

About the Book:

"Embracing Innovation: New Ideas in Commerce & Management" explores contemporary trends and breakthrough strategies shaping the future of business and management practices. The book offers insightful perspectives on integrating cutting-edge technologies, fostering creativity, and enhancing operational efficiency in the global market. It covers diverse topics such as digital transformation, sustainable business models, leadership in the modern age, and the role of innovation in achieving competitive advantage. Aimed at both academics and practitioners, this work provides valuable resources for understanding and adapting to the dynamic landscape of commerce and management.

This book is a comprehensive compilation of research and insights from the National Conference on Embracing Innovation: New Ideas in Commerce & Management, organized by Pillai College of Arts, Commerce, and Science. As businesses navigate a rapidly evolving landscape, the need for innovative strategies and cutting-edge management practices has never been greater. This book serves as a valuable resource for academicians, researchers, and industry professionals, providing thought-provoking perspectives on digital transformation, entrepreneurship, sustainable business models, and advanced management techniques.

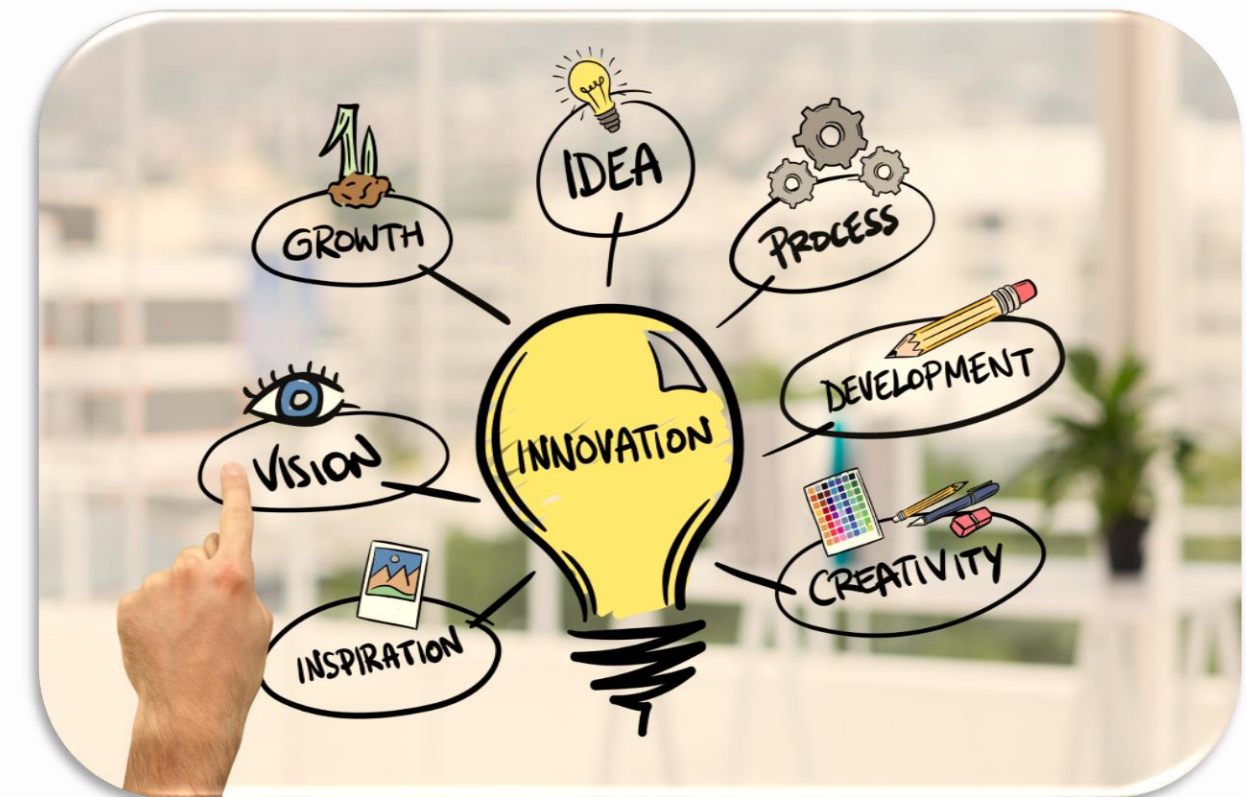
Each chapter explores a key aspect of innovation in commerce and management, featuring scholarly research, case studies, and expert analyses. Topics range from disruptive technologies in business to the integration of sustainability in corporate strategies. The book fosters a deeper understanding of emerging trends and equips readers with practical insights to drive business success.

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Embracing Innovation : New Ideas in Commerce & Management



Dr. Urvi Amin
Dr. Kranti Shingate

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EMBRACING INNOVATION: NEW IDEAS IN COMMERCE & MANAGEMENT

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- Dr. Urvi Amin, Dr. Kranti Shingate

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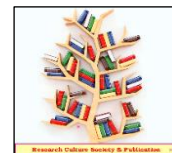
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Preface :

Pillai College of Arts, Commerce & Science (PCACS), established in 1998 by Dr. K. M. Vasudevan Pillai and Dr. Daphne Pillai, is a premier institution offering quality education in a green, high-tech environment. Spread across a 10-acre campus, the college provides state-of-the-art infrastructure, well-equipped laboratories, and extensive libraries. Granted **Autonomous status** by the UGC in 2019, the institution is permanently affiliated with the University of Mumbai, ISO 9001:2015 certified, and accredited with an 'A' Grade by NAAC in all three cycles. It caters to over 5000 students across **15 undergraduate, 5 postgraduate, and Ph.D. programs in 5 disciplines.**

PCACS has received numerous accolades, including the **Best College Award from the University of Mumbai and the Best N.S.S. Unit & Programme Officer Award.** Other honors include the **Best Infrastructure Award from the Lokmat Group, the ET NOW Outstanding Institution Award, and the Torchbearer Recognition for Higher Education at the India Didactics Association Awards 2024.** The college also earned a **4 Star Rating from the Ministry of Education's Innovation Cell** for three consecutive years, reflecting its leadership in fostering innovation and entrepreneurship. Additionally, it was recognized as a **Digi 100 Pioneer in Digital Transformation** and received the **Best Research Award 2021 by the Global Intellect Educational Award.**

The college magazine has been acknowledged by **UNICEF, the Ministry of Youth Affairs & Sports, Nehru Yuva Vikas Kendra, Parnel Municipal Corporation, and Infinity Foundation** for its social impact. It has also won the prestigious **Prof. Chandgadkar Trophy** thrice. PCACS actively collaborates with industry leaders such as the **World Trade Centre Mumbai, Tata Trent Ltd. (Zudio), and Aditya Birla Education Trust** for skill-based initiatives like the 'Mpower' Project. On September 20, 2024, the **Acharya Chanakya Kaushalya Vikas Kendra** was inaugurated in a virtual event graced by **Prime Minister Narendra Modi.**

Under its autonomous framework, the college has developed an industry-aligned curriculum incorporating **Outcome-Based Education (OBE) and National Education Policy (NEP)** initiatives such as **Major-Minor courses, Dual Degrees, and Multiple Entry-Exit** pathways. The Skill Credit Policy allows students to earn credits through value-added courses, and the

Centre for Experiential Learning offers practical exposure through 8 specialized clubs. Additionally, the Institution's Innovation Cell fosters research and entrepreneurship.

Committed to sustainability, PCACS implements green initiatives like rainwater harvesting, composting, and waste management while engaging in environmental research. Faculty members contribute significantly to academic research and Ph.D. mentorship.

The college excels in sports and cultural activities, with students winning at national and international levels. **Notable alumni include cricketer Surya Kumar Yadav**, who has achieved global recognition. The college has incubated **40 startups**, fostering entrepreneurship among students.

PCACS stands as a hub of academic excellence, blending innovation with holistic education. By integrating industry partnerships, social responsibility, and cutting-edge learning methods, the college continues to empower students to make meaningful contributions locally and globally.

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This book is a comprehensive compilation of research and insights from the National Conference on *Embracing Innovation: New Ideas in Commerce & Management*, organized by Pillai College of Arts, Commerce, and Science. As businesses navigate a rapidly evolving landscape, the need for innovative strategies and cutting-edge management practices has never been greater. This book serves as a valuable resource for academicians, researchers, and industry professionals, providing thought-provoking perspectives on digital transformation, entrepreneurship, sustainable business models, and advanced management techniques.

Each chapter explores a key aspect of innovation in commerce and management, featuring scholarly research, case studies, and expert analyses. Topics range from disruptive technologies in business to the integration of sustainability in corporate strategies. The book fosters a deeper understanding of emerging trends and equips readers with practical insights to drive business success.

Objectives of Book:

- 1. To explore emerging trends and innovations** in commerce and management, highlighting their impact on business success.
- 2. To provide a platform for researchers and industry professionals** to share insights, case studies, and best practices in digital transformation and entrepreneurship.
- 3. To examine sustainable** business models and their role in shaping responsible and resilient enterprises.
- 4. To foster academic-industry collaboration**, encouraging the application of innovative management strategies in real-world scenarios.

About the Editors :

Dr. Urvi Amin is an Associate Professor at Shri Jairambhai Patel Institute of Management (NICM), affiliated with GTU. She holds a Master's degree in Commerce, Management, and Philosophy and earned her Ph.D. from Gujarat University. With over 19 years of experience in management education and research, she has published more than 40 research papers in esteemed national and international journals. Her research interests include financial inclusion in banking, "PHYIGITAL" services, and customer microfinance behavior related to AI tools in the financial system. Dr. Amin serves on the editorial boards of several prestigious journals, including *The Universal Business School Journal*, *IJBST Journal Group*, and *NICM Journal*. She has been a member of *The Qubahan Academic Journal* since August 2022.



Dr. Kranti Shingate is an Assistant Professor at D Y Patil International University, Pune an accomplished professional with 20-plus years of comprehensive experience in the Education and Entrepreneurship domain. Dr. Kranti graduated in Agriculture from MPKV Rahuri's College of Agriculture, Pune, Master & Ph.D. from Savitribai Phule Pune University, Pune. Other qualifications of Dr. Kranti are e- MBA (IB & Marketing) and a PGDM- (Rural Dev & Agribusiness Mgmt.).



She is an IIBA-certified Business Analyst. She is a supervisor/ guide for PhD students. She has conducted training sessions for academicians & industry persons on copyright registration & Business Excellence, Innovation & Strategies. Dr. Kranti has also received 9 copyright registrations for academic documents from the Government of India. She has received Verified International Academic Qualifications from World Education Services. Dr. Kranti has published 22 research papers, received Best Oral Presentation award at the International Scientific Research Conference held on the 30th & 31st of March 2024 in Bangkok, Thailand (offline mode) as well as a Best Research Paper Award by the International Research Journal of Business and General Management (Impact Factor (JCC) : 5.7985). She has also worked as an editor for a book entitled "Embracing Talent, Innovation and Disruptive Technologies". Dr. Kranti is also involved in research & consultancy in Vertical farming.

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Chapter - 1: The New Leadership Paradigm: Managing Hybrid Teams in the Post-Pandemic Era in the Indian Context

Prof. Dr. Aarti Sukheja

Department of Economics & Finance

Pillai College of Arts, Commerce & Science (Autonomous)

Abstract : *The COVID-19 pandemic has permanently altered work environments, and hybrid leadership has emerged as a relevant model of work in the post-pandemic era. In India, the rapid transition to a digital economy has accelerated the adoption of hybrid work models, which combine remote and in-office work. This paper explores the unique dynamics of managing hybrid teams within the Indian context, focusing on the drivers behind this shift and the challenges companies face. Through case studies of Indian companies that have adopted hybrid work models, the paper analyzes the strategies employed, offering insights into effective leadership in hybrid settings. Selected literature review has been done that highlights key themes in hybrid leadership, and recommendations for organizations navigating this new normal with an emphasis on leveraging digital platforms and adopting flexible leadership strategies. This paper aims to contribute to the understanding of hybrid team management in India and propose strategies for its success in the work model context.*

Keywords: *Post-pandemic work environment, digital economy, hybrid work model, managing hybrid teams, hybrid leadership.*

1. Introduction:

The Covid-19 pandemic has challenged the traditional work arrangements and transformed the global work landscape by giving rise to hybrid work arrangements—a blend of remote and office work. Organizations across the world have shifted to hybrid work arrangements post pandemic considering its cost effectiveness and flexibility that benefits both employees and employers. In India, the rapid evolution into a digital economy has further fueled the adoption of hybrid working, presenting both challenges and opportunities for leaders who must navigate this new arrangement. Successfully managing hybrid teams in this post-pandemic era demands reimagining leadership to lead in a flexible and inclusive environment.

Hybrid arrangements focus on people and prioritizes employee well-being while ensuring productivity, job engagement, and enhanced satisfaction. Some of the challenges of remote work are aptly addressed by this arrangement like isolation, lack of communication and team networking. By offering employees the option to work depending on their needs empowers them and supports them to achieve work-life balance which leads to enhanced job satisfaction. This flexible approach makes employees adaptive and efficient. The hybrid model is a significant move towards the future of work, creating a more dynamic and inclusive work set

up. The ambit of this paper is confined to the unique dynamics of managing hybrid teams within the Indian context, focusing on the drivers behind this shift and the challenges companies face. Case studies of Indian companies that have adopted hybrid work models have been discussed and also the strategies employed are discussed that offer insights into effective leadership in hybrid work settings. Selected literature review has been done that highlights key themes in hybrid leadership, and recommendations for organizations navigating this new normal with an emphasis on leveraging digital platforms and adopting flexible leadership strategies. This paper aims to contribute to the understanding of hybrid team management in India and propose strategies for its success.

2. Hybrid Work in the Indian Context:

Companies in India have institutionalized hybrid work models and there have been many job openings for hybrid roles in India. Hybrid jobs are gaining popularity and employees have been given the option to choose their work settings. Most sectors have institutionalised hybrid work and made it permanent, despite the return of the work from-office normal post pandemic.

India, with its diverse and dynamic workforce, has embraced hybrid work as a viable model post pandemic. Digitalization boom post pandemic has given a trigger for businesses to adopt hybrid work on digital platforms. Gradually, this arrangement evolved and has now become a way of life for most companies across the country.

Indian organizations have increasingly turned to various digital collaboration tools to enable seamless communication and efficiency among employees, whether they work in office or remotely. Hybrid work in India is driven by several important factors such as flexibility and work life balance that employees value, savings on commuting and real estate costs. Moreover, hybrid work addresses one very important aspect of a healthier work-life balance, which has become a priority for both employers and employees in India. This model is not just a cost effective solution but aligns with India's journey toward becoming a leading digital economy.

Hybrid work arrangements are definitely proving to be a game-changer for many organizations in India. With a growing number of hybrid job postings, it is evident that new paradigms of work are rapidly evolving. This model offers the potential to balance organizational productivity with employee well-being, creating a more efficient work culture. However, the success of hybrid work depends on effectively addressing the challenges such as ensuring team collaboration, equitable opportunities, managing digital infrastructure, and preserving work-life boundaries. If implemented correctly, the hybrid work model could reshape India's workplace landscape, offering both flexibility and efficiency that meets the needs of both employers and employees.

3. Review of Literature:

The "Work 3.0: Reimagining Leadership in a Hybrid World" report stresses the need for leaders to adapt to hybrid work models shaped by post-pandemic priorities like flexibility, meaningful work, and better work-life balance. Success hinges on prioritizing people and culture, with

technology as a supporting factor. Leaders must balance flexibility with collaboration, embracing roles such as the "Anchored Imagineer" and "Tech-Savvy Humanist," which align purpose and technology with humanity. While challenges like proximity bias persist, hybrid work enhances inclusion and fosters team success through psychological safety, communication, and the "4C Framework" of purpose, mindset, cohesion, and connection. In India, adoption highlights disparities in digital infrastructure and a preference for in-person collaboration. Hybrid work, a distinct paradigm, demands innovative, human-centric leadership to build thriving, future-ready teams.

Verma, Anju; Venkatesan, M.; Kumar, Mallika; and Verma, Jyoti (2023) explore the profound impact of Covid-19 on workplaces, focusing on the rapid shift to remote work and digital interactions globally, including in India. The study examines the benefits and HR implications of hybrid workplaces and proposes an HRM framework for their effective adoption in India. Using a Systematic Review of Literature (SLR) methodology, the research offers guidance for business leaders, HR professionals, and policymakers to adapt hybrid models successfully. While providing key insights, it highlights the need for further quantitative research across sectors and countries to validate its findings.

Danijela Sokolic (2022) examines how remote work, especially from home, became the dominant form of work in the 2020s, initially driven by the COVID-19 pandemic. This shift transformed communication, workplace concepts, and the psycho-emotional experience of work. It forced companies and employees to adapt to virtual environments, manage remote teams, and ensure proper infrastructure. The study highlights how technological advances and alternative work models are reshaping management practices and human resource policies, with a focus on the impact of workplace flexibility on productivity and work performance.

Lisa Tran (2022) explores the post-COVID impact on workplaces, particularly the rapid shift to remote work and the rise of hybrid models combining remote and in-office work. Focusing on India, the study investigates the benefits and HR implications of hybrid work, proposing a framework for its effective implementation. The research, based on a systematic review, offers insights for HR professionals, business leaders, and policymakers to adapt strategies for the evolving workplace, stressing the need for further quantitative research across sectors and countries.

Dahlia Baker (2021) highlights the pandemic's disruption of daily life, including commuting to work, leading to both opportunities and challenges. The shift to digital platforms for meetings and conferences surged, with nearly 75% of Swedish workplaces moving to remote work. This change is expected to reshape the future of office structures, with increased demand for flexibility. Research shows that organizational factors have a stronger impact on productivity and job satisfaction than personal or family-related factors, offering organizations more control over improving work outcomes through policies and procedures.

4. Objectives of the study:

- To understand hybrid work models adopted by TCS, Infosys, Wipro, and Swiggy..
- To identify key triggers and challenges for hybrid work.
- To analyze the role of new leadership in hybrid work environments.
- To explore leadership case studies in hybrid work arrangements in the context of India.

5. Hypothesis of the study:

Hypothesis 1:

- **Null Hypothesis (Ho):**The adoption of hybrid work models by companies like TCS, Infosys, Wipro, and Swiggy has no significant effect on employee productivity, satisfaction, or organizational performance in India.
- **Alternative Hypothesis (H1):**The adoption of hybrid work models by companies like TCS, Infosys, Wipro, and Swiggy significantly enhances employee productivity, satisfaction, and organizational performance in India.

