantages, and investment procedures is superficial in nature. Numerous investors are defensive or skeptical because of market fluctuations, a lack of financial knowledge, or previous losses. However, younger, technologically advanced, and financially literate investors respond in a more dynamic and constructive way towards SIPs, appreciating their methodical and goal-based nature.

The research concludes that enhanced awareness and investor education, combined with open financial advisory services, can significantly boost investor confidence and participation in mutual fund schemes. Suggestions involve focused awareness campaigns, easy-to-understand financial communication, and increased regulatory support to fill the knowledge gap and create a more investment-friendly climate.

Keywords: *Systematic Investment Plan, financial Literacy, Mutual funds, Investor Sentiment and Risk Perception.*

OBJECTIVES OF THE STUDY:

1. To measure the degree of knowledge about mutual funds and Systematic Investment Plans (SIPs) among consumers.
2. To identify the sources from which investors obtain information about SIPs and mutual funds.
3. To determine the attitude of individual investors towards SIPs and mutual funds as an investment option.
4. To assess the drivers of investment choices in SIPs and mutual funds (e.g., risk perception, expected return, tax benefits, etc.).
5. To find out the relationship between demographic variables (age, income, education, etc.) and the awareness and attitude towards mutual funds and SIPs.
6. To identify the investor problems and barriers to the adoption of mutual funds and SIPs.
7. To give recommendations for enhancing financial knowledge and encouraging mutual fund investment by the public at large.

MANUSCRIPT SUBMISSION

GUIDELINES FOR CONTRIBUTORS

1. Manuscripts should be submitted preferably through email and the research article / paper should preferably not exceed 8 – 10 pages in all.
2. Book review must contain the name of the author and the book reviewed, the place of publication and publisher, date of publication, number of pages and price.
3. Manuscripts should be typed in 12 font-size, Times New Roman, single spaced with 1" margin on a standard A4 size paper. Manuscripts should be organized in the following order: title, name(s) of author(s) and his/her (their) complete affiliation(s) including zip code(s), Abstract (not exceeding 350 words), Introduction, Main body of paper, Conclusion and References.
4. The title of the paper should be in capital letters, bold, size 16" and centered at the top of the first page. The author(s) and affiliations(s) should be centered, bold, size 14" and single-spaced, beginning from the second line below the title.

First Author Name1, Second Author Name2, Third Author Name3

1 Author Designation, Department, Organization, City, email id

2 Author Designation, Department, Organization, City, email id

3 Author Designation, Department, Organization, City, email id

5. The abstract should summarize the context, content and conclusions of the paper in less than 350 words in 12 points italic Times New Roman. The abstract should have about five key words in alphabetical order separated by comma of 12 points italic Times New Roman.
6. Figures and tables should be centered, separately numbered, self explained. Please note that table titles must be above the table and sources of data should be mentioned below the table. The authors should ensure that tables and figures are referred to from the main text.

EXAMPLES OF REFERENCES

All references must be arranged first alphabetically and then it may be further sorted chronologically also.

• Single author journal article:

Fox, S. (1984). Empowerment as a catalyst for change: an example for the food industry. *Supply Chain Management*, 2(3), 29–33.

Bateson, C. D., (2006), 'Doing Business after the Fall: The Virtue of Moral Hypocrisy', *Journal of Business Ethics*, 66: 321 – 335

• Multiple author journal article:

Khan, M. R., Islam, A. F. M. M., & Das, D. (1986). A Factor Analytic Study on the Validity of a Union Commitment Scale. *Journal of Applied Psychology*, 12(1), 129-136.

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- **Text Book:**

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2007). *Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies* (3rd ed.). New York: McGraw-Hill.

S. Neelamegham," Marketing in India, Cases and Reading, Vikas Publishing House Pvt. Ltd, III Edition, 2000.

- **Edited book having one editor:**

Raine, A. (Ed.). (2006). *Crime and schizophrenia: Causes and cures*. New York: Nova Science.