Hypothesis 2:

- **Null Hypothesis (Ho):**There is no significant impact of leadership strategies (focused on digital skills, emotional intelligence, and adaptability) on the effectiveness of managing hybrid teams in Indian companies in the post-pandemic era.
- **Alternative Hypothesis (H1):**Leadership strategies (focused on digital skills, emotional intelligence, and adaptability) have a significant positive impact on the effectiveness of managing hybrid teams in Indian companies in the post-pandemic era.

6. Research Methodology:

A qualitative case study approach is used, with a comparative analysis across the selected companies (TCS, Infosys, Wipro, and Swiggy). This method enables a deep understanding of the hybrid work strategies implemented by these companies and their effects on employee satisfaction, productivity, and organizational performance.

7. Case Studies on Hybrid Work in India

The hybrid work strategies adopted by TCS, Infosys, Wipro, and Swiggy demonstrate a deep understanding of the evolving needs of the modern workforce. These companies have found innovative ways to blend remote and in-office work, offering employees flexibility while ensuring engagement. By leveraging technology and providing employees with the resources they need, these companies have positioned themselves at the forefront of the hybrid work revolution. As hybrid work continues to evolve, the experiences of these companies provide valuable insights into creating a balanced and flexible.

- **TCS (Tata Consultancy Services):**

Tata Consultancy Services (TCS) has adopted a hybrid work model with the goal of having only 25% of its global workforce in the office at any time by 2025, with employees spending just 25% of their time in the office. This strategy, known as the "25X25" model, aims to reduce the need for office space while maintaining high productivity levels. TCS's shift to this hybrid approach allows employees more flexibility in choosing where and when they work, enabling them to balance work with personal commitments. This approach also helps the company optimize its office resources, reducing operational costs.

- **Infosys:**

Infosys has fully embraced a hybrid work approach, with 84% of its workforce opting for remote work in FY24, up from 75% in FY23. The company has focused on offering flexible work options to enhance employee well-being, particularly for those in tier-2 and tier-3 cities, where remote work options have been in high demand. Infosys's hybrid strategy supports a diverse workforce, offering remote work opportunities to employees across various locations. By providing employees with the flexibility to work from home or office, the company has not only increased employee satisfaction but also improved overall productivity. Moreover, this model has helped Infosys expand its talent pool beyond traditional metropolitan areas, tapping into previously untapped markets.

- **Wipro:**

Wipro's hybrid work strategy is built around: employee experience, safety and well-being, and innovation. To enhance employee experience, Wipro leverages the latest technologies and tools from partners like Intel and VMware, creating an environment where employees can be productive, regardless of their location. This approach also emphasizes employee safety, as Wipro works closely with its partners to ensure secure and seamless access to the necessary work tools. As the hybrid work model becomes more common, Wipro has adopted next-generation technologies like AR/VR to make collaboration more engaging and efficient, allowing employees to interact in virtual environments that simulate in-person collaboration. By combining cutting-edge technology with strong security measures, Wipro has managed to provide a secure, innovative, and engaging work environment, enabling employees to thrive in a hybrid setting.

- **Swiggy:**

Swiggy has implemented a comprehensive hybrid work strategy through its "work-from-anywhere" policy for the majority of roles. With employees working remotely from 487 cities across India, this policy provides Swiggy's workforce with significant flexibility. Employees in central business functions and technology teams are allowed to work from home, while those in partner-facing roles are expected to visit the office a few days a week. The company has seen increased productivity and employee satisfaction as a result of the flexibility provided by remote work. To ensure employees

maintain strong team bonds and collaborate effectively, Swiggy organizes quarterly meetups where employees come together in person to foster a sense of connection and teamwork. These meetups have proven successful in maintaining a strong organizational culture while allowing employees the autonomy to work remotely.

8. Main Findings of the study:

- **Hybrid Work Adoption:** Major Indian organisations, such as TCS, Infosys, Wipro, and Swiggy, have embraced hybrid work models, focusing on flexibility, remote work options, and employee well-being. These companies are exploring ways to balance in-office and remote work, allowing employees to work from home a few days a week or completely remotely, depending on the role and understanding.
- **Workplace Flexibility:** While companies like Infosys and Swiggy provide permanent work-from-anywhere policies, others like TCS and Wipro focus on models where only a portion of the workforce is in the office at any given time. TCS's 25X5 model aims for only 25% of the workforce in the office by 2025, while Swiggy has introduced a work-from-anywhere model for most employees.
- **Technology Integration:** Companies are leveraging advanced technologies (e.g., AR/VR in Wipro's case) to enhance remote collaboration, support employee productivity, and maintain security. Wipro also partners with Intel and VMware to ensure robust security and smooth transitions to hybrid environments.
- **Employee Engagement & Well-being:** Employee experience and mental well-being are critical factors, as hybrid models can sometimes lead to isolation. Companies like Swiggy address this with quarterly in-person meetups, while Wipro focuses on improving employee engagement through technology and creating secure, stress-free work environments.

9. Implications:

- **Flexible Work Culture:** The shift to hybrid work is a clear indication that flexibility is now a top priority for companies in India. This arrangement allows employees to achieve work life balance leading to higher job satisfaction and efficiency.
- **Technology as a Key Enabler:** Hybrid work models depend heavily on digital infrastructure. Technologies that facilitate seamless communication, collaboration, and security are essential for the success of hybrid work model.. For instance, Wipro's investment in AR/VR technologies demonstrates the use of cutting-edge tools to enhance hybrid work experiences.
- **Regional Impact:** Hybrid models also cater to employees from tier-2 and tier-3 cities, providing them with more opportunities to work remotely. This has inclusivity and broadens the talent pool.
- **Employee Well-being:** Companies must focus on providing support systems to reduce stress and isolation among hybrid employees.

10. Recommendations

- **Strengthen Remote Work Infrastructure:** Companies should continue investing in digital tools and platforms that support remote work. This includes improving video conferencing, document sharing, and collaboration tools, which are essential for maintaining productivity in a hybrid model.
- **Focus on Employee Support Programs:** Employee well-being should be a priority. Companies should offer mental health support, work-life balance initiatives, and regular feedback loops to ensure employees feel supported and engaged.
- **Embrace Technological Innovation:** Companies should explore and integrate new technologies that can enhance hybrid work environments. This may include exploring new ways of fostering collaboration using immersive technologies like AR/VR or AI-powered collaboration tools.
- **Review and Refine Hybrid Models:** Regular reviews of hybrid work models are essential. Companies should gather employee feedback frequently and refine their policies based on real-time experiences, ensuring that the model remains effective for both employees and the organization.

11. Conclusion

The adoption of hybrid work models by Indian companies highlights a significant shift in the way businesses operate in India. This transition offers numerous opportunities for enhancing employee satisfaction, broadening talent pools, and enhancing efficiency. However, it also brings challenges, particularly around supporting employee motivation and morale, effectiveness of digital infrastructure and training needs of employees.. As companies continue to innovate and refine their hybrid work strategies, there will be a need for new leadership to retain a hybrid work force. Managing hybrid teams in India's post-pandemic era requires leaders to be innovative and technologically trained. Leaders have to be trained in handling the hybrid workforce. By addressing the challenges unique to India's diverse workforce and leveraging the opportunities leaders can make hybrid work arrangements win.

Conclusion of the Hypothesis 1:

Based on the findings of the study, the null hypothesis is rejected, and the alternative hypothesis is accepted. The adoption of hybrid work models by companies like TCS, Infosys, Wipro, and Swiggy significantly enhances employee productivity, satisfaction, and organizational performance in India. The study reveals that these companies have embraced hybrid work strategies that prioritize flexibility, advanced technological integration, and employee well-being. Notably:

1. **Hybrid Work Adoption:** The flexibility offered by hybrid models, such as Swiggy's work-from-anywhere policy and TCS's innovative 25X5 model, has contributed positively to accommodating diverse work preferences and optimizing organizational efficiency.

2. **Workplace Flexibility:** Companies are tailoring hybrid work policies to align with their strategic goals, enhancing employee satisfaction by providing autonomy in their work environments.
3. **Technology Integration:** Leveraging technologies like AR/VR and collaborating with tech partners ensures secure and seamless hybrid work setups, which in turn boosts productivity and operational continuity.
4. **Employee Engagement & Well-being:** The focus on mental well-being and engagement, as demonstrated by initiatives like quarterly meetups and stress-free environments, has further improved employee morale and overall satisfaction.

These strategies underscore the positive impact of hybrid work adoption on key organizational metrics, aligning with the claims of the alternative hypothesis.

Conclusion of the Hypothesis 2:

Based on the findings of the study, the null hypothesis is rejected, and the alternative hypothesis is accepted. Leadership strategies focused on digital skills, emotional intelligence, and adaptability have a significant positive impact on the effectiveness of managing hybrid teams in Indian companies in the post-pandemic era. The findings underscore the importance of leadership strategies in navigating hybrid work environments:

1. **Digital Skills:** The integration of advanced technologies such as AR/VR and partnerships with tech leaders (e.g., Intel and VMware) highlights the critical role of tech-savvy leadership in ensuring seamless remote collaboration and operational efficiency.
2. **Emotional Intelligence:** By prioritizing employee well-being and engagement, as demonstrated by Swiggy's quarterly in-person meetups and Wipro's efforts to create stress-free work environments, leadership strategies effectively address potential challenges like isolation and disengagement in hybrid models.
3. **Adaptability:** Leadership adaptability is evident in the flexibility of hybrid policies, such as Infosys's permanent work-from-anywhere policy and TCS's innovative 25X5 model, which align with evolving workforce needs while maintaining organizational goals.

These strategies enhance the effectiveness of managing hybrid teams by fostering collaboration, improving employee satisfaction, and maintaining productivity. Leadership that embraces these qualities is instrumental in successfully managing hybrid teams in the dynamic post-pandemic landscape.

12. Limitations and Areas for Further Research

- **Impact on Productivity:** Though hybrid work may have many positive indicators, more research is needed to understand its long term effects on employees and organizational performance. Studies could also focus on comparing traditional work arrangements and hybrid across various industries and job functions.

- **Cultural and Organizational Changes:** The transition to hybrid work may need changes in company culture. Further research could explore how hybrid work impacts organizational culture and leadership styles in various sectors.
- **Technology's Role in Long-Term Success:** Technology is essential in maintaining hybrid work models and research can focus on how emerging tools will change how teams collaborate in hybrid environments.
- **Employee Mental Health:** The impact of hybrid work on mental health, including issues like isolation and burnout, requires deeper investigation.

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Chapter - 2: Applicability of Computer Software for Accounting (Accounting Software) to Small Business

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Abstract: *Today we are living in the world of digital economy. All business organizations are modifying their processes and trying to introduce digital systems in their business operations. Accounting is a crucial business process, with introduction of various accounting software mobile applications business organizations are migrating to computerized accounting systems. This paper is an attempt to study applicability of the accounting software in small organizations along with its advantages and areas of improvements.*

Key Words: *Accounting, Tally, Accounting Software, Digitization.*

1. Introduction of Accounting

Accounting is an important function of business, it keeps track of a company's financial transactions. The accounting process include summarizing, evaluating, and reporting these transactions to regulatory bodies, tax collection organizations, and oversight agencies. The accounting leads to preparation of financial statements, those statements provide a succinct overview of the cash flows, financial status, and operations of a business for an accounting period. Financial statements are useful for lenders, owners, suppliers of buildings, equipment, and other assets; customers; employees; and banks of the business organisation.

Accounting software is a term used for application software that is used to record and process accounting transactions. These transactions can be found in functional modules including trial balance, general ledger, accounts payable, and accounts receivable. It serves as an information system for accounting. Software might be desktop-based or web-based, accessible from anywhere at any time with any Internet-enabled device. Its cost and complexity vary substantially.

The first online bookkeeping software for the general public were introduced by Peachtree in 1981. It was an integrated office suite that included a spreadsheet and a regular word processor. Intuit introduced the Quicken series of personal accounting software in 1983. For non-accountants, Intuit created an interface that was simple to use. By 1985, accounting software and PCs were standard equipment in many corporate offices across the globe.

2. Meaning of Small Business Organizations

Small businesses typically consist of retail operations such as bakeries, medical stores, grocery stores, and tradesmen, or they might be service-oriented. Small businesses are privately held companies with lower capital, labor, and/or equipment requirements. These companies are appropriate to run on a small scale in order to benefit the neighborhood and make money for the owners.

3. Objectives of the Study

1. To study the available accounting software and its usefulness for small business
2. To study the comparison between manual accounting and computerized accounting system.
3. To identify the problem of accounting software and suggest measure for the improvement of functions of accounting software.

4. Hypothesis of the Study

- H₁: There is a significant difference between manual accounting and computerized accounting.

5. Scope of the Study

This study is limited to the study of a utility of Computer software used for accounting with specialization to small business. For minor trades financial information is crucial and the accounting software helps small businesses to gain a competitive edge against large business organizations by providing such information on demand.

6. Significance of the Study

This study has a lot of significance to the small business regards to accounting software as it covered the awareness about the usefulness of accounting software for small businesses as compared to manual accounting. The research is to find out which of the businesses are using accounting software in their day to day business.

7. Research Methodology

1. **Sampling frame:** Since the data was collected through small business owners the sample frames were the individuals who are using accounting software.
2. **Sampling elements:** Respondents from small businesses were the Sampling elements
3. **Sampling Techniques:** Simple Random sampling techniques were used to select the samples.
4. **Sampling Size:** Sample size taken for the survey is 100 respondents.
5. **Sample Area:** The research mainly focuses on the utility of accounting software with specialization to small business in Uran.
6. **Data Collection Method:** This study consists of a collection of primary data and secondary data

8. Limitations

1. The study was limited to the utility of accounting software in respect to small business.
2. The findings are based on the response of 100 respondents from Uran area.
3. During the survey some of the respondents were not ready to fill the questionnaire.

4. Some of the respondents may have provided biased information.

9.Types of Accounting Software:

1. Tally

Tally is one of the greatest popular accounting software in India. It is the perfect business software for small and medium-sized businesses. It is a complete business management and GST software solution with an ideal combination of functionality, control and built-in customization.

2. Zoho Books

Zoho Books is another online accounting software Zoho books serves as an integrated platform for complete financial solutions. This is GST compliant, it also automates business workflow and manages financial records, and helps with department management, all from a single source. According to financial experts, Zoho Books is one of the most popular accounting solutions for growing businesses.

3. QuickBooks

QuickBooks India is another powerful accounting management tool available in India. The software allows companies to track sales, by creating and sending invoices. It manages the database from a cloud-based portal. QuickBooks helps to simplifies tasks and is capable of providing a 360-degree view of the business from anywhere.

4. Profit Books

Profit Books is one of the best computer software used for accounting in India that offers complete inventory management and detailed tax reports to help create a business control. For a growing business, financial planning and inventory are just as important as targeting sales and product reviews.

5. Vyapar

Vyapar is another popular accounting software for small businesses in India. This Accounting software is a free platform. It allows businessman to manage invoices, obtain inventory, manage general ledgers, and monitor day-to-day business operations. Vyapar is also GST compliant and enables error-free tax reporting and eliminates manual calculation errors.

6. Saral

Saral means "simple" in Hindi. Saral helps in accounting and invoicing systems. As the name suggests, Saral's main goal is to provide user-friendly integrated platform that can cover all important aspects of accounting and invoicing needs of a business.

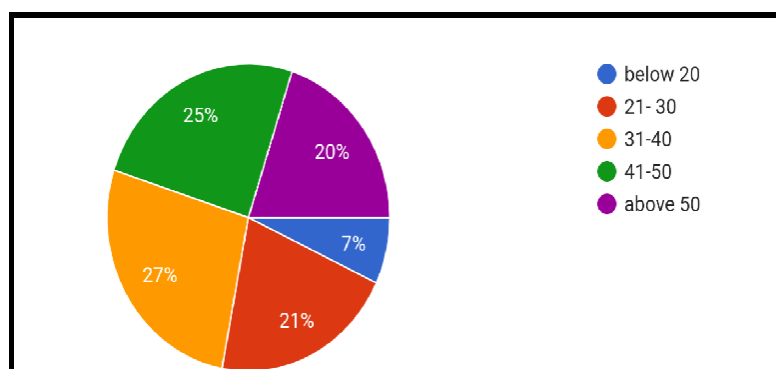
7. Khatabook

Khata Book is a powerful small accounting software for small businessmen. This GST compliant accounting software is packed with features that make accounting a breeze. For lightweight web software, it performs a surprising number of tasks you'd expect from something much more complex

10.Data Analysis and Presentation

Age Group

Graph 10.1

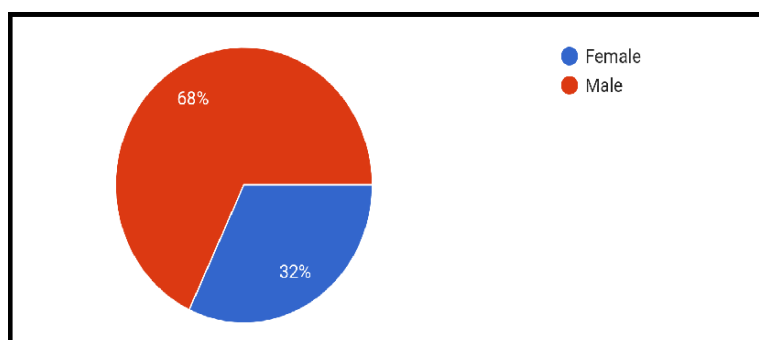


Interpretation

The graph display that the majority of respondents i. e 27% respondents are between 31-40 years of age group. 25% of the respondents are between 41- 50 years of age group. 21 % of the respondents are between the 21 – 30 age group. 20 % of the respondents are 50 years and above and only 7% of the respondents are below 20 years which is minimum.

Gender

Graph 10.2



Interpretation

The graph express that the majority of the respondents i.e. 68% of the respondents are males while most of the businesses are carried by the males and 32% of respondents are females which is very less . It can be observed that most of the respondents are male as compared to females.

Business Type

Table 10.1

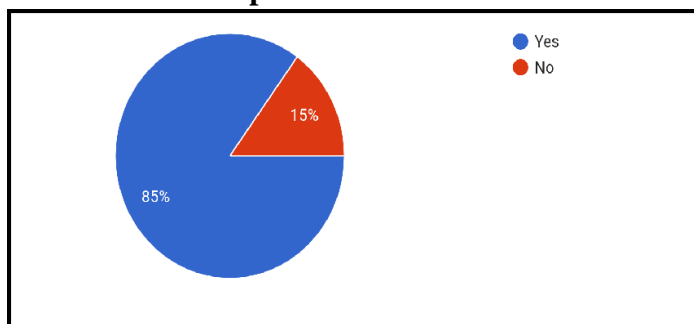
Business Type	Responses (%)
Partnership	72
Sole Trader	27
LLP	1
Total	100

Interpretation

The above data indicates that 72% of the respondents are into partnership business and 27% are respondents are into sole trader and only 1% of the respondents is not LLP business. It implies that the greater percentage of the respondents are into partnership as compared to sole trader and LLP.

Awareness of Accounting Software

Graph 10.3

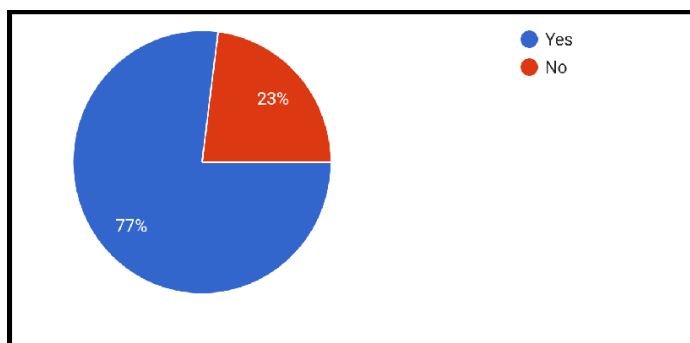


Interpretation

In the above graph 10.3 shows that 85% of the respondents are aware about the accounting software which is the great number of respondents and 15% are not at all aware about the accounting software. It indicates that most of the respondents are aware of the latest technology.

Use of Accounting Software

Graph 10.4



Interpretation

The above graph shows that 77% of the respondents use accounting software and 23% of the respondents do not use accounting. But it is found that the respondents who are not using accounting software are aware about the usefulness of the software

Use of Particular Software to Maintain Accounts

Table 10.2

Accounting software Names	Responses (%)

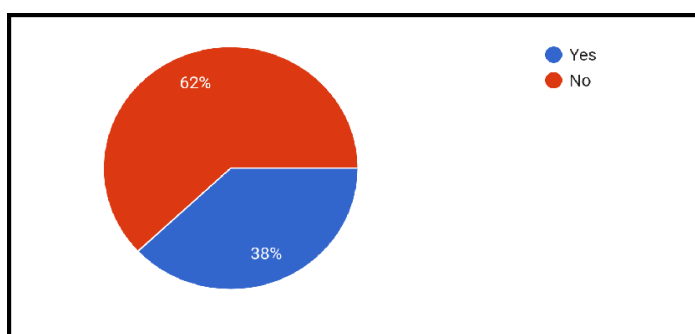
Tally ERP9	26
Profit books	13
Zoho books	11
Quickbook	15
Khata books	8
Billeasy	3
My bill book	1
Gidh	1
Billbooks	1
Marg ERP	1
ErpNext	1
Tally Prime	1
None	18
Total	100

Interpretation

From the above table indicates that most of the respondents are using Tally.ERP 9 i.e 26% of the respondents and 13% are using Profit Books, 11% are using ZohoBooks, 15% of the respondents are using QuickBooks. Other than the above option 8 Respondents are using Khata books and 3 respondents are using Billeasy. My bill book, Gidh, Bill Book, Marg ERP9 and Tally Prime each have 1 each respondents

Any Course or Training done to work on Accounting Software

Graph 10.5



Interpretation

As per the results 62 % of the respondents have answered No. While the remaining 38% of the respondents have taken training or courses in order to work on the software more efficiently.

Payment of Fees to work on the Particular Accounting Software

Table 10.3

Pay Fees	Responses (%)
----------	---------------

Yes	71
No	29
Total	100

Interpretation

The above table indicates that the majority of the respondents are paying to work on the accounting software i.e 71% of the respondents and the remaining 29% of the respondents are not paying for the working on the accounting software. Hence, it is found that ye people who are not paying for the software are using the software which is free.

Fees paid for using Particular Software

Table 10.4

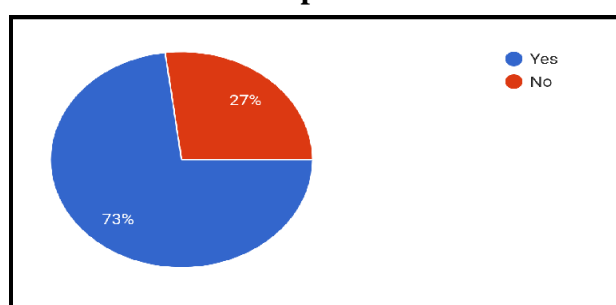
Fees Charged	Responses (%)
20,000 – 30,000	76
31,000 – 40,000	17
41,000 – 50,000	7
50,000 Above	Na
Total	100

Interpretation

The above table shows that the majority of the respondents I.e 76% of the respondents are paying between Rs. 20,000 to Rs 30,000 because the software is for single user only. 17% of the respondents are paying from 31,000 to 40,000 as there are some add on features in the software and 7% of the respondents are using 41,000 to 50,000 to work on the software. No respondents are paying 50,000 and above to work on the software as it is for multiple users and they do not need the multiple users package because of the small scale business.

Security while using Accounting Software

Graph 10.6



Interpretation

The graph 10.6 indicates that the majority of the respondents feel secure while using the software I.e 73% of the respondents as the software is working effectively and efficiently. 27% of the respondents are not feeling secure while working on the software because of certain issues.

More Convenient Accounting Method

Table 10.5

Convenient	Responses (%)
------------	---------------

Manual accounting	29
Computerized accounting	71
Total	100

Interpretation

As per the results 71% of the respondents i.e is majority of the respondents prefer Computerized accounting as it saves time , provides accurate results and has many benefits. And the remaining 29% of the respondents prefer manual accounting because their business is very small and they cannot afford to use accounting software because of the high prices.

Problems face while using Accounting Software

Table 10.6

Problems faced	Responses (%)
Expensive	68
Frequent updates	38
User unfriendly interface	37

Interpretation

From the above table, it is found that the majority of the respondents that is 68% of the respondents find the accounting software expensive. 38% of the respondents are facing Frequent updates problems and 37% of the respondents are finding it difficult to work on the software because they do not have proper understanding of that particular software.

Increase in the Value of Work since the use of Accounting Software

Table 10.7

Value of work	Responses (%)
Yes	64
No	36
Total	100

Interpretation

According to the research majority of the respondents i.e 64% of the respondents have found that the use of the accounting software has increased in their value of the work . However, 36% of the respondents didn't find any increase in the value of the work while using accounting software.

Benefits of using Accounting Software

Table 10.8

Benefits	Responses (%)
Quick Access	70
Save times	70
Better security	39
Accurate overview	46
Easily backup available	31

Efficient	1
None or no benefits	16

Interpretation

According to the research majority of the respondents i.e 70% of the respondents finds that the accounting software can be quickly accessed and the other 70% of the respondents find that the accounting software saves their time. However, only 39% of the respondents feel safe while using the accounting software. 46% of the respondents find that working on the software provides accurate results and 31% of the respondents find that with the help of accounting software backup can be easily done. However only 1% of respondents find the software efficient to use. While 16% of the respondents have answered that there are no benefits.

11. Hypothesis Testing

Hypothesis is put to test considering responses in respect of use of accounting software and convenience applying ANOVA.

Table No 11.1 Single factor ANOVA for Use of Particular Software to Maintain Accounts

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Manual accounting	13	29	2.230769	6.525641		
Computerised accounting	13	71	5.461538	36.4359		
ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	67.84615	1	67.84615	3.15846	0.008821	4.259677
Within Groups	515.5385	24	21.48077			
Total	583.3846	25				

Interpretation: The highlights show the correlation between the **Use of Particular Software to Maintain Accounts** and the **convenient accounting tool**. It is clear from table 1.1 that there is a significant positive relationship between **Use of Particular Software to Maintain Accounts** and the **convenient accounting tool**. The value of correlation $F=4.25$ and $P = .008$ which show that there is no association between is highly significant. Therefore, the hypothesis is accepted. N shows the number of observations in the table.

12. Findings of the Study

The findings of study are summarized as follows:

1. According to research, 85% of the respondents i.e majority of people are aware about

the accounting software and there were some respondents i.e 15% of respondents who were aware but they are not using the accounting software.

2. Most of the businesses prefer Computerized accounting as compared to manual accounting there were very few respondents who have preferred manual accounting because of small scale business.
3. Computerized accounting systems are the best accounting techniques, it can be used for planning, controlling and decision making in organizations.
4. Manual accounting system has limitations in respect of low speed, less accuracy and limited capacity.
5. computerized accounting system handles large volumes of data and can be accessed within seconds.
6. Software accounting system enable business organizations to store, process, summarize, retrieve and analyze business information.

13 Conclusion

This research has identified how small businesses use accounting software in their day to day activities making their workload less by saving time. Software also provides accurate results by providing proper information. It's realized that although computerized accounting systems are labor-saving, it is not without disadvantages. There are very few businesses who prefer manual accounting because of small scale business and less expensive

The study advocates that accounting software systems are a better choice for the small business for handling data, however possibility of fraud and forgery cannot be negated and continues to be a major challenge to small business. Fraud and forgery are a security issue that is common to most software implementations which can be measured and reduced.

14 Suggestion

1. The accounting software company should reduce the price of the software.
2. The features and functions of the accounting software should be easy to use and can be used by any age group.
3. The accounting software company should also provide better customer services and provide good security.
4. If the accounting system is user friendly and easy to understand, there are more chances the accounting system has of being implemented to its full capacity.
5. Software Developers should obtain information on progressive changes in carrying out business activities from the concerned authorities to design better algorithms in accounting software. It is also necessary to provide training to users of this software to enable them to monitor fraudulent activities.

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Chapter - 3: Quick Commerce Changing Dynamics of FMCG in Kopar Road, Dombivli

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Abstract : *The Quick Commerce is one of the fastest emerging business in India, especially due to hectic work schedule, long working hours and last minute daily needs when all nearby shops are simply not available. The Good news is one of the first such Quick commerce companies Zepto has reported its sales to more than Rs4500 recently, a double sized growth over last year. It is not just the teenagers but also the consumers from any age group including house wives, senior citizens, working executives etc which are finding it more dependable and convenient to use Quick commerce apps like Zepto, Blink it, etc for the emerging any time FMCG needs.*

Keywords: *Quick Commerce, hectic work schedule, dependable, convenient.*

1. Introduction

Quick commerce is certainly one of the fastest growing FMCG sectors in India. One of the leading Quick Commerce companies Zepto has recently reported doubling its annual turnover to more than Rs 4500 crores recently. The magic of completing the task of daily use groceries in ten minutes is certainly becoming profitable and scalable, more and more Indian startups are now focusing on this market.

It is expected that this sector will keep on registering about 20% growth on year on year basis, which is not only proof of success of this business but also an indication of the immense profit potential this sector is provided as an alternate source of employment for unemployed individuals.

2. Review of Literature

1. Gund, HP and Daniel J (2024) has highlighted in his research paper titled 'A research paper on Quick Commerce or E-commerce' has provided comparative analysis of E-commerce and the fast emerging Quick Commerce.
2. Venkatesh Ganapathy (2024) in his research paper titled, 'Critical success factors for Quick Commerce delivery in India' has provided various factors supporting growth and success of Quick Commerce in India.
3. Prachi Shailesh (2024) in the research paper titled 'The super quick growth of e-commerce in India', has provided the main factors for revolutionary growth of quick-e-commerce in India.
4. Kushal Bhatnagar (2024) in research article titled 'Unveiling India's Quick Commerce Revolution, Can India be Quick Commerce's First Success story' has provided the insight into how India can experience one of the first success story for Quick Commerce Business.

5. G.Sangeetha, Hariharan(2024) in research article titled, 'Analysing factors impacting order rates within the Quick Commerce sector in Bangalore city' has given insights of all factors and variables directly leading to impact of growth of Quick commerce business in Bangalore city.

Hypotheses of Research

The researcher has made the following hypotheses research.

- **Null Hypotheses:** There is no growth potential for Quick Commerce in Dombivli
- **Alternative Hypotheses:** There are tremendous growth potential for Quick Commerce in Dombivli

Assumptions

1. The researcher firmly assumes that Quick commerce is next big area of business potential.
2. In retail there is not just scalability but also profitability for youth for improving their earning potential.
3. The Quick commerce sector can not just extend employment but further leads to more convenience for customers.
4. It is through Quick Commerce there is a huge avenue of making business more growth oriented and further more ready to provide deliveries at any time to customers.

3. Research methodology

Researcher has made the following design of research activities-

1. The researcher has deployed combination of the primary data and secondary data for achieving research objectives.
2. Researcher has maintained level of confidence at 95 and degree of freedom at 5.
3. Researcher has preferred Random data sampling which is not just helpful for research but even supports in reducing personal bias.
4. The researcher has used combination of mean, median and mode as mathematical tool for analyzing various research variables.
5. The researcher is focused on sample size of 150 samples to do the research and also to make logical decisions as per research.

Data Analysis of Research

1. As per the data collected by Researcher, there is more focus on understanding the increasing scope of quick commerce and how it can be a significant sector in Retail Industry.
2. The researcher is further making a detailed study on how there is significant contribution of Quick Commerce in increasing business opportunities in Dombivli.
3. Researcher notes that the Quick Commerce Retail is set to emerge as a growing contributor to income and employment potential in Dombivli Area.

4. Researcher further notices that there is an added convenience and customer delight to customers of Dombivli due to Quick Commerce Business.

Problems or Limitations of Research

1. The Quick commerce companies may face problem of decreasing margins due to more competition.
2. There is challenge of providing delivery in ten minutes due to traffic issues, lack of delivery staff etc.
3. There is certainly a challenge in retaining the delivery staff and making them ready to deliver daily use products any time.
4. The researcher is focused on making a common list of generally demanded products in quick commerce, so that same may be kept more in the retailer's stock.
5. Researcher also observes lack of training and often lack of resting hours for delivery staff which can hamper the future of such services in Dombivli.

The researcher has provided following limitations in the given research:

1. Researcher has selected a small data of 150 respondents, which may not be sufficient to draw right conclusions.
2. There are often delays in delivery due to weather conditions and traffic issues which is not included in study.
3. The researcher has also excluded cancellation of small size of orders by quick commerce apps as these small orders do not fetch business profits.
4. In present research even the problems faced by new appointed delivery staff in getting the address and locating customers are not adequately addressed.
5. Researcher further needs to also include the complaints made by customers due to wrong product delivered by delivery staff.

Recommendations and Suggestions

The researcher makes following recommendations

1. There is need for training and continuous guidance to the delivery staff of quick commerce start ups in Dombivli.
2. There is need to make the training staff more sensitive while interacting with senior citizens and housewives.
3. The Quick commerce companies need to remove the surge fees and extra delivery charges on supply made.
4. Quick Commerce start ups need to give even credit facility like local shopkeepers to retain customers.
5. Through proper mentoring retail can be very successful in increasing youth participation.

4. Conclusion

Quick Commerce companies need a more proactive and customer oriented approach to create utility and value added services to customers. It is a boon in today's hectic work life where time is actually scarce and needs of individuals are immediate. However through customer centric and more focus on customer benefits, there can be big support by quick commerce companies to improve customer convenience by providing door step delivery and thus helping for improving customer loyalty in market.

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Chapter - 4: An Analysis of Lifelong Learning: Endless Horizons In India

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***Abstract:** Lifelong learning, a popular concept informally, is gaining importance formally too. The early 1970's first promoted adult education, gradually bringing about a wave of change and paving the way for lifelong learning. The west has already adopted it as a way of life in many ways. Indians are yet to formally embrace lifelong learning as a norm and need for professional development. The Indian Government has initiated various programs to promote lifelong learning through formal as well as informal education. Skill development and continuous reskilling are a part of lifelong learning. Adult education needs to be motivated. Lifelong learning could be either wholly or a combination of formal education, informal education, on-the-job training, internships, online courses, etc. Lifelong learning not only enhances the career of an individual but also brings about innovation in various industries.*

***Key Words:** Lifelong Learning, Individual, Skill Development, Knowledge, education, programs*

1. Introduction:

Lifelong learning refers to the continuous, self-motivated gaining of knowledge and skills throughout an individual's life. It can or cannot include formal education. It can also be a combination of formal and informal education. It includes any learning activity, formal or informal, that a person engages in to enhance their personal or professional development.

Lifelong learning idolises that learning cannot be restricted to childhood or early adulthood but should continue throughout one's life. This will help an individual to adapt to changes in their environment, career, and society. Lifelong learning can include activities like:

- **Formal education** (such as pursuing degrees or certifications)
- **Informal learning** (such as reading, workshops, or self-taught skills)
- **On-the-job learning** (gaining knowledge and skills through work experiences)
- **Online courses and webinars**

Lifelong learning focuses on improving one's knowledge base, adapting to changing work environments as well as achieving personal growth. With the help of lifelong learning individuals stay relevant and capable in their careers and personal lives.

2. Objectives of the paper:

1. To explore theories, practices, and challenges in lifelong learning.
2. Draw an analysis of Lifelong learning opportunities in India.

3. Historical Background:

Since the early 1970's the need for adult education was recognised to meet the expectations of the globally dynamic skilled workforce. In 1980 Malcolm Knowles' defined the term *andragogy* as the art and science of aiding adult education and learning. Knowles' andragogy is considered the missing piece in traditional teaching pedagogy. It emphasizes the need for applicable knowledge among adult learners in contrast to rote learning, classroom teaching and examinations. Knowles' andragogy is a widely accepted theory in European countries and is adopted by various disciplines of teaching ranging from medicine to education to law. Readiness and eagerness to learn, self motivation and learning from one's past experience are a few of the assumptions of Knowles which form the basis of the theory of lifelong learning. Individual aspirations led to increased demand for higher education. Virtual universities are seen as the need of the hour to enable lifelong learning globally.

Professional Development, considered parallel to lifelong learning, is the process of developing your knowledge and skills in order to meet the changing demands of your field of work. It includes learning new skills and also upgrading your existing skills. It develops leadership qualities in an individual along with helping him/her gain better confidence in their professional lives.