- **Edited book having more than one editor:**

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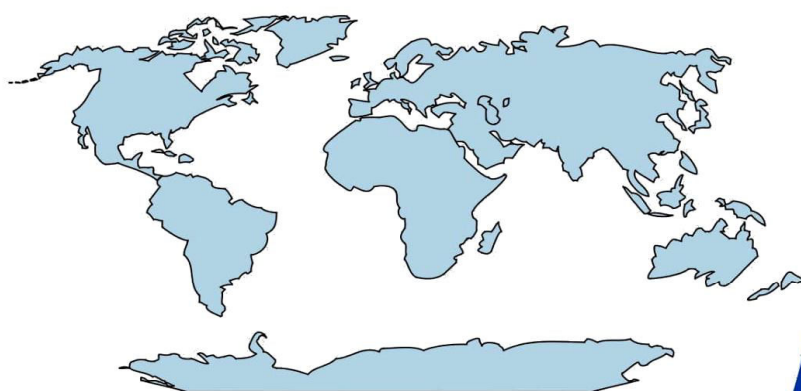
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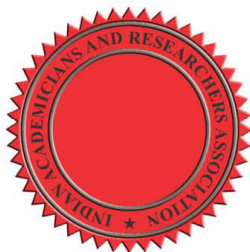
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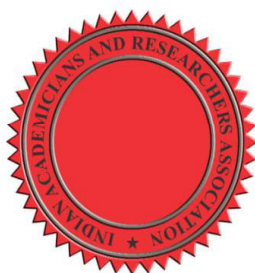
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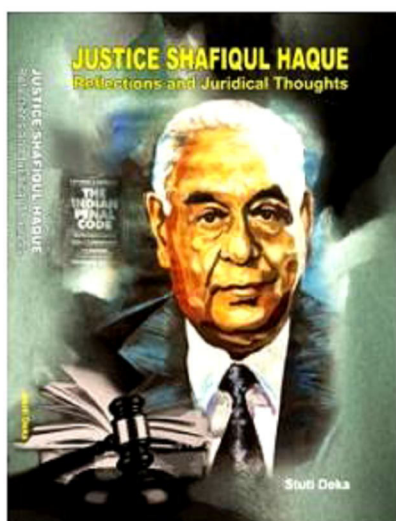


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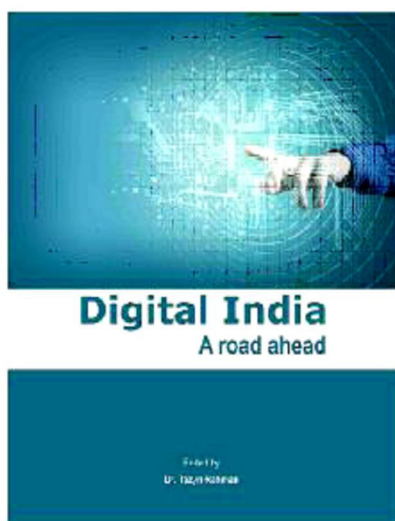
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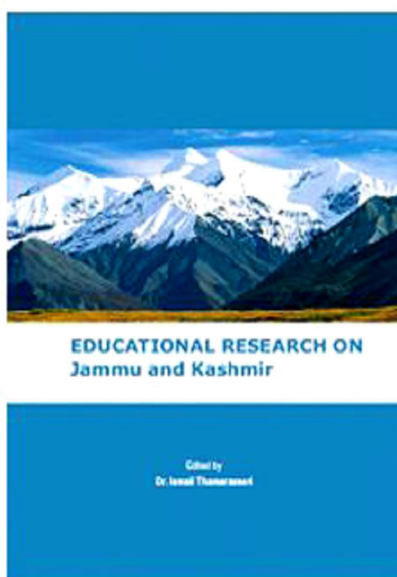
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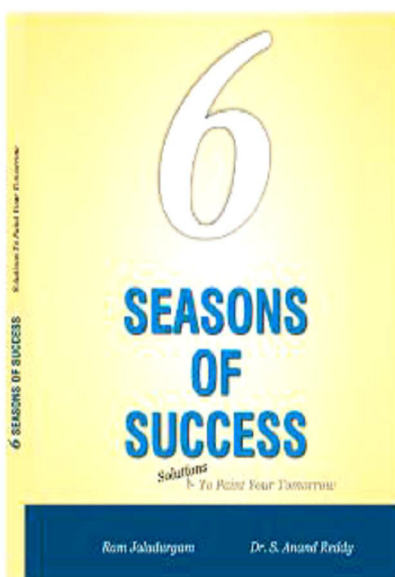
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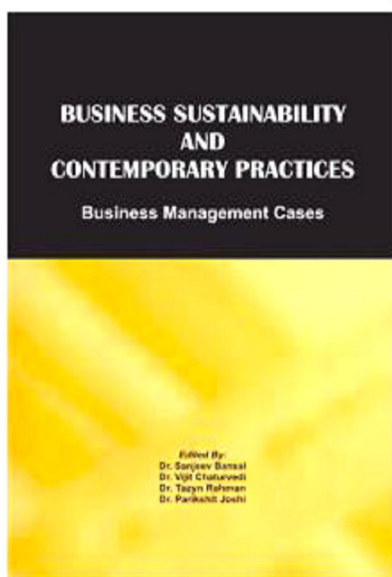
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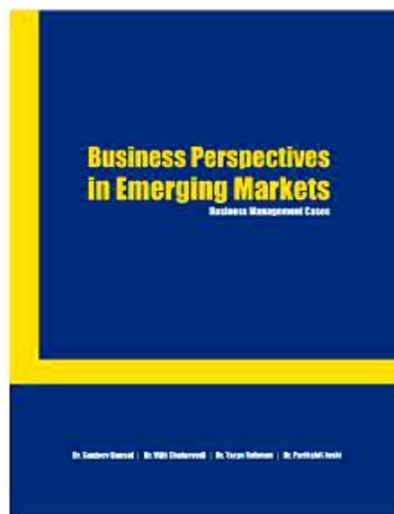
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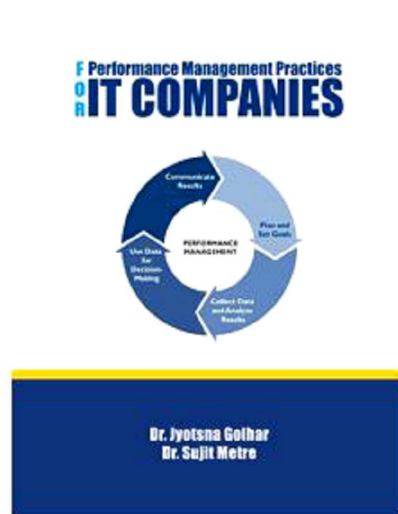
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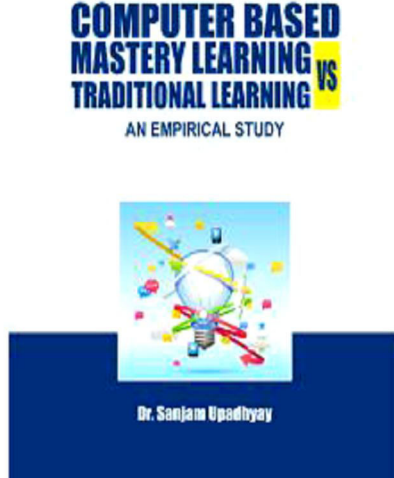