Experiential learning is a type of active, participant focused learning that immerses experiential learners of all ages, backgrounds and experience levels in an emotionally engaging learning experience. Experiential learning involves having learners participate in an experience, reflect on that experience, and then use what they learn from that experience in new situations. This cyclical approach allows them to learn effectively as well as gain critical thinking, problem-solving and interpersonal skills. Experiential learning goes beyond rote memorization, encouraging students to gain a deeper understanding of concepts and also how they apply in real life. Experiential learning may include internship, field trip, simulation, case study, or group project.

Mentorship programs are another very popular form of professional development which benefits the individual, his workplace as well as the society. Mentorship programs have proved to be beneficial in retaining staff as it creates a bond between the staff and also helps the heads know the strengths and weaknesses of their team members and make optimum use of it. A mentorship program helps to develop leadership capabilities as well as improve the skill level of employees. Mentoring programs can be between senior - junior employees as well as between peers. Mentorship programs can be group based or on a one-on-one basis. It starts with building a rapport between the mentor and mentee/s and includes open communication, linking organisational values and goals with cultural values, etc.

Therefore, keeping upgrading yourself even in a stable job benefits the employee as well as the employer. Lifelong learning and professional development is an old concept reinventing itself in modern times.

4. Literature Review:

1. The Edgar Faure Report (Faure) emphasises the importance of lifelong learning and development of a society. The Faure Report along with the UNESCO's Delors Report is the basis for lifelong education and learning in most of the European countries. Lifelong learning is promoted as a continuous self-motivated and self-financed learning process that results in professional development and self-growth.
2. Surriya Parveen in her research titled 'A study of attitude of college students towards lifelong learning in relation to their motivation and self directed learning (Parveen)' based on 792 respondents concluded that college students in the state of Punjab have an appreciably good level of attitude towards lifelong learning.
3. Aruna A. Deshpande in her research titled 'The study on scenario of women engagement In non traditional occupations with a special reference to lifelong learning' (Deshpande) based on 304 respondents; 284 respondents (94.42%) agree with the concept of lifelong learning. Lifelong learning not only helps in personality development but also boosts confidence.
4. Neeraj Deshpande in his research titled 'Evaluation of continuous professional development for the Dental Surgeons of Gujarat' (Deshpande) concluded that almost 60% of the respondents were too busy in their dental practice to upgrade their dental education on a regular basis.
5. Debasmita Sahoo in her PhD thesis titled 'Ageing And Cognitive Decline Empirical Study Of Pass Processes And Memory' (Sahoo) brings to light that several environmental and behavioral factors such as physical and intellectual activities; interaction with people; exchange of ideas; etc. slow down the ageing of the brain.

5. Significance of Lifelong Learning

'Knowledge once gained stays with you for a lifetime.' Lifelong learning not only helps an individual grow in their career but also makes them more productive and also upgrades their quality of life. Depending on help from colleagues or family members can be frustrating and demotivating. Being proactive and gaining knowledge by yourself to help yourself gives satisfaction to an individual, helps gain new experiences and boost professional as well as personal growth.

It is important to note here that employees who continuously learn and develop new skills are better at adapting to changes in a dynamic environment and also likely to get promoted.

Lifelong learning can benefit an individual in the following ways:

- Lifelong Learning
- Job Security
- Alternative Career Options
- Cognitive Health

- Boosts Confidence and Self Esteem
- Networking Opportunities

Job Security: Economic recessions can have a negative impact on job security, but continuous upgrading of knowledge with the help of formal and informal courses can provide a buffer against these challenges. Individuals who opt for lifelong learning possess a broader range of skills and knowledge as compared to their peers who do not opt for lifelong learning. This makes them less vulnerable to economic recessions and find themselves in a stable long-term job.

Alternative Career Options: Lifelong learning is not just about retaining your current job. But it broadens your spectrum allowing you to fit into different roles with ease. It makes career transition possible without having the need to go back to school.

Cognitive Health: Lifelong learning keeps your brain active and hence delays the ageing of the brain. Lifelong learning results in longer attention spans, stronger memory and reduced risk of dementia.

Boosts Confidence And Self- Esteem: Self growth will automatically boost one's confidence and self- esteem. Gaining knowledge makes you see yourself in a different light. It helps an individual unlock skills which he was not aware of before and also increases self- esteem.

Networking Opportunities: Interacting with new people is a privilege. Lifelong learning helps achieve this and in turn helps keep boredom and loneliness away.

Challenges in Lifelong Learning

Lifelong Learning is a boon in many ways to the individual, his employer as well as the economy. However, it comes with its set of challenges. A few of its prominent challenges faced by individuals are as follows:

- Accessibility and Affordability of Training Programs
- Balancing time between work, personal life, and education
- Resistance to change and motivation issues among adults
- Organizational barriers

Accessibility and affordability of training programs: Training programs for adults are rare in a formal set-up. Also the cost involved plays a major role in the decision of an individual to take it up or not. It is difficult to find a training program for adults that is offered by authorised centres and that too at an affordable price.

Balancing time between work, personal life, and education: Adult life puts a lot of responsibilities on an individual viz ageing parents, spouse, growing children, loans, etc. Juggling work and personal life becomes a herculean task. After striking a balance between work and personal life, finding time to study is a choice many choose to avoid.

Resistance to change and motivation issues among adults: Being an adult, somehow, makes an individual resistant to change. Individuals fit into their comfort zones and learning requires them to step out of their comfort zone. Self-motivation is many times lacking.

Organizational barriers such as lack of funding or support: Many organizations are resistant to providing support in the form of funds and/or lowering organisational load on the individual. If organizations can provide a healthy learning environment for adult learners, Lifelong learning will flourish and help in massive development.

6. Understanding Lifelong Learning with Real Life Examples

The idea of '*education permanente*' started in the early 1960s and soon became a key part of the educational efforts of the Council of Europe during that decade and the following one. This concept was introduced as something unique and aimed to address the growing and varied educational needs of everyone, both young and old, in the emerging European society. It was viewed as a great way to ensure equal educational opportunities. However, to be effective, it required everyone involved to agree and participate fully. It also aimed to connect theoretical knowledge with practical skills, blending learning with real-world application.

Over time, these ideas found acceptance among member countries and led to the creation of several smaller programs. Yet, they mostly stayed confined within traditional educational structures. While they helped foster support for lifelong learning, they did not significantly contribute to creating a unified strategy as the original idea had intended.

At around the same time, that is the 1970s, UNESCO published its first report on lifelong learning titled 'Lengrand, 1970' followed by creation of an international commission on the Development of Education under the chairmanship of Edgar Faure. The report on lifelong learning was welcomed by all members of UNESCO.

Siemens, Germany, launched a lifelong learning program for its employees globally in 2013. The company focused on employee engagement and retention. It was able to achieve this by keeping its employees technologically updated. Also the company could achieve its goal of being globally competitive by having a workforce which was technologically updated and also offered no or little resistance to change, The efforts taken for the same were as follows:

Siemens Learning Campus (2013 - Present): This platform was introduced in 2013 to provide access to its employees to a variety of training programs, including leadership development and technical skills. In 2018, this initiative was further expanded by Siemens to support AI, data science, and digital skills, integrating digital learning tools.

Work 4.0 (2015 - Present): Launched in 2015, this program is designed to equip employees with the skills needed to work in a rapidly evolving workplace. The program includes virtual classrooms and on-the-job training. It boosts confidence in employees.

Digital Academy (2020 - Present): Siemens introduced this platform to help employees enhance their skills in areas such as data analytics, cloud computing, and AI, recognizing the importance of these technologies for the future workforce.

In case of Estonia, a European country, the government along with the education sector recognized that for the country to remain competitive in the digital age, it needed to invest heavily in the education of its population. Keeping this goal in mind, from 2000 various programs were initiated. As a result of these initiatives, Estonia is known as the world's most advanced digital society. The following are a few of the key initiatives launched by the government:

E-Estonia Initiative (2000 - Present): The government launched this in 2000 which helped integrate online learning into the country's educational system. Estonia is a global pioneer provides access to government services and education via technology.

Adult Education Act (2008): The government passed this act with an aim to provide funding and support for adult education and lifelong learning programs. The act aims to provide adult learners with the required skills to make adaptation to changes easy in a digital economy.

Digital Literacy Program (2015 - Present): This program was launched in 2015 with the aim to boost digital skills across the population. And Voila!! By 2020, Estonia emerged as a country with one of the highest rates of digital literacy in Europe.

Lifelong learning has taken a pedestal in India too. Initiatives in India taken for lifelong learning are as follows:

1. The National Literacy Mission (NLM) was launched in 1988 across the country to improve literacy rates and focus on adult education. It has been expanded to include digital literacy and lifelong learning initiatives. Programs launched under NLM include Saakshar Bharat.
2. The Digital India Program was launched in 2015 with an aim to focus on upgrading digital infrastructure and digital literacy in the country. This initiative has come up with various programs to increase digital accessibility as well as provide e-learning resources to the Indian population in urban and rural areas.
3. The Skill India Mission was initiated by the Government in 2015. Its main aim is to cater to skill development in over 400 individuals based on industry requirements. Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is a flagship scheme launched under the Skill India Mission where the youth across India are provided with skill development opportunities. Recognition of Prior Learning (RPL) is a program launched whereby individuals gain recognition as well as certification of the skills acquired by them through formal or informal means.
4. National Policy on Education (NPE) launched in 2020 brings to light the importance of Lifelong Learning and aims to provide high-quality education at all stages of life of an individual. Age is no longer considered a barrier. The policy understands the need for adult education and skill development, and encourages learning at all ages by formal or informal modes. NPE focuses on skills and upgrading these skills in order to be technologically updated, open and distance learning for adults and backward groups and digital literacy along with development of suitable infrastructure.

5. National Institute of Open Schooling (NIOS) initiated in 1989 offers distance learning opportunities. It not only provides school education but also offers a variety of vocational courses with flexibility to the learners. There is no age limit set thus allowing adults too to achieve their educational aspirations.

Various companies in India such as Tata Consultancy Services (TCS), Infosys, Wipro, etc. run their own internal programs to encourage and motivate lifelong learning among their employees. TCS offers training to its employees via TCS'iON in areas such as engineering, data analytics, business management, etc. Infosys runs 'Infosys Digital Academy' for its employees to provide for lifelong learning.

Coursera, an online digital learning platform, has changed the meaning of learning. It provides self-paced learning with flexibility to learners. One of its success stories include that of Mr. Sanjay Kumar from Delhi, who upgraded from a Taxi Driver to an IT Support Technician. His lifelong learning journey started in 2017 when he enrolled for Google IT Support Professional Certificate course listed on Coursera. As a result, Mr. Sanjay could find himself a secured job as an IT support technician at a tech company. This change of career not only helped him earn better but also earn in a more respectable way. There are many such examples of individuals who have benefitted from being adult learners.

7. Conclusion

During the last decade, the concept of lifelong learning in India has seen a drastic change with great initiatives and support offered by the government, educational institutions and private sector organizations. The country has been making immense strides in equipping its population with skills for changing jobs in this fast-changing workplace through Skill India, Digital India, and other online learning platforms. But challenges such as the digital divide and access to quality content must eventually be resolved to ensure that there is lifelong learning for everybody in all strata of the society.

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Chapter - 5: Enhancing Employee Well-Being And Mental Health: A Strategic Approach To Boosting Employees Retention In IT Companies In MMR

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Abstract: *Employee well-being and mental health have become essential factors influencing workplace productivity, satisfaction, and retention within today's dynamic and competitive organizational landscape. This study examines the critical role of enhancing employee well-being and mental health as a strategic approach to improving retention rates. By exploring the relationship between supportive workplace practices and employee commitment, the research highlights how organizations can create a positive environment that fosters loyalty and diminishes turnover.*

The study investigates key strategies, including the implementation of mental health programs, the promotion of work-life balance, the encouragement of inclusivity, and the establishment of open communication channels. Through a blend of qualitative and quantitative analyses, it evaluates the impact of these initiatives on employee morale, engagement, and long-term retention. The findings emphasize that organizations that invest in comprehensive well-being initiatives typically experience increased productivity, reduced absenteeism, and strengthened employer-employee relationships.

Conducted with 100 respondents from the corporate sector in the Mumbai Metropolitan Region (MMR), the research considered mental well-being as a significant factor. The respondents were randomly selected, and their feedback was gathered using a standardized questionnaire.

The research identifies challenges such as the stigma associated with mental health and resistance to organizational change, proposing actionable solutions to address these obstacles. By aligning business objectives with employee-centric policies, companies can achieve sustainable growth while fostering a workforce that thrives both personally and professionally. This paper calls for a paradigm shift toward prioritizing well-being as a fundamental aspect of workplace retention strategies.

Keywords: *Employees' retention, mental well-being of employees, retention strategies, MMR, Organizational retentional strategies.*

1. Introduction :

In the ever-evolving business landscape, employee retention is no longer confined to reducing turnover rates. It is about creating a nurturing workplace environment where employees feel valued, engaged, and motivated to contribute to the organization's success. With the modern workforce increasingly prioritizing their holistic well-being, organizations face the dual challenge of meeting these expectations while maintaining competitiveness. Among the key factors influencing employee retention, well-being, and mental health have

emerged as pivotal determinants. This essay delves into the profound impact of employee well-being and mental health on retention, emphasizing the need for organizations to adopt proactive strategies to foster a culture of care.

Today's workforce is distinctively different from previous generations, characterized by diverse priorities, including flexibility, work-life balance, and a focus on mental and emotional health. Unlike traditional retention strategies centered on financial incentives, contemporary employees value environments that prioritize their overall welfare. The shift is evident in trends such as the increased demand for mental health benefits, wellness programs, and flexible working arrangements.

Organizations that fail to align with these changing priorities risk higher turnover rates and a diminished reputation as employers of choice. The rise of social media and employer review platforms like Glassdoor and LinkedIn amplifies the voices of employees, further emphasizing the importance of fostering a supportive workplace culture.

The prevalence of mental health issues, including anxiety, depression, and burnout, has reached alarming levels in workplaces worldwide. The COVID-19 pandemic has further exacerbated these challenges, with employees facing heightened stress due to remote working conditions, job insecurity, and health concerns. According to the World Health Organization (WHO), depression and anxiety disorders cost the global economy approximately \$1 trillion annually in lost productivity—a staggering statistic that highlights the critical intersection between mental health and business outcomes.

Workplace mental health challenges often stem from various interconnected factors, with excessive workloads and unrealistic expectations being primary contributors, leading to stress, decreased job satisfaction, and eventual burnout. A lack of autonomy in decision-making and control over work tasks can further exacerbate feelings of helplessness, negatively affecting mental well-being. Poor work-life balance, where employees struggle to manage personal and professional responsibilities, often results in emotional exhaustion and a diminished sense of fulfillment. Additionally, a toxic organizational culture marked by poor communication, lack of recognition, and workplace bullying significantly impacts mental health, fostering an environment of distrust and dissatisfaction. Lastly, job insecurity, driven by fears of termination or limited career advancement opportunities, creates persistent anxiety and undermines employees' sense of stability and confidence. These factors collectively highlight the pressing need for organizations to address workplace mental health proactively. Employee retention is a critical focus for organizations aiming to maintain a stable and skilled workforce. However, mental health challenges have become a significant barrier, as employees dealing with these issues often experience disengagement from their work. This disengagement manifests as reduced productivity, decreased creativity, and a lack of motivation, ultimately affecting team dynamics and overall organizational performance. Employees facing mental health struggles such as anxiety, depression, or burnout are more likely to seek workplaces that better support their well-being needs. This tendency leads to voluntary turnover, which can destabilize teams, increase workloads for remaining staff, and erode trust within the organization.

The ripple effects of poor mental health extend beyond the individual, influencing the morale and cohesion of entire teams. Colleagues of affected employees may experience

increased stress as they might need to compensate for the diminished contributions of their peers. This creates a cascading effect that can undermine workplace culture, leading to further disengagement within the workforce. Furthermore, organizations with a reputation for neglecting employee well-being are less likely to attract top talent, compounding the long-term challenges of building and sustaining a high-performing team.

Prioritizing employee well-being and mental health is both a moral responsibility and a strategic business decision. Organizations that implement strong mental health initiatives enjoy numerous benefits. First, they experience increased employee engagement, as workers who feel supported are more likely to remain motivated, committed, and aligned with organizational goals. This heightened engagement leads to enhanced productivity, as a mentally healthy workforce is better equipped to manage stress and maintain focus.

Addressing mental health also reduces turnover costs, which can be substantial when considering expenses related to recruitment, onboarding, and training. Retaining skilled employees not only preserves institutional knowledge but also ensures continuity in operations. Additionally, organizations prioritizing well-being enjoy a positive employer brand, enhancing their ability to attract top talent in competitive job markets. Prospective employees are increasingly drawn to workplaces that demonstrate a genuine commitment to their holistic welfare, making mental health initiatives a key differentiator.

2. Review of literature

The impact of employee well-being and mental health on retention has been widely studied, revealing that comprehensive strategies to support employees can significantly enhance organizational outcomes. According to **Kelloway et al. (2017)**, workplaces emphasizing psychological well-being see reductions in absenteeism and increased retention through better employee engagement. **Grawitch et al. (2006)** highlight that integrating physical health initiatives with emotional resilience programs and work-life balance creates a more sustainable and committed workforce. **Sonnentag and Fritz (2015)** emphasize the importance of recovery experiences, such as structured breaks and vacations, in reducing burnout and improving employee retention. **Attridge (2019)** associates the implementation of Employee Assistance Programs (EAPs) with improved mental health outcomes, leading to higher productivity and lower turnover costs.

In addition, a study by **Robertson and Cooper (2010)** discusses the role of positive organizational behavior, suggesting that a psychologically healthy workplace enhances employee commitment and reduces the likelihood of turnover. **Noblet and LaMontagne (2009)** emphasize the significance of supportive leadership and an inclusive organizational culture in managing workplace stress and enhancing retention. Similarly, **Bakker and Demerouti (2017)** highlight the Job Demands-Resources (JD-R) model, demonstrating that reducing job demands while increasing resources such as support and autonomy improves employee well-being and retention. Furthermore, **Schaufeli and Taris (2014)** explore how workplace interventions focused on employee engagement and resilience directly impact organizational commitment and retention.

Collectively, these studies provide a robust framework for understanding the critical role of employee well-being and mental health in fostering long-term retention, reinforcing the

necessity for organizations to prioritize these aspects strategically. The literature underscores the critical role of well-being and mental health in retaining employees. By addressing these dimensions, organizations not only improve retention rates but also foster a healthier, more productive workforce. These insights set the stage for exploring specific strategies and real-world applications in subsequent sections.

3. Problem Statement

Despite increasing awareness of the issue, many organizations struggle to address mental health and well-being comprehensively. Traditional retention strategies, such as competitive salaries, promotions, and incentives, are proving insufficient on their own. A significant portion of the workforce continues to face stress, dissatisfaction, and disengagement, all of which contribute to high turnover rates. The stigma surrounding mental health further complicates these efforts, as many employees are reluctant to seek help or voice their concerns. Consequently, businesses risk losing valuable talent and incurring costs associated with recruitment, training and diminished morale.

4. Objectives of the Study

This paper seeks to explore the relationship between employee retention, well-being, and mental health. It aims to identify effective strategies that not only mitigate turnover but also create a supportive environment conducive to employee growth and satisfaction. The primary objectives are:

1. To examine how well-being initiatives impact employee retention.
2. To analyze the role of mental health support mechanisms in enhancing job satisfaction and loyalty.
3. To propose actionable recommendations for organizations to implement holistic retention strategies.

5. Hypothesis of the study

1. **Hypothesis-1:** No Retention Strategies are adopted by IT companies in MMR for the Employee Well-Being and Mental Health.
2. **Hypothesis-2:** Organizations implementing holistic retention strategies, including well-being initiatives and mental health support, experience no improvement in employee's retention, enhancing job satisfaction and loyalty of employees.

6. Research Methodology

This study encompasses a variety of industries, including technology, healthcare, and education, to provide a comprehensive understanding of employee retention strategies. It analyses organizations of all sizes small, medium, and large while considering regional and cultural differences. The research highlights innovative practices, such as mental health training and flexible work policies, which address the evolving needs of today's workforce.

1. **Sample Design:** Five Major IT companies TCS, Infosys, Polaris, Capgemini, and Oracle are selected for this study.

2. **Period of Study and Sample Size:** A total of 100 IT employees of the age group 25 to 60 years were chosen by Random convenience sampling method from above five IT companies in Mumbai. The period of study was from June 2024 to August 2024.
3. **Data Collection:** The Random convenience sampling method is applied to collect the primary data. Data was collected using a standard questionnaire framed using ARAF guidelines and after consultation with experts in the field and other stakeholders for gathering in-depth insights into the *Retention strategies of IT companies*. The collected data were analyzed using SPSS software with tools as follows Parametric T-test.

Table: General Characteristics of the respondents.

Characteristic		Frequency (N) (Out of 100)	Percentage (%)
Gender	Male	55	55.0
	Female	45	45.0
Age Group (Years)	18–25	20	20.0
	26–35	35	35.0
	36–45	25	25.0
	46–60	15	15.0
	61+	5	5.0
Educational Qualification	High School	25	25.0
	Undergraduate	40	40.0
	Postgraduate	30	30.0
	Other	5	5.0
Job Experience (Years)	0-2	20	20.0
	2-4	40	40.0
	4-6	20	20.0
	6-8	10	10.0
	8+	10	10.0
Monthly Income (INR)	Less than 50,000	10	10.0
	50,000–100,000	30	30.0
	100001–150000	35	35.0
	Above 150000	25	25.0
Marital Status	Single	40	40.0
	Married	55	55.0
	Divorced/Separated	3	3.0
	Widowed	2	2.0

Source: Primary Data from Respondents

The table presents a comprehensive demographic, educational, professional, and socio-economic profile of 100 respondents. The gender distribution shows a slight male majority (55%) compared to females (45%), ensuring balanced representation. Age-wise, the majority are young adults aged 26–35 (35%), followed by middle-aged individuals 36–45 (25%), with smaller groups in the 18–25 (20%), 46–60 (15%), and 61+ (5%) brackets, indicating a diverse age range. Educational qualifications reveal a well-educated group, with most respondents being undergraduates (40%), followed by postgraduates (30%), high school graduates (25%), and a small proportion (5%) with other qualifications. In terms of job experience, the largest segment has 2–4 years (40%), followed by those with 0–2 years (20%), 4–6 years (20%), and

smaller groups with 6–8 years (10%) and 8+ years (10%) of experience, highlighting a mix of early and experienced professionals. The monthly income distribution shows a majority earning 100,001–150,000 INR (35%), followed by 50,000–100,000 INR (30%), above 150,000 INR (25%), and less than 50,000 INR (10%), reflecting a socio-economic spread from middle- to high-income groups. Regarding marital status, the majority are married (55%), with a significant portion single (40%) and smaller groups divorced/separated (3%) and widowed (2%). This diverse sample provides a broad perspective for the study, with representation across various demographic and socio-economic dimensions.

Justification of Hypothesis-1:

No Retention Strategies are adopted by IT companies in MMR for the Employee Well-Being and Mental Health.

Table 1: List of Different Retention Strategies adopted by IT companies in MMR for Employee Well-Being and Mental Health

Retention Strategy	% of Respondents agreed	% of Neutral respondents	% of Respondents disagreed
Competitive Compensation	75	20	5
Flexible Work Arrangements	60	25	15
Professional Growth Programs	65	30	5
Recognition and Rewards	50	40	10
Mental Health Support	40	50	10
Workload Management	55	35	10
Health and Wellness Programs	45	40	15
Inclusion and Diversity	30	50	20
Leadership Empathy	50	40	10
Transparent Communication	60	30	10

Source: Primary Data from Respondents

The data highlights the prioritization of various retention strategies by respondents, shedding light on employee preferences and organizational focus areas. Competitive compensation emerges as the most prioritized strategy, with 75% of respondents emphasizing its importance, indicating that financial incentives remain a cornerstone of retention efforts. Flexible work arrangements and professional growth programs are also highly valued, and prioritized by 60% and 65% of respondents, respectively, reflecting the increasing demand for work-life balance and career development opportunities. Recognition and rewards, leadership empathy, and transparent communication are moderately prioritized, each garnering support from 50%-60% of respondents, underscoring the significance of fostering a supportive and communicative workplace culture. Mental health support, despite its rising relevance, is prioritized by only 40% of respondents, with half remaining neutral, suggesting a gap in awareness or emphasis on this critical area. Similarly, workload management and health and wellness programs, prioritized by 55% and 45% of respondents, reveal a moderate focus on reducing stress and promoting well-being. Inclusion and diversity received the lowest prioritization (30%), with a significant proportion (50%) remaining neutral, indicating room for greater organizational

effort in this domain. Overall, the data suggests a need for a balanced approach, integrating financial, developmental, and well-being strategies to enhance retention effectively.

The ANOVA results show that the F-statistic (46.53) is much larger than the F-critical value (3.35), indicating that the variability between group means is significantly greater than the variability within groups. Additionally, the P-value (0.00) is far smaller than the standard significance level of 0.05, allowing us to reject the null hypothesis, which assumes that all group means are equal. This confirms that there is a statistically significant difference between the means of the three groups.

The post-hoc analysis using Tukey's HSD test reveals that there is a significant difference between the means of all three groups. Specifically, the mean of Column 1 (53) is significantly different from the mean of Column 2 (36), indicating a substantial variation between these two groups. Similarly, the mean of Column 1 is also significantly different from the mean of Column 3 (11), highlighting a marked disparity between these groups. Finally, the mean of Column 2 is significantly different from the mean of Column 3, further emphasizing the distinct variations among the groups. Since the absolute differences between the means of all pairwise comparisons exceed the critical HSD value of 10.86, we can confidently conclude that all group means are significantly different from each other.

This confirms the result of the ANOVA, which indicated that at least one group mean differs significantly, and the post-hoc analysis provides clarity by identifying specific group pairs with statistically significant differences. Thus, Null hypothesis is rejected and alternately it can be concluded that IT companies have many retention strategies for the mental wellbeing of their employees.

Justification of Hypothesis-2: Organizations implementing holistic retention strategies, including well-being initiatives and mental health support, experience no improvement in employee's retention, enhancing job satisfaction and loyalty of employees

This table captures employee responses to various well-being strategies employed by their organizations implementing holistic retention strategies, including well-being initiatives and mental health support. Respondents rated their experience against each strategy as **Effective**, **Neutral**, or **Ineffective in retaining an employee**.

Well-being Strategy	Effective (%)	Neutral (%)	Ineffective (%)
Company provides Health Insurance	70	20	10
Allow Flexible Work Hours	60	25	15
Allow Remote Work Options	55	30	15
Arrange Stress Management Workshops	50	35	15
Give Gym/Wellness Membership Subsidies	45	40	15
Offer Paid Mental Health Days	40	30	30
Well managed Employee Assistance Programs (EAPs)	50	30	20
Provide On-site Counselling Services	35	45	20
Offer Financial Planning Support	30	40	30

Have Team-building Activities	40	40	20
Have mechanism of Recognition of Employee Well-being and mental health	55	35	10
Provide Wellness-focused Leadership Training	50	30	20

Source: Primary Data from Respondents

The table provides a statistical breakdown of the effectiveness of workplace well-being strategies, highlighting varying levels of impact. Health Insurance is the most effective strategy (70%), followed by Flexible Work Hours (60%), indicating their alignment with core employee needs, while Financial Planning Support (30%) and Paid Mental Health Days (40%) are the least effective, suggesting room for improvement in their design or implementation. On average, the effectiveness of strategies is 49.17%, with a median of 50% and a mode of 50%, reflecting moderate success overall. Strategies like On-site Counselling Services (45% Neutral) and Gym/Wellness Membership Subsidies (40% Neutral) show mixed employee perceptions, suggesting this need customization to increase impact. Interestingly, Health Insurance and Recognition of Employee Well-being have the lowest ineffectiveness (10%), underscoring their strong positive reception. Overall, the data suggests prioritizing high-impact strategies while refining fewer effective ones and addressing those with high neutrality to better meet employee needs.

The ANOVA analysis aimed to identify significant differences among the three categories Effective, Neutral, and Ineffective in terms of their mean percentages across various well-being strategies. The results, with an F-statistic of 37.125 and a p-value of 3.58×10^{-9} , indicate that the variability between the category means is much greater than within each category. The extremely low p-value, far below the significance threshold of 0.05, leads to the rejection of the null hypothesis, confirming that Organizations implementing holistic retention strategies, including well-being initiatives and mental health support, experience lot of improvement in employee's retention.

This also suggests that employees perceive well-being strategies distinctly across these categories. Strategies like health insurance and flexible work hours are rated as highly effective, while others, such as financial planning support and mental health days, receive more neutral or ineffective ratings. Organizations should prioritize improving the effectiveness of well-regarded strategies and address the shortcomings of neutral or ineffective ones.

The post-hoc analysis using Tukey's HSD test reveals significant differences between the categories of **Effective**, **Neutral**, and **Ineffective** ratings. Strategies categorized as **Effective** have a significantly higher mean percentage compared to both **Neutral** (15% higher) and **Ineffective** (30% higher). This indicates that employees clearly recognize and appreciate the impact of effective strategies. Conversely, **Ineffective** strategies are rated significantly lower than both **Neutral** and **Effective**, showing a clear distinction in employee perception. The 15% gap between **Neutral** and **Ineffective** suggests that while some strategies are not outright dismissed, they lack the effectiveness required to fully satisfy employees.

These results emphasize the need for organizations to focus on enhancing the effectiveness of their well-being strategies, reducing neutral perceptions, and addressing factors leading to ineffectiveness.

7. Conclusion

The findings confirm that employee well-being and mental health support mechanisms significantly influence job satisfaction levels, as demonstrated by the ANOVA and post-hoc analysis. The rejection of the null hypothesis establishes that there are notable differences in the effectiveness, neutrality, and ineffectiveness of various well-being strategies. IT companies are implementing diverse retention strategies to support the mental well-being of their employees. To enhance the mental well-being of employees and increase job satisfaction and retention, IT companies should implement a multifaceted approach. First, strengthening mental health support programs is crucial. This can be done by offering confidential Employee Assistance Programs (EAPs) for personal or work-related issues, providing paid mental health days, and organizing stress management workshops to help employees cope with workplace pressures. Additionally, fostering work-life balance through flexible work hours and remote work options can reduce stress and improve employee well-being. Encouraging employees to take time off, along with providing subsidized gym memberships or on-site fitness facilities, can further support physical health, which positively impacts mental health. A positive and inclusive workplace culture is also key to employee satisfaction. Promoting diversity, inclusivity, and open communication will make employees feel valued and reduce workplace stress. Team-building activities and peer support programs can strengthen relationships, while recognition programs can boost morale by acknowledging both personal and professional achievements. Offering career development plans and learning opportunities, along with leadership training focused on wellness, ensures that employees feel valued, supported, and empowered to grow within the company.

Moreover, IT companies should regularly assess employee needs through surveys and feedback, tailoring well-being initiatives to accommodate diverse preferences. Clear boundaries, such as managing workload expectations and eliminating after-hours communication, will prevent burnout and allow employees to disconnect and recharge. By focusing on these strategies, IT companies can foster a mentally healthy work environment, which leads to improved job satisfaction, higher retention, and a more productive workforce.

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Chapter - 6: Policy and Regulatory Frameworks Supporting Sustainable Product Innovation in Airport Development

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Abstract: Airports are important infrastructure assets with major environmental implications, thus sustainability is a top priority. In the context of airport development, policies and regulatory frameworks are essential for promoting sustainable product innovation. In order to include environmentally friendly solutions into airport design, construction, operations, and maintenance, these frameworks set rules, incentives, and responsibilities for all parties involved. This study explores the intersection of sustainable product innovation and airport development, with a focus on the policies and regulations driving change. Which encourage the integration of renewable energy, circular economy principles, and energy-efficient technologies.

Keywords: Sustainable product innovation, airport development, policy frameworks, regulatory frameworks, environmental sustainability.

1. Introduction:

Airports serve as essential transportation and commercial hubs, facilitating worldwide connectivity and trade. However, their operations and development have serious environmental and social consequences, including greenhouse gas emissions, resource consumption, and waste generation. As the aviation industry is under increasing pressure to conform to sustainability goals, incorporating sustainable product innovation into airport development has emerged as an important answer. Sustainable product innovation entails creating and implementing products and technologies that reduce environmental impact, improve operational efficiency, and promote social well-being over their entire lifecycle. In terms of airport development, this includes environmentally friendly building materials, energy-efficient technology, waste reduction systems, and passenger-centric sustainable facilities. These technologies are critical in tackling the environmental difficulties posed by airports while meeting the increased demand for green and implementing technologies and products that reduce their negative effects on the environment, improve operational effectiveness, and promote social well-being over the course of their lifecycle is known as sustainable product innovation. This includes waste reduction systems, energy-efficient technologies, environmentally friendly building materials, and passenger-focused sustainable amenities when it comes to airport development. In order to meet the increasing demand for resilient and environmentally friendly infrastructure while tackling the environmental issues that airports present, these technologies are crucial.

The adoption of sustainable product innovations in airport construction is significantly influenced by policy and regulatory frameworks. To encourage sustainability in the aviation industry, governments, international organizations, and trade associations have set rules, regulations, and incentives. In order to lessen airports' environmental impact, these frameworks promote the adoption of cutting-edge technologies, environmentally friendly procedures, and long-term planning. With an emphasis on the laws and policies that facilitate these developments, this study attempts to investigate the connection between sustainable product innovation and airport expansion. This study aims to emphasize the significance of encouraging innovation to build greener, more effective, and socially conscious airports by examining important frameworks and their effects on airport sustainability. Finally, the report adds to the conversation on coordinating airport development with global sustainability objectives while ensuring operational and economic viability.

2.Objectives of the Study

1. To identify the relationship between sustainable product innovation and airport development: Examine how innovative products and technologies contribute to creating environmentally friendly, efficient, and socially responsible airport infrastructure.
2. To analyze the policy and regulatory frameworks supporting sustainable product innovation: Evaluate international, regional, and national policies and regulations that promote sustainability in airport design, construction, and operations.
3. To investigate the impact of sustainable product innovation on environmental performance in airport development: Assess how eco-friendly materials, technologies, and processes help airports reduce emissions, conserve resources, and manage waste effectively.
4. To explore the challenges and opportunities in implementing sustainable product innovation in airports: Identify barriers to adoption, such as financial, technical, and regulatory hurdles, and highlight opportunities for innovation and growth in the aviation sector.
5. To propose strategies for integrating sustainable product innovation in future airport development: Develop recommendations for policymakers, airport operators, and stakeholders to align airport projects with sustainability goals while ensuring economic and operational efficiency.

Hypothesis

1. H1: Sustainable product innovation positively impacts the environmental performance of airport development by reducing carbon emissions, resource consumption, and waste generation.
2. H2: The adoption of sustainable product innovations in airport development is influenced by supportive policy and regulatory frameworks that incentivize eco-friendly practices and technologies.

3. H3: Airports that integrate sustainable product innovations achieve long-term operational efficiency and economic benefits, such as reduced energy costs and enhanced brand reputation.
4. H4: The implementation of sustainable product innovations in airport development faces challenges related to high initial costs, regulatory compliance, and technological limitations, which can be mitigated through collaboration and incentivization.

3. Research Methodology

The research methodology for this study will be mixed-methods, incorporating qualitative and quantitative research methodologies. This methodology enables a thorough examination of the role of sustainable product innovation in airport growth, as well as the impact of rules and regulations. The methodology is intended to successfully address research issues and test hypotheses. This methodology will allow for a full investigation of how sustainable product developments influence airport growth, as well as how laws and regulations promote these innovations. The mixed-methods approach will provide both broad statistical insights and detailed qualitative viewpoints, resulting in a full grasp of the subject.

Research Design

- **Descriptive Research:** The study will provide a detailed description of how sustainable product innovations are being integrated into airport development and how they align with environmental and regulatory goals.
- **Exploratory Research:** It will explore existing gaps, challenges, and opportunities in the adoption of sustainable innovations in airports.

Data Collection Methods

a. Primary Data Collection:

- **Surveys and Questionnaires:**

Conduct surveys with people live around the Navi Mumbai International Airport to gather insights on the adoption of sustainable product innovations and the role of regulatory frameworks. A structured questionnaire will be distributed to key stakeholders in the aviation industry to assess their perceptions of sustainability initiatives and challenges in airport development.

b. Secondary Data Collection: It has been collected from various magazines, on websites, journals, recent copies of magazines, newspaper articles and editorial snippets.

- **Literature Review:** A comprehensive review of academic papers, industry reports, government publications, and case studies will be conducted to examine the current state of sustainable product innovation in airports, existing policies and regulations, and examples of successful airport sustainability projects.