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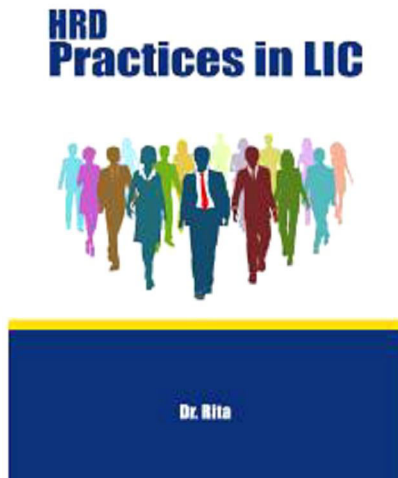
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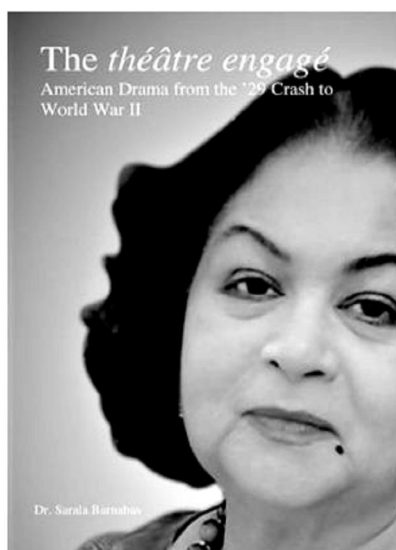
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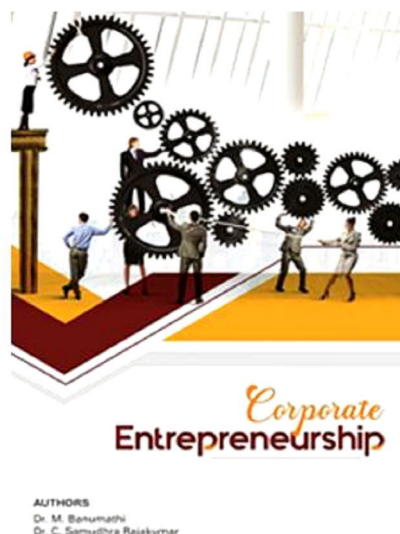
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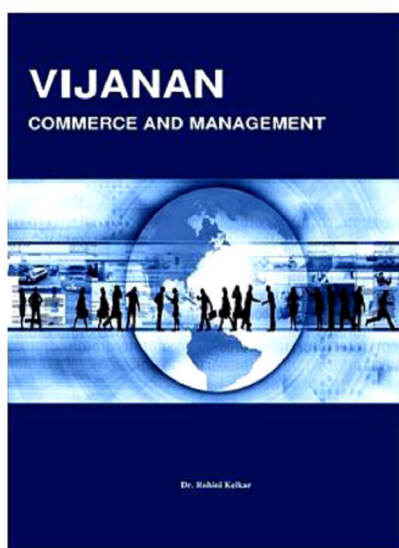
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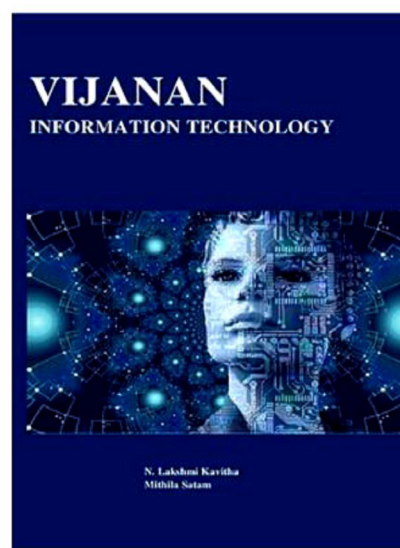
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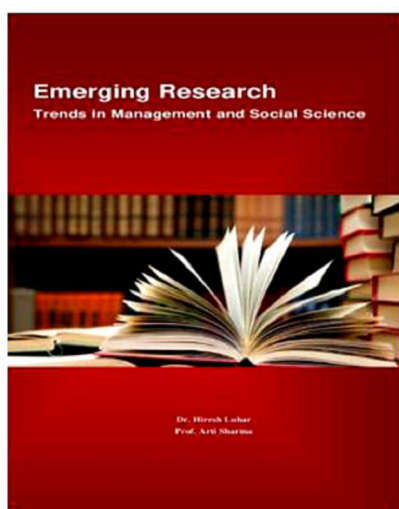
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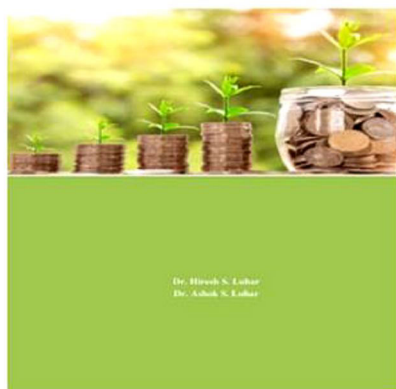