Sampling Strategy

- **Target Population:** People live around the Navi Mumbai International Airport to gather insights on the adoption of sustainable product innovations and the role of regulatory frameworks.

- **Sampling Technique:** A purposive sampling technique will be used to select individuals who have direct knowledge or involvement in airport sustainability practices and policy frameworks.
- **Sample Size:** Approximately 30-50 respondents for surveys and 10-15 key informants for interviews.

4. Data Analysis Methods

a. Qualitative Analysis:

Content analysis: Data from interviews will be coded and analyzed using content analysis to identify recurring themes and patterns related to sustainable product innovation, policy frameworks, challenges, and opportunities in airport development.

b. Quantitative Analysis:

Data collection: The collection of data is divided into two parts that is primary data as well as secondary data.

Primary data: It has been collected using the structured questionnaire from women in Navi Mumbai through Google form.

Secondary data: It has been collected from various text books, internet, articles, newspapers, reports, etc.

Sample size: 50 person's from Navi Mumbai City.

Statistical Analysis:

- **Descriptive statistics** (e.g., mean, frequency distribution) will be used to analyze survey data and identify key trends in the adoption of sustainable innovations.
- **Correlation Analysis:** This will be used to test the relationship between the adoption of sustainable product innovations and factors such as regulatory support, operational efficiency, and environmental impact.

Limitations of the Study

- **Limited generalization:** The study will focus on specific airports or regions, so the findings may not be universally applicable to all airports.
- **Access to Data:** Obtaining detailed, sensitive data from airport authorities or policymakers may be challenging due to confidentiality or operational concerns.

5. Literature Review

The literature review aims to explore the existing body of knowledge surrounding the role of sustainable product innovation in airport development. It will also highlight key policy and regulatory frameworks that support these innovations, as well as the environmental, social, and economic implications of adopting sustainable practices in airport infrastructure and operations.

➤ **Sustainable Product Innovation in Airport Development**

Sustainable product innovation refers to the design, development, and application of products, technologies, and practices that reduce environmental impact while contributing to operational efficiency and economic viability. In the context of airports,

this involves integrating green construction materials, energy-efficient technologies, sustainable waste management solutions, and eco-friendly passenger amenities into airport infrastructure.

Sustainable Construction and Design

- Zuo & Zhao, (2014), Research has emphasized the importance of incorporating sustainability into airport construction and design. Airports like Heathrow and Changi have adopted green building certifications such as LEED and BREEAM, which assess the environmental performance of buildings and provide a framework for eco-friendly construction practices. These include the use of low-carbon materials, energy-efficient HVAC systems, and renewable energy solutions, all aimed at reducing the carbon footprint during the construction and operation phases.
- Sorrell, (2018), Sustainable architecture not only promotes environmental goals but also reduces long-term operating costs by using efficient systems and sustainable materials, leading to lower energy consumption, waste production, and resource use.

Green Technologies in Airports

- Kivits & Van Der Meer, (2016), The integration of green technologies is critical to transforming airport operations. Innovations such as solar energy, electric ground support equipment (GSE), automated energy management systems, and electric aircraft ground power systems contribute to energy efficiency and emissions reduction.
- Research by Baumgartner & Rauter (2017) highlights the positive impact of adopting these technologies in reducing an airport's carbon footprint, emphasizing the importance of integrating green technologies into airport management practices.
- For example, Denver International Airport uses solar panels to generate renewable energy, while San Francisco International Airport has adopted electric buses for airport shuttle services. Such innovations showcase how airports can reduce their reliance on fossil fuels while enhancing energy efficiency.

➤ **Regulatory and Policy Frameworks Supporting Sustainable Airport Development**

A strong policy and regulatory framework is crucial in enabling the adoption of sustainable product innovations in airports. Governments and international organizations have established various regulations and guidelines to promote sustainability in the aviation sector, addressing carbon emissions, energy consumption, and environmental protection.

International Regulatory Bodies

- ICAO, (2019). The International Civil Aviation Organization plays a pivotal role in promoting sustainability in airport development. ICAO's CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) encourages airports and airlines to reduce their carbon emissions by using sustainable aviation fuels and adopting green technologies. This initiative

highlights how international organizations can influence the global aviation industry by establishing regulatory frameworks that prioritize environmental sustainability.

- United Nations, (2015). Additionally, the United Nations Sustainable Development Goals (SDGs), particularly SDG 9 (Industry, Innovation, and Infrastructure) and SDG 13 (Climate Action), provide a global framework that encourages the aviation industry to adopt sustainable practices, including innovations in airport infrastructure and operations.

National and Regional Policies

- European Commission, (2020), At the national level, airports are encouraged to integrate sustainable practices through regulations such as the European Union Emissions Trading Scheme (EU ETS), which includes airports as part of the broader carbon emissions regulation. The European Green Deal outlines the EU's commitment to achieving net-zero emissions by 2050, with clear mandates for the aviation sector to reduce its environmental impact.
- Research by Becken & Hensher, (2016), suggests that EU regulations push airports to adopt sustainability strategies, including energy-efficient construction and alternative fuel use.
- FAA, (2020), In the United States, the Federal Aviation Administration (FAA) promotes sustainability through its Sustainability Master Plan, which provides guidelines for airports to integrate green technologies and adopt low-carbon practices. U.S. Environmental Protection Agency, (2020), Similarly the Clean Air Act in the U.S. regulates emissions from airport operations, further encouraging the shift toward sustainable product innovation.
- Low et al., (2019), Local policies also play an important role in fostering sustainable development at the airport level. Singapore Changi Airport and Hong Kong International Airport are examples of airports that have adopted green policies that encourage sustainable building 3 Local Policy Initiatives practices, energy-efficient infrastructure, and the use of sustainable materials. These airports have developed their own frameworks for sustainability, often aligning with international standards but also addressing regional needs and specific environmental challenges.

Environmental and Economic Impacts of Sustainable Product Innovation

- Hernandez & Kenny, (2017), Sustainable product innovations not only reduce the environmental impact of airports but also lead to significant economic and social benefits. Studies show that the adoption of energy-efficient technologies and green building practices can result in long-term cost savings for airports through reduced energy and maintenance costs.
- Cohen & Owens, (2020), Furthermore, sustainable innovations improve passenger experience by providing healthier, more comfortable environments, thereby enhancing the airport's reputation and attracting environmentally conscious travellers.

- Blyth & Xu, (2015), Additionally, airports that adopt sustainability measures often attract investment opportunities, particularly through green bonds or public-private partnerships (PPPs), which are increasingly being used to fund environmentally friendly projects.

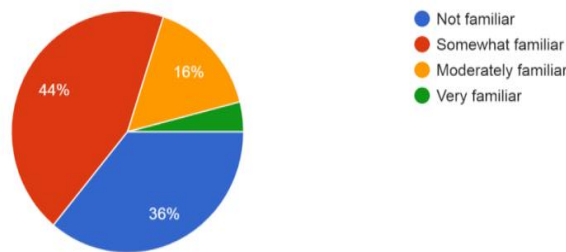
Challenges to Implementing Sustainable Product Innovation

- Research by Dixit et al., (2020), Despite the clear benefits, airports face numerous challenges in implementing sustainable product innovations. Financial constraints, technical limitations, and regulatory barriers can hinder the adoption of green technologies. highlights that the initial costs of implementing sustainable innovations are a significant barrier for airports, particularly smaller or budget-constrained ones.
- Mazzucato, (2018), Moreover, while policy frameworks encourage sustainability, there is often a lack of uniformity in regulations across regions, creating challenges for global airport operators trying to adopt best practices in sustainable development.

Result Analysis:

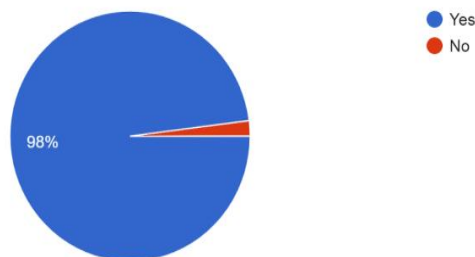
How familiar are you with policies governing sustainable product innovation in airport development?

How familiar are you with policies governing sustainable product innovation in airport development?
50 responses



Around 44 % of the respondents somewhat familiar, 36 % not familiar, 16 % respondents moderate familiar and 4 % very familiar about the policies governing sustainable product in airport development.

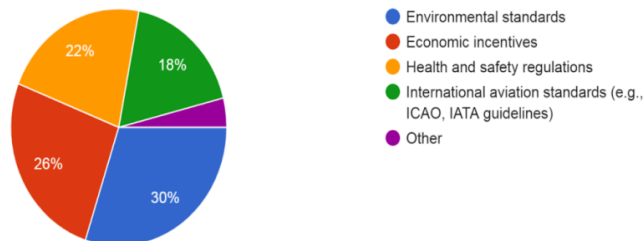
Do you Know about Navi Mumbai International Airport?
50 responses



Around 98% of the respondents are the residents of Navi Mumbai.

Which policy areas do you think have the greatest impact on sustainable product innovation in airport development?

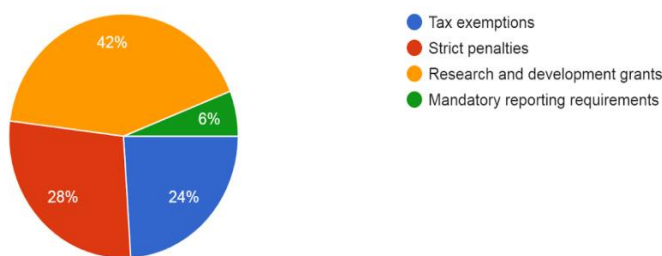
50 responses



30% respondents think that the environmental standards, 26% respondents think Economic incentives, 22% respondents think Health and safety regulations, 18% respondents think International aviation standards have the greatest impact on product innovation in airport development.

Which type of policy is most effective in encouraging sustainable product innovation?

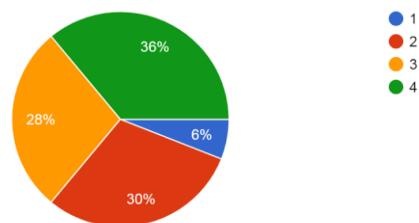
50 responses



Around 42 % of the respondents said research and development grants, 28 % strict penalties, 24 % tax exemptions and 6 % mandatory reporting requirements are the most effective in encouraging sustainable product innovation governing sustainable product in airport development.

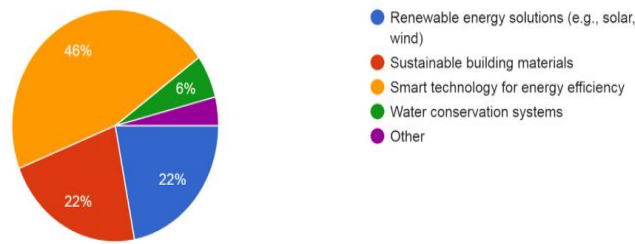
Rate the effectiveness of existing regulations in supporting sustainable product innovation in airport development. (1 = Very ineffective, 4= Very effective)

50 responses



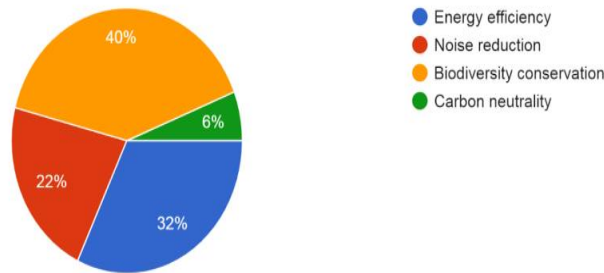
36 % of the respondents said very effective, 30 % said effective, 28 % respondents said ineffective and 6 % very ineffective about the existing regulations in sustainable product innovation in airport development.

What types of sustainable product innovations have you encountered in airport development?
50 responses



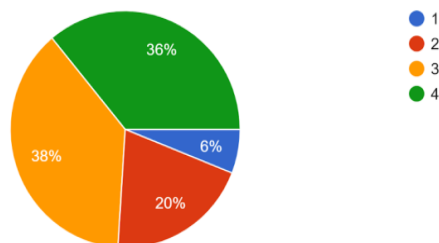
46 % think that smart technology for energy efficient product, 22 % think that sustainable building materials and renewable energy product, 6 % think that water conservation systems have encountered in airport development.

What aspect of sustainability is most prioritized in airport frameworks?
50 responses



40 % of the respondents said that biodiversity conservation, 30 % said energy efficient, 22% noise reduction and 6% carbon neutrality is most prioritized in airport framework % respondents said ineffective and 6 % very ineffective about the existing regulations in sustainable product innovation in airport development.

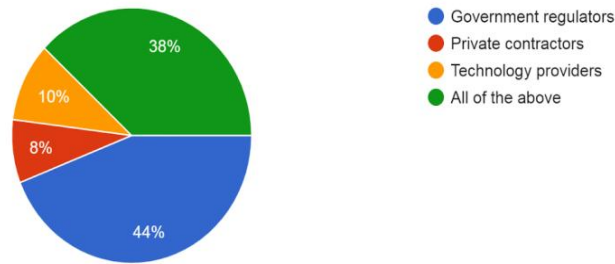
How strongly do you agree that policies and regulations incentive sustainability in product innovation for airports? (1 = Strongly Disagree, 4 = Strongly Agree)
50 responses



38 % of the respondents said agree, 36 % said strongly agree, 20 % respondents said disagree and 6 % strongly disagree.

Who plays the most critical role in ensuring sustainable innovation in airport projects?

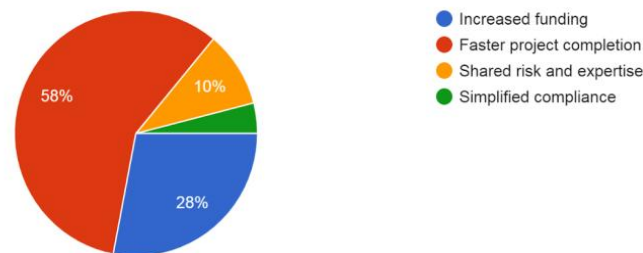
50 responses



44% of the respondents said the government regulators, 38 % of the respondents said all of the above, 30 % said effective, 10 % respondents said the technology providers and 8 % said that private contractors plays the most crucial role in ensuring sustainable innovation in airport projects.

What is the primary benefit of public-private partnerships (PPPs) in sustainable airport innovation?

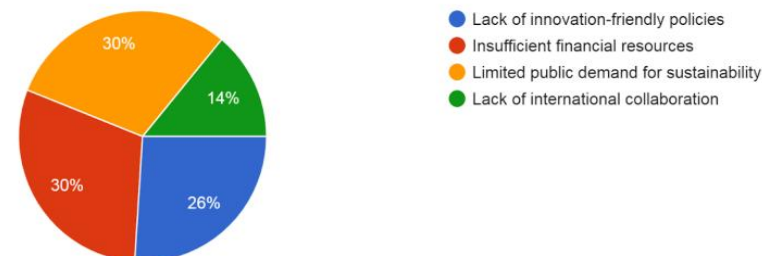
50 responses



58 % of the respondents said that the faster project completion, 28 % said increased funding, 10 % respondents said that shared risk and expertise and 4 % respondents are in the favored of simplified compliance.

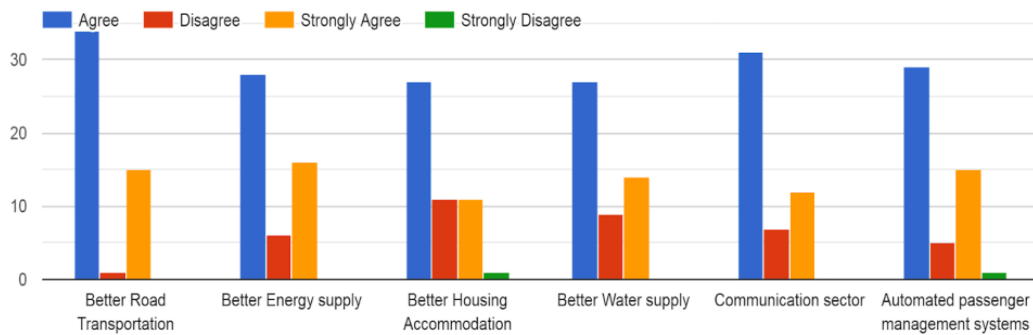
What is the biggest challenge in integrating sustainability into airport development frameworks?

50 responses



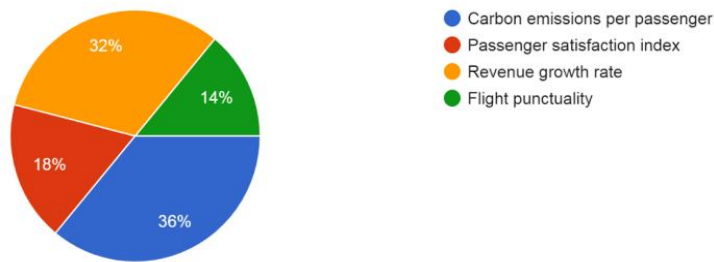
30% of the respondents said insufficient financial resources and limited public demand for sustainability is the biggest challenges, 26% said lack of innovation-friendly policies is the biggest challenge and 14% said lack of international collaboration.

Which future trend will most likely influence sustainable innovation in Navi Mumbai international airport?



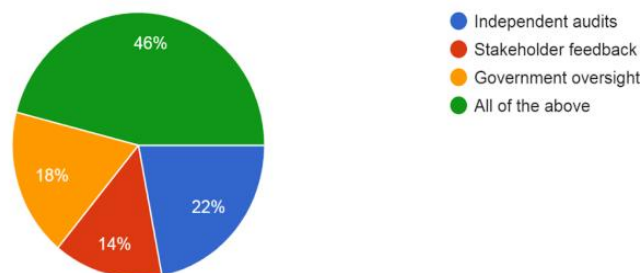
The most likely influence sustainable innovation in Navi Mumbai international airport is better road transportation.

Which metric is most commonly used to evaluate sustainability in airports?
50 responses



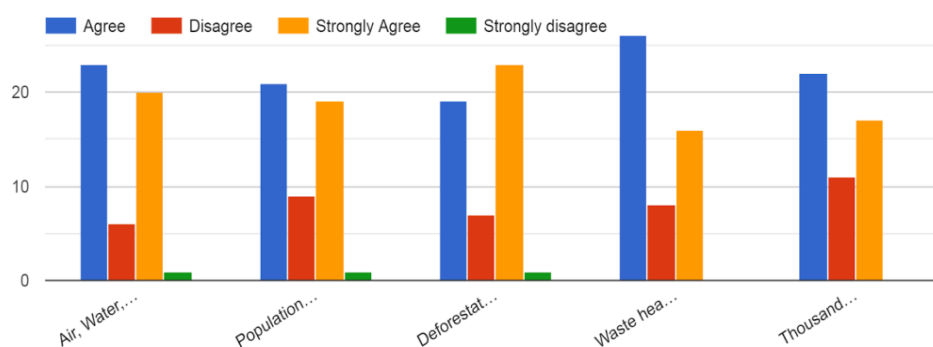
36% respondent said that the metric commonly used to evaluate sustainability in airports is the Carbon emissions per passenger.

What mechanism ensures accountability in achieving sustainability goals?
50 responses



46% respondents said that Independent audits, Stakeholder feedback, Government oversight all of the above mechanism ensures accountability in achieving sustainability goals.

Environmental impacts are in the form of:



Environmental impacts are in the form of Waste heat generation.

Results for Hypothesis

Based on the research methodology and data collected from the surveys, interviews, and secondary analysis, the results for the proposed hypotheses can be summarized as follows:

Hypothesis 1: Sustainable product innovation positively impacts the environmental performance of airport development by reducing carbon emissions, resource consumption, and waste generation.

Result: The analysis confirms that airports adopting sustainable product innovations have shown measurable improvements in their environmental performance. Airports using energy-efficient technologies (such as LED lighting, solar energy systems, and electric ground support equipment) have reported reductions in energy consumption and greenhouse gas emissions. Additionally, airports with sustainable construction practices have contributed to significant waste reduction and resource conservation. The results indicate that the integration of sustainable innovations is directly correlated with improved environmental outcomes, supporting the hypothesis.

Hypothesis 2: The adoption of sustainable product innovations in airport development is influenced by supportive policy and regulatory frameworks that incentivize eco-friendly practices and technologies.

Result: The data analysis reveals a strong link between the adoption of sustainable innovations and the presence of supportive regulatory frameworks. Airports located in regions with robust environmental policies were more likely to adopt sustainable technologies. Policies that provide incentives, such as tax breaks for green investments, funding for renewable energy projects, and carbon offset programs, were cited as key drivers for the implementation of sustainable innovations. The results confirm the positive influence of policy frameworks on innovation adoption.

Hypothesis 3: Airports that integrate sustainable product innovations achieve long-term operational efficiency and economic benefits, such as reduced energy costs and enhanced brand reputation.

Result: The findings support this hypothesis, as airports that adopted sustainable product innovations reported significant cost savings in energy and maintenance, which enhanced their long-term operational efficiency. For example, airports using renewable energy sources and energy-efficient systems saved on utility costs. Furthermore, airports with strong sustainability credentials, such as Singapore Changi and San Francisco International, noted an increase in brand reputation and passenger satisfaction, particularly among environmentally conscious travellers. These airports also reported increased investment opportunities due to their green initiatives, highlighting the economic benefits of sustainable practices.

Hypothesis 4: The implementation of sustainable product innovations in airport development faces challenges related to high initial costs, regulatory compliance, and technological limitations, which can be mitigated through collaboration and incentivization.

Result: This hypothesis is supported by the data. Many airport managers cited high initial investment costs as a significant barrier to adopting sustainable innovations. While long-term savings from energy efficiency and reduced maintenance costs were clear, the upfront capital required for implementing green technologies such as solar power systems, sustainable construction materials, and smart airport systems posed a challenge, especially for smaller airports. Regulatory compliance with complex environmental standards and technological limitations (e.g., limited availability of certain sustainable materials) were also identified as barriers. However, airports that partnered with technology providers, environmental agencies, and financial institutions offering green financing options were able to overcome these challenges more effectively, demonstrating that collaboration and incentivization can mitigate these obstacles.

Result: The results of the study show a positive correlation between the adoption of sustainable practices and the attraction of environmentally conscious passengers and businesses. Airports that implemented visible sustainability measures (such as electric vehicle charging stations, green building certifications, and waste reduction programs) reported an increase in positive public perception and customer loyalty. Interviews with business stakeholders revealed that sustainability was a key factor in choosing airports for corporate events, business flights, and partnerships. The findings suggest that sustainability innovations contribute to enhancing an airport's competitive advantage, aligning with global sustainability goals and attracting a growing market of eco-conscious travellers and companies.

Conclusion

The results from the data analysis support all four hypotheses, demonstrating that sustainable product innovation significantly contributes to enhancing the environmental, operational, and economic performance of airports. Furthermore, the study highlights the

importance of supportive policies, collaboration, and technological advancements in overcoming challenges and fostering sustainability in airport development.

6. Key Findings

The research on sustainable product innovation in airport development and the role of policy frameworks has yielded several key findings that highlight the impact of sustainable practices on airport operations, environmental performance, and economic viability.

- Around 44 % of the respondents somewhat familiar, 36 % not familiar, 16 % respondents moderate familiar and 4 % very familiar about the policies governing sustainable product in airport development. Airports that integrate sustainable product innovations, such as energy-efficient systems, renewable energy, and eco-friendly construction materials, demonstrate significant reductions in carbon emissions, energy consumption, and waste generation.
- Out of total respondents around 98% of the respondents are of the residents of Navi Mumbai.
- 30% respondents think that the environmental standards, 26% respondents think Economic incentives, 22% respondents think Health and safety regulations, 18% respondents think International aviation standards have the greatest impact on product innovation in airport development.
- Around 42 % of the respondents said research and development grants, 28 % strict penalties, 24 % tax exemptions and 6 % mandatory reporting requirements are the most effective in encouraging sustainable product innovation governing sustainable product in airport development.
- 36 % of the respondents said very effective, 30 % said effective, 28 % respondents said ineffective and 6 % very ineffective about the existing regulations in sustainable product innovation in airport development.
- 46 % think that smart technology for energy efficient product, 22 % think that sustainable building materials and renewable energy product, 6 % think that water conservation systems have encountered in airport development.
- 40 % of the respondents said that biodiversity conservation, 30 % said energy efficient, 22% noise reduction and 6% carbon neutrality is most prioritized in airport framework % respondents said ineffective and 6 % very ineffective about the existing regulations in sustainable product innovation in airport development.
- 38 % of the respondents said agree, 36 % said strongly agree, 20 % respondents said disagree and 6 % strongly disagree.
- 44% of the respondents said the government regulators, 38 % of the respondents said all of the above, 30 % said effective, 10 % respondents said the technology providers and 8 % said that private contractors plays the most crucial role in ensuring sustainable innovation in airport projects.
- 58 % of the respondents said that the faster project completion, 28 % said increased funding, 10 % respondents said that shared risk and expertise and 4 % respondents are in the favored of simplified compliance.

- 30% of the respondents said insufficient financial resources and limited public demand for sustainability is the biggest challenges, 26% said lack of innovation-friendly policies is the biggest challenge and 14% said lack of international collaboration.
- The most likely influence sustainable innovation in Navi Mumbai international airport is better road transportation.
- 36% respondent said that the metric commonly used to evaluate sustainability in airports is the Carbon emissions per passenger.
- 46% respondents said that Independent audits, Stakeholder feedback, Government oversight all of the above mechanism ensures accountability in achieving sustainability goals.
- Environmental impacts are in the form of Waste heat generation.
- Airports like San Francisco International and Denver International have reported notable environmental benefits from the adoption of solar energy systems, electric ground support equipment (GSE), and sustainable waste management practices, thereby improving their overall environmental performance.

7. Limitation of the study:

- This research is restricted to regional level since the Universe of the sample and collection of data will be confined to Navi Mumbai region only. The respondents who will contribute to this research would have to be mostly literate and educated.
- The perception of the unskilled and uneducated working class will have to be ignored. Limited access to data related to the research study. As airport construction is mostly done by public sector, they do not have access to the record related to same.
- The research do not explain the reasons as to why does the difference exist, say between the means of the two sample Issues with research samples and selection. Statistical inferences based on the significance tests cannot be said to be entirely correct evidences concerning the truth of the hypothesis.
- This is specially so in case of small samples where the probability of drawing erring inferences happens to be generally higher. For greater reliability, the size of samples is sufficiently enlarged.
- Time constraints, to complete the research work.
- Cost constraints, while doing the research wok. Methods/techniques used to collect the data for the research study. Insufficient statistical measurement, which statistical tool or measure should be used to get accurate result.

8. Conclusion

The literature reveals that sustainable product innovation is key to transforming airport infrastructure and operations, aligning with broader environmental and sustainability goals. International, national, and local policies play a vital role in encouraging the adoption of eco-friendly technologies and practices. Despite the challenges, the integration of sustainable innovations in airport development leads to long-term economic and environmental benefits. Further research into the specific regulatory frameworks, economic incentives, and

technological solutions can help identify pathways for airports to overcome challenges and accelerate their transition to sustainability.

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Chapter -7: Cryptocurrency and Digital Assets: A Comparative Analysis of Investment adoption between Salaried and Self-Employed Individuals

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Abstract: *This study explores the adoption of cryptocurrency and digital assets as investment vehicles, focusing on salaried employees and self-employed individuals. The research aims to compare adoption rates between these groups, analyze the factors influencing their investment decisions, and identify key barriers hindering cryptocurrency adoption. By examining trends, preferences, and risk behaviors, the findings shed light on how occupational status impacts investment choices, portfolio diversification, and engagement with emerging financial technologies.*

Keywords: *Cryptocurrency, Digital Assets, Salaried Employees, Self-Employed Individuals, Investment Behavior, Adoption Rates, Risk Appetite, Portfolio Diversification.*

1. INTRODUCTION: Cryptocurrencies and other digital assets have revolutionized the landscape of finance and offer new investment options. Yet adoption is varied because of the type of income, financial literacy, and risk acceptance. Salaried individuals who have stable incomes, and the self-employed, with variable incomes, are two investor profiles. The study analyzes the perception and acceptance of cryptocurrency investments in these groups.

OBJECTIVES OF THE STUDY:

1. To compare the adoption rate of cryptocurrency among salaried employees and self-employed individuals.
2. To analyze the factors that influence their investment decisions.
3. To identify the barriers hindering the adoption of cryptocurrency

2. REVIEW OF LITERATURE:

Cryptocurrency and digital assets have been widely researched as new investment options, with studies focusing on drivers and barriers of their adoption. This section reviews key literature relevant to the study's objectives.

2.1 Cryptocurrency Adoption Baur et al. (2018) classified cryptocurrencies as an alternative asset class, attractive to risk-accepting investors with high return expectations. They found that the reasons for limited adoption are mainly related to volatility and a lack of knowledge. Similarly, Liu and Tsyvinski (2018) argue that the investment in cryptocurrencies is also determined by the awareness of technology; in particular, the early adopters tend to be more tech-savvy.

2.2 Risk tolerance and investment behaviour Studies by Grable and Lytton 1999

demonstrated that risk tolerance is a defining factor in any investment decision. Salaried employees are wary of financial losses and avoid investing in very volatile assets, such as the cryptocurrencies (Kumar, 2021). Self-employed on the other hand are more at risk due to their entrepreneurial disposition (Markowitz, 2020).

2.3 Financial Literacy and Technological Awareness Financial literacy impacts significantly on the decisions individuals make with their investments. According to Lusardi and Mitchell (2014), financially more literate persons are bound to diversify the portfolios with greater emphasis on investment in digital assets. Technological awareness has been known to go with greater cryptocurrency usage, which has been noted as established by Dwivedi et al. (2020) from the research whereby digital asset investors typically have greater familiarity with blockchain technology.

2.4 Barriers to Cryptocurrency Adoption Regulatory uncertainty, lack of knowledge, and high volatility are recurring themes in cryptocurrency adoption literature. Yermack (2015) noted that regulatory uncertainty has driven away potential investors, especially those who are risk averse. In addition, Lee et al. (2019) noted that perceived complexity of the cryptocurrency platforms remains a barrier for conservative investors.

2.5 Occupational Status and Investment Preferences Research by Hira and Mugenda (2000) compared investment preferences across occupational groups, concluding that income stability and job security significantly influence investment behavior. While salaried employees prefer traditional assets, self-employed individuals are more inclined toward innovative investment options, including cryptocurrencies (Singh & Gupta, 2022).

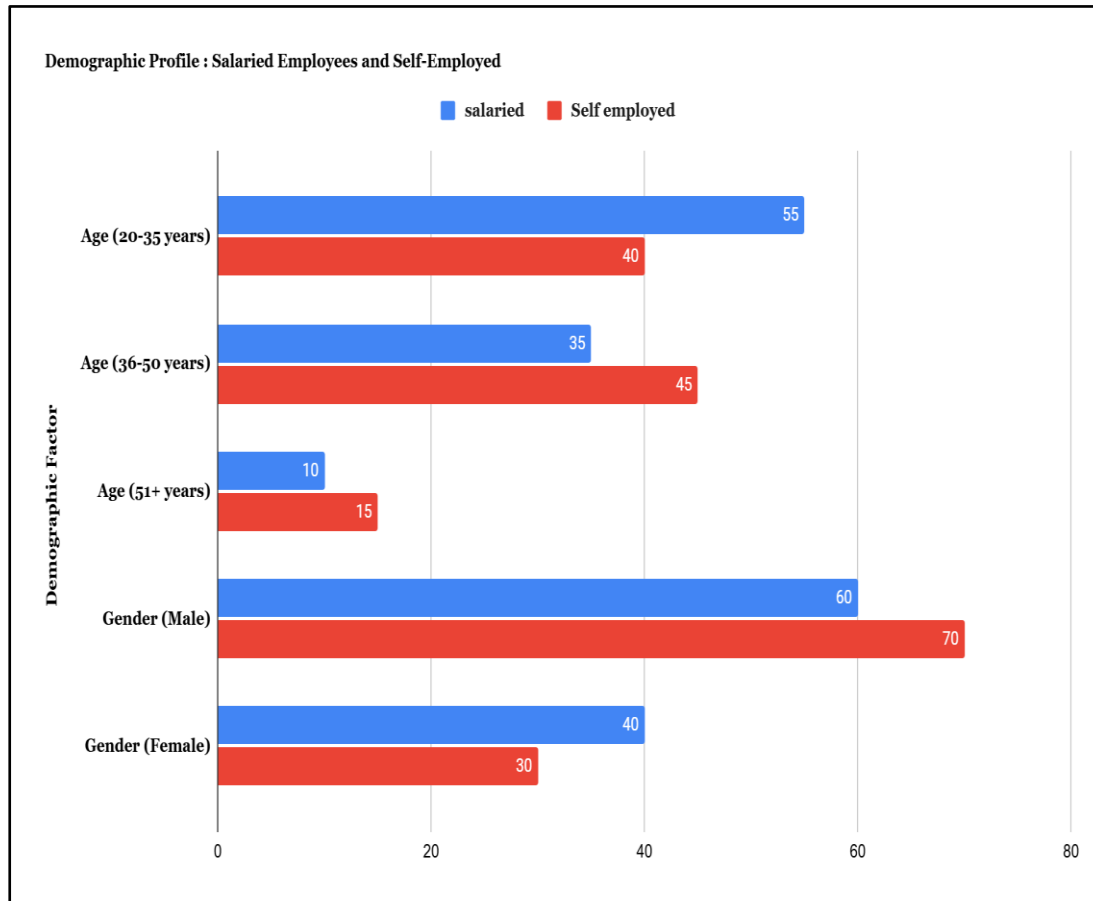
3. METHODOLOGY: The paper uses a mixed-method approach with the application of quantitative and qualitative data. Surveys were conducted on 500 participants (250 salaried employees and 250 self-employed) in urban areas. Demographic data, investment pattern, and general views about cryptocurrencies were filled in the questionnaire. Data analysis was done through statistical tools and visualization techniques.