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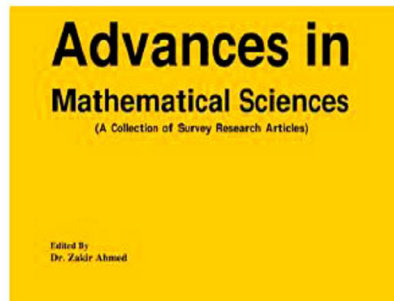
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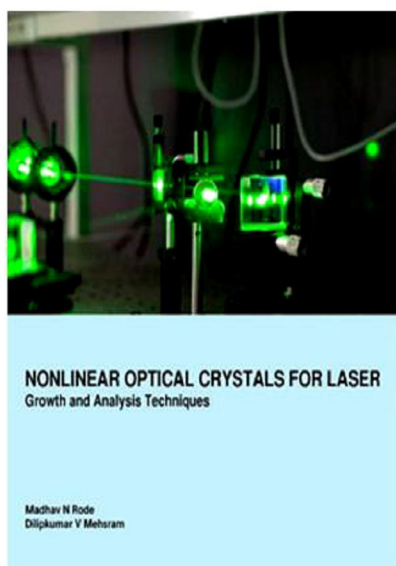


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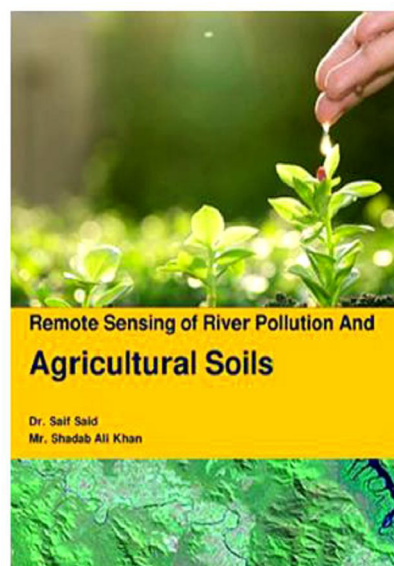
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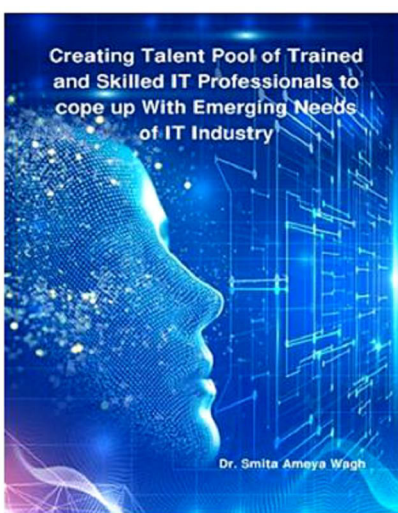
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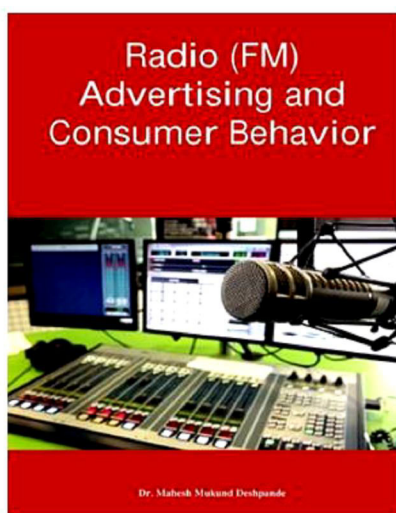
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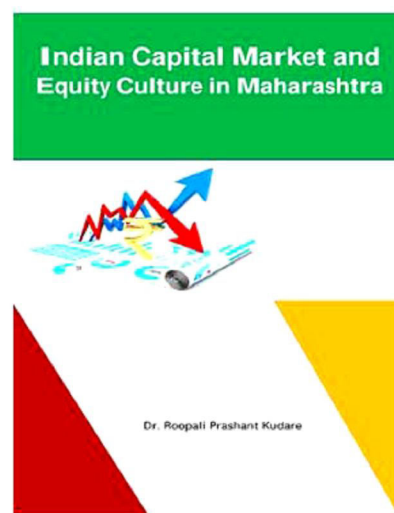