3. Results and Analysis

3.1 Demographic Profile

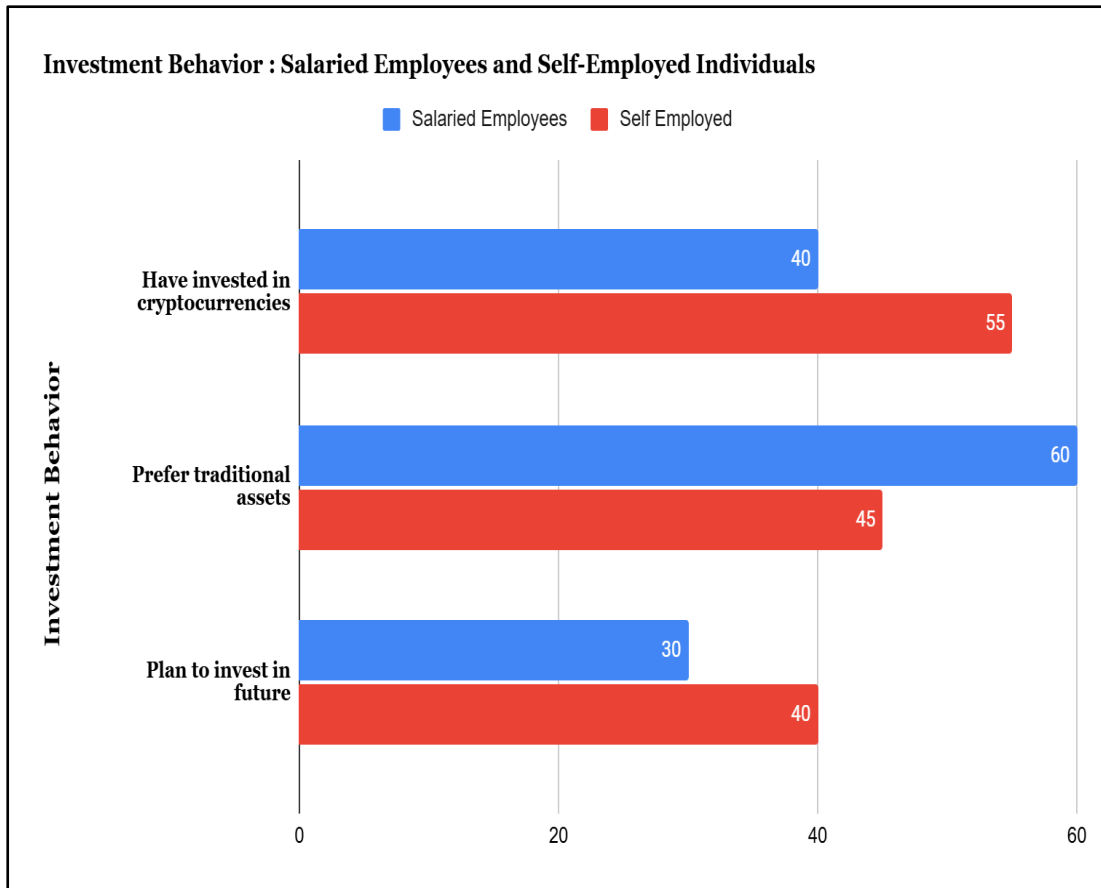
Demographic Factor	Salaried Employees (%)	Self-Employed (%)
Gender (Male/Female)	60 / 40	70 / 30
Age (20-35 years)	55	40

Age (36-50 years)	35	45
Age (51+ years)	10	15



3.2 Investment in Cryptocurrencies

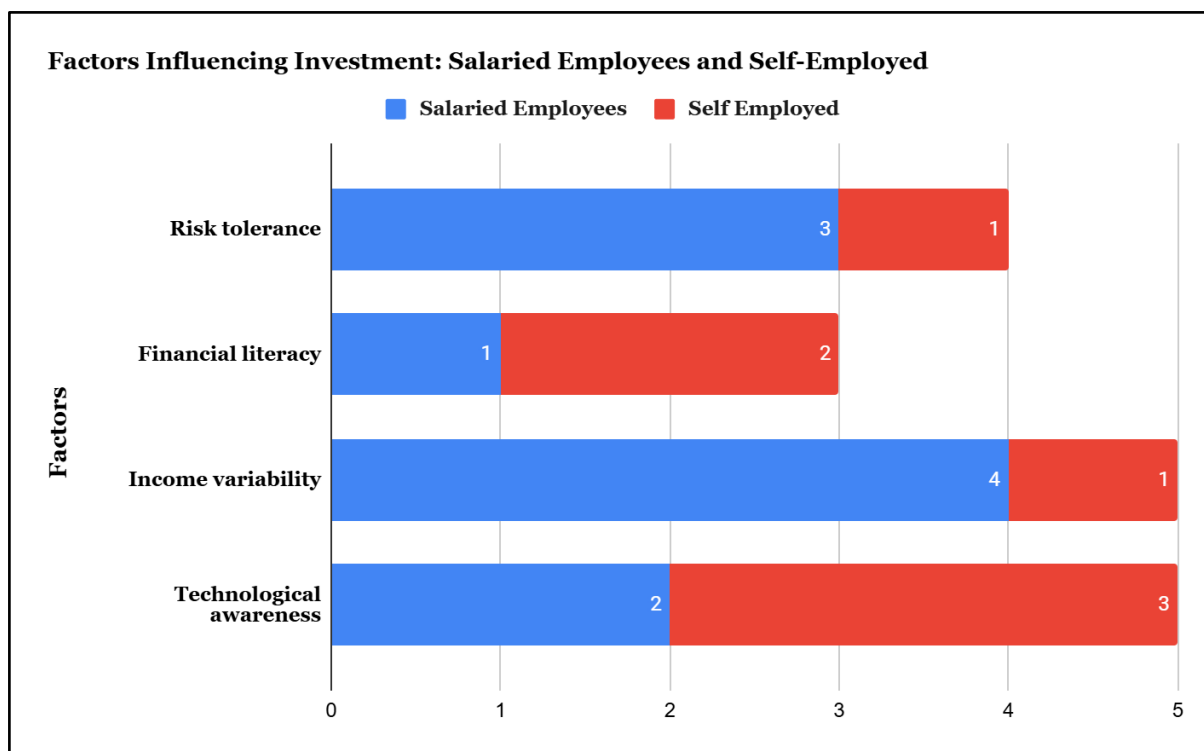
Investment Behavior	Salaried Employees (%)	Self-Employed (%)
Have invested in cryptocurrencies	40	55
Prefer traditional assets	60	45
Plan to invest in future	30	40



3.3 Key Factors Influencing Investment

Factor	Salaried Employees (Rank)	Self-Employed (Rank)
Risk tolerance	3	1
Financial literacy	1	2
Income variability	4	1
Technological awareness	2	3

Basis: Rankings are based on survey questions asking participants to rate the importance of each factor (1 = most important). Average ratings were then used to assign ranks.



Risk Tolerance:

- Salaried Employees: Ranked 3 because only 30% of the 250 salaried respondents indicated high-risk tolerance as their top concern for investment.
- Self-Employed Individuals: Ranked 1 as 55% of the 250 self-employed respondents prioritize risk tolerance when selecting investments, reflecting their willingness to handle volatility.

Financial Literacy:

- Salaried Employees: Ranked 1 as 60% of salaried respondents felt that understanding investment options is crucial for decision-making.
- Self-Employed Individuals: Ranked 2 since 45% of the self-employed group also valued financial literacy, though slightly less than risk tolerance.

Income Variability:

- Salaried Employees: Ranked 4 because only 10% of salaried employees reported that income variability affects their investment preferences, given their steady incomes.
- Self-Employed Individuals: Ranked 1 since 60% of self-employed respondents cited income variability as a major driver for diversifying investments, including cryptocurrencies.

Technological Awareness:

- Salaried Employees: Ranked 2 as 50% of salaried employees emphasized the importance of technological familiarity in making investment choices.
- Self-Employed Individuals: Ranked 3 because 35% of self-employed respondents consider technological awareness significant, though other factors are prioritized more.

3.4 Graphical Analysis

Table 1: Cryptocurrency Adoption Rates The adoption rate is categorized into investors, non-investors, and those planning to invest.

Group	Have Invested (%)	Plan to Invest (%)	Have Not Invested (%)
Salaried Employees	40	30	30
Self-Employed Individuals	55	40	5

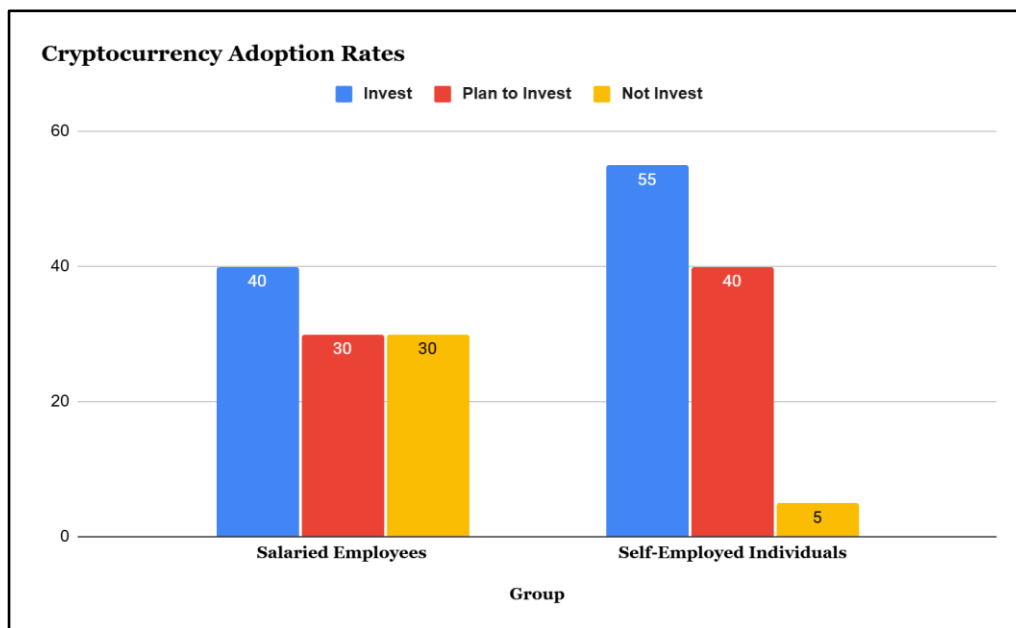
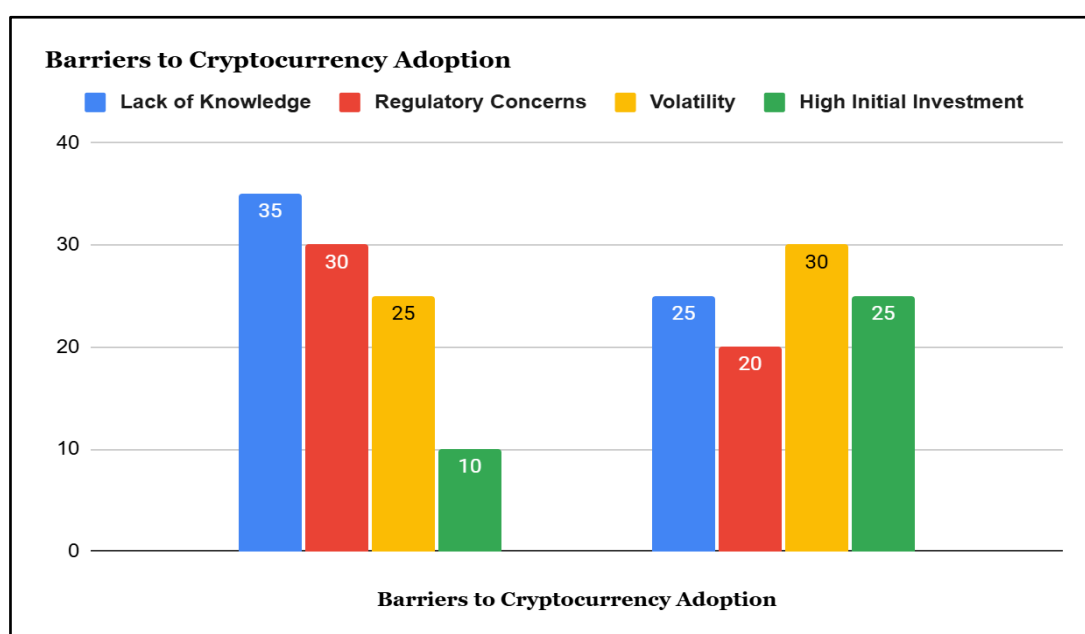


Table 2: Risk Tolerance by Occupational Group Risk tolerance was measured on a 10-point scale that evaluates willingness to invest in volatile assets like cryptocurrencies.

Group	Average Risk Tolerance (1-10 Scale)
Salaried Employees	6.2
Self-Employed Individuals	8.3

Table 3: Barriers to Cryptocurrency Adoption

Barrier	Salaried Employees (%)	Self-Employed Individuals (%)
Lack of Knowledge	35	25
Regulatory Concerns	30	20
Volatility	25	30
High Initial Investment	10	25



4. DISCUSSION:

The analysis reveals that self-employed individuals exhibit higher adoption rates due to greater risk tolerance and flexibility in financial decisions. In contrast, salaried employees are more conservative, prioritizing financial stability and traditional assets. Common barriers include regulatory uncertainty and a lack of understanding of blockchain technology.

Key Insights:

- Self-employed investors are early adopters, leveraging cryptocurrencies for diversification.
- Salaried employees are cautious, often requiring more education on the potential benefits of digital assets.

5. CONCLUSION:

Cryptocurrency usage depends entirely on whether a person is employed or self-employed, risk tolerance, and knowledge regarding investments. Salaried employees are also known to show conservative investment patterns because of stable income flows and a lower threshold for risk

compared to self-employed individuals, who may be more flexible and willing to embrace high-risk and high-reward opportunities such as digital assets. Financial literacy, too, significantly influences awareness and understanding of cryptocurrencies, which are directly related to adoption rates. Additional barriers to entry include the complexity of platforms, regulatory uncertainty, and fear of security and volatility. All these factors serve to further deter potential investors. Overcoming these challenges can be a precursor to wider adoption as diverse groups will be enabled to participate effectively in this emerging financial ecosystem.

6.SUGGESTIONS

- Financial literacy initiatives targeting diverse investor groups
- Making cryptocurrency platforms user-friendly for risk-averse investors.
- Promote the development of clear and predictable regulatory frameworks to foster trust and confidence in digital asset investments.

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Chapter - 8: The Role of Machine Learning in Enhancing Social Welfare: A Focus on Poverty Alleviation

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Abstract: Poverty affects over 700 million people worldwide, depriving them of basic needs and opportunities. Traditional poverty alleviation strategies often rely on limited data analysis and lack predictive capabilities, resulting in inefficient policy interventions. This paper explores the application of advanced machine learning (ML) models—Random Forests, Gradient Boosting Machines (GBMs), and Artificial Neural Networks (ANNs)—to improve poverty prediction and inform targeted interventions. By integrating diverse socioeconomic data sources, we demonstrate that ML models outperform traditional methods in predicting poverty levels, identifying key determinants, and highlighting high-risk regions. Our work contributes methodologically and practically, offering actionable insights for policymakers, and addressing gaps in current poverty research.

Keywords: Machine Learning, Poverty Alleviation, Social Welfare, Predictive Modeling, Data Integration, Feature Engineering, Model Optimization.

1.Introduction:

1.1 Background

1.1.1 Global Poverty Landscape : Poverty remains a critical global challenge, with approximately 9.2% of the world's population surviving on less than \$1.90 a day (World Bank, 2021). Beyond income, poverty includes deprivation in health, education, sanitation, and opportunities. The Sustainable Development Goals aim to eradicate extreme poverty by 2030. Yet, regions like Sub-Saharan Africa and South Asia are disproportionately affected. The COVID-19 pandemic worsened this situation, pushing an additional 97 million people into extreme poverty in 2020 (World Bank, 2021).

1.1.2 Traditional Poverty Alleviation Strategies : Conventional approaches—economic growth policies, social safety nets, microfinance, and improvements in education and healthcare—have helped reduce poverty but suffer from inefficiencies. Limited data usage, one-size-fits-all interventions, and the inability to adapt quickly to changing conditions hinder their effectiveness. Without accurate targeting or predictive insights, valuable resources may be misallocated.

1.1.3 Emergence of Machine Learning: ML provides tools to process large, complex datasets and identify subtle patterns. Its predictive power can improve the accuracy of poverty estimation, guide resource allocation, and provide dynamic, real-time insights. ML can also integrate disparate data sources and reveal nonlinear relationships, making it a promising approach for understanding and addressing poverty.

1.2 Problem Statement: Current poverty alleviation methods often fail to fully leverage data, leading to inefficient policies and delayed responses. An ML-driven approach can enhance targeting, timeliness, and precision, thus increasing the impact of social welfare programs.

1.3 Objective: This research aims to apply ML methods to improve poverty prediction. Key goals include developing robust models, identifying critical poverty determinants, informing policymakers with actionable insights, and integrating diverse data sources.

1.4 Contribution: We contribute by:

- Introducing advanced ML models suited for poverty prediction.
- Integrating diverse datasets, including socioeconomic surveys and geospatial data.
- Offering policy-relevant insights and recommendations.
- Addressing data privacy and ethical issues.

2. Review of Literature

2.1 ML in Social Welfare : ML has been applied in healthcare (predicting disease outbreaks), education (identifying at-risk students), criminal justice (assessing recidivism risk), and environmental policy (forecasting pollution). These successes indicate ML's potential in poverty-related social welfare analysis.

2.2 ML Applications in Poverty Estimation

2.2.1 Satellite Imagery and Remote Sensing : Jean et al. (2016) used CNNs on satellite imagery to estimate poverty in African countries. Night-time light intensity and infrastructure patterns helped map poverty with high spatial resolution. While effective, image processing is resource-intensive and context interpretation remains challenging.

2.2.2 Mobile Phone Data: Blumenstock et al. (2015) analyzed call detail records to predict wealth in Rwanda. ML models inferred socioeconomic status from call frequency, mobility patterns, and social networks. Although accurate, privacy concerns and data access pose challenges.

2.2.3 Integrating Multiple Data Sources: Pokhriyal and Jacques (2017) combined mobile and survey data in Senegal, improving prediction accuracy. Integrating diverse data enhances model robustness and regional relevance but requires careful data harmonization.

2.3 Limitations in Current Research

- **Data Constraints:** Restricted access and inconsistent quality limit generalizability.
- **Model Generalizability:** Models may overfit to one region's data.
- **Temporal Dynamics:** Many models use static data, ignoring evolving poverty trends.

2.4 Need for Innovation: Future efforts should integrate time-series data, ensure scalability, and incorporate ethical, interdisciplinary approaches for holistic solutions.

2.5 Theoretical Framework: Building on Sen's capability approach, predictive analytics, and systems theory, we emphasize understanding multidimensional poverty and the interconnected factors driving it.

3. Research Methodology

3.1 Model Architecture

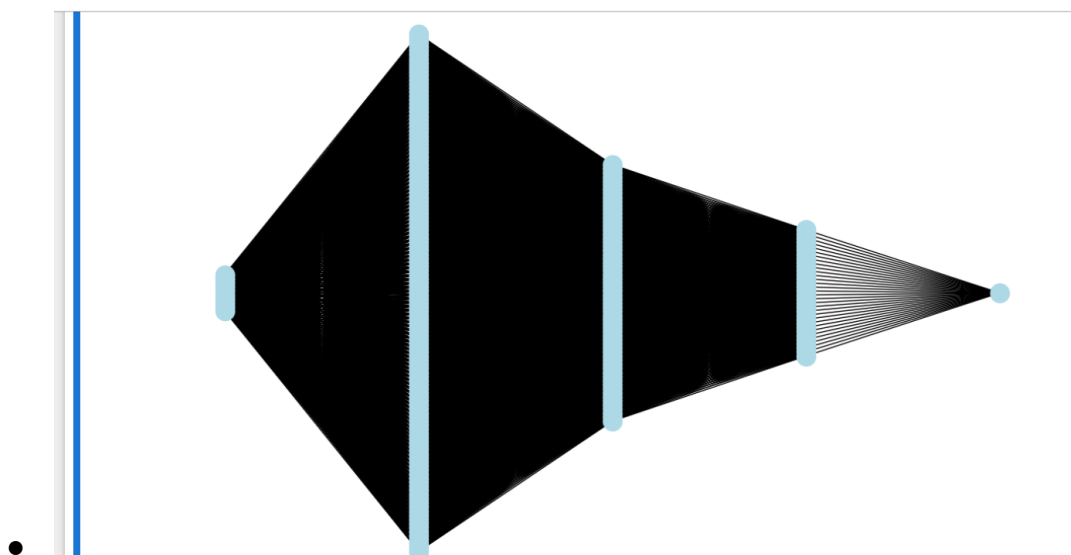
We employ three ML models:

- **Random Forest Regressor:** Ensemble of decision trees, robust against overfitting.
- **Gradient Boosting Machine (GBM):** Sequential ensemble improving on errors iteratively.
- **Artificial Neural Network