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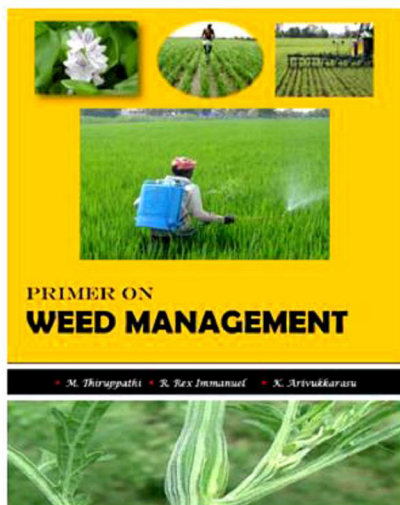
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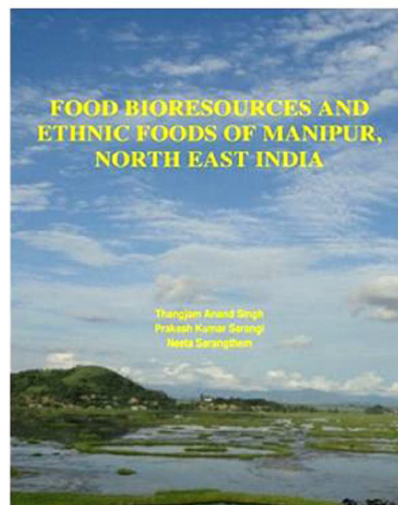
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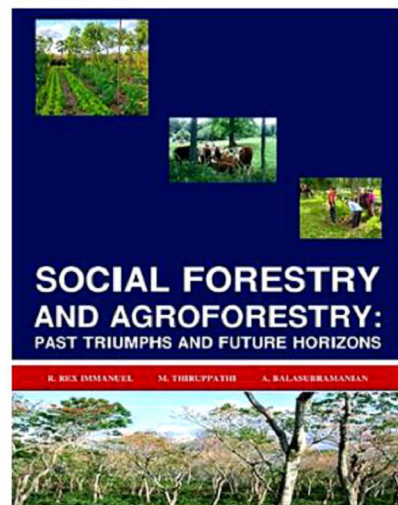
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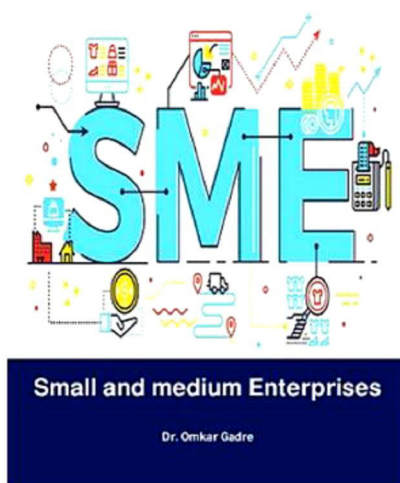
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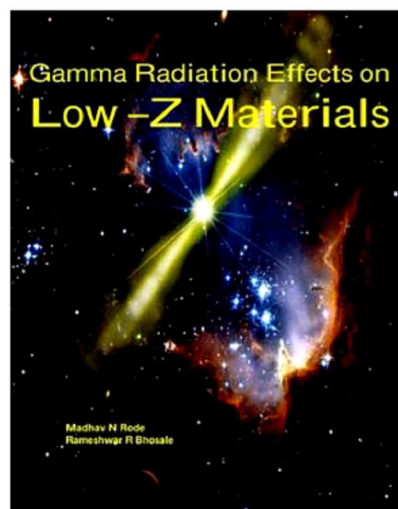
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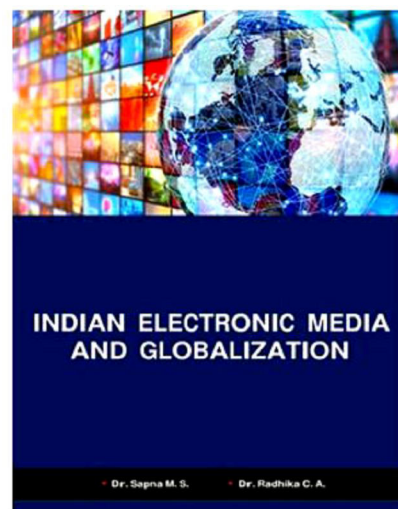
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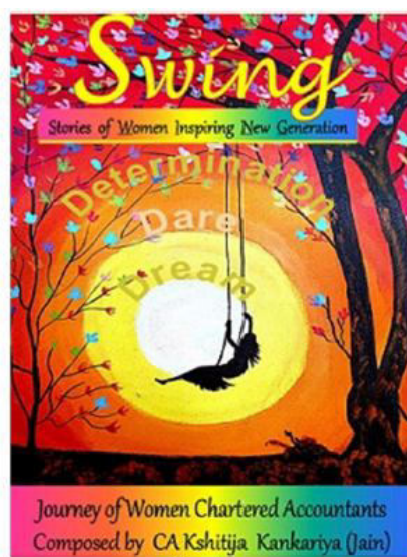
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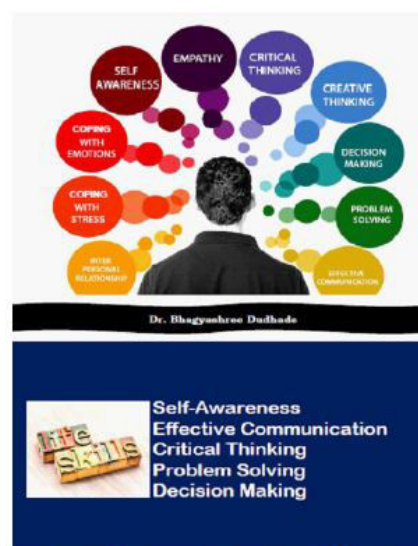
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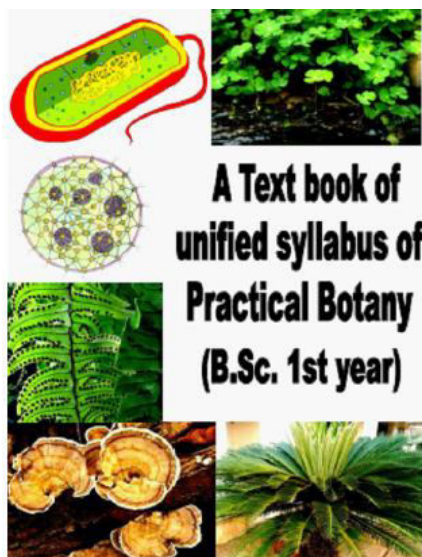
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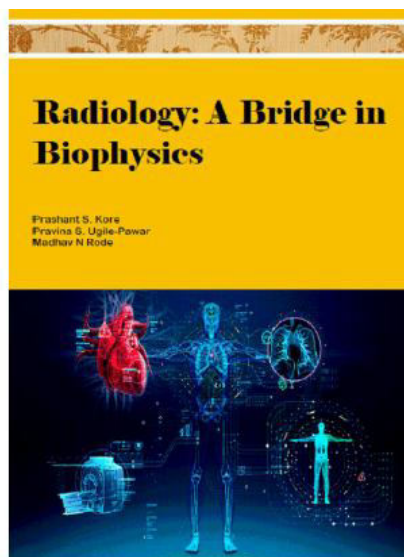
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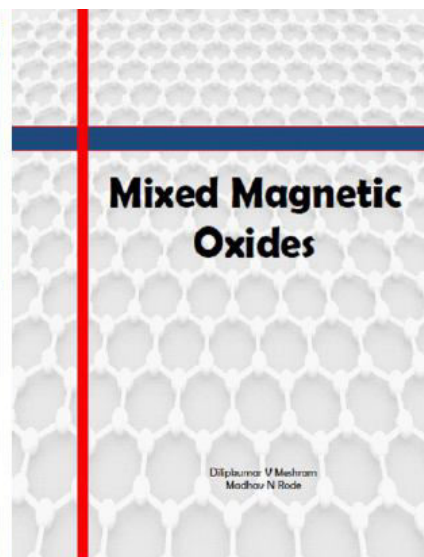
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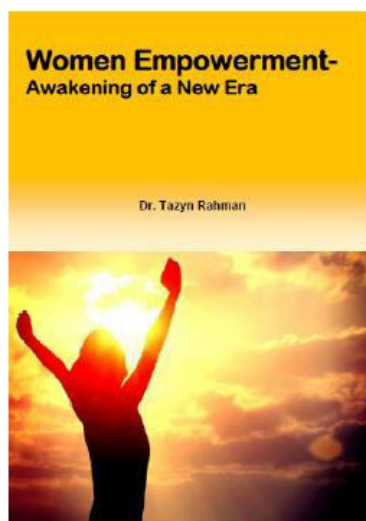


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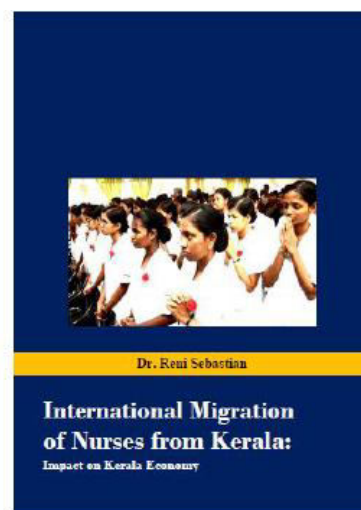


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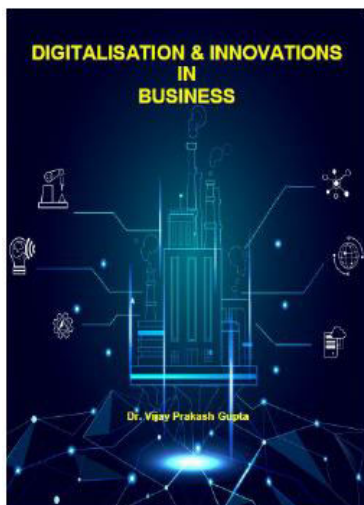


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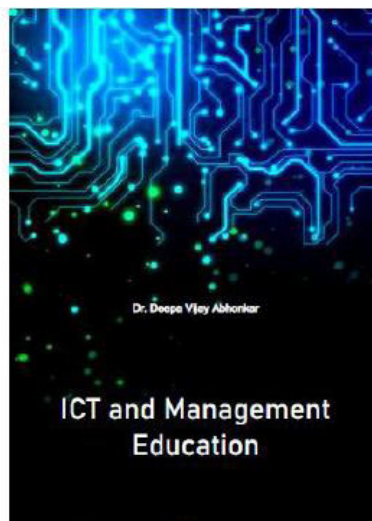
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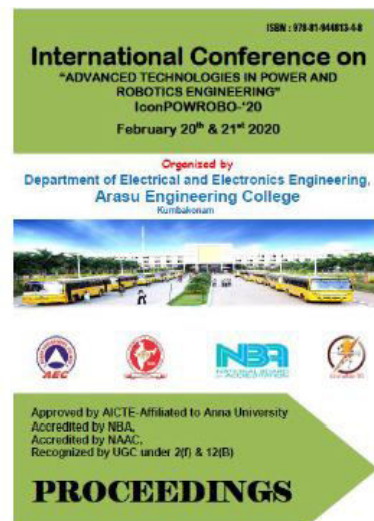
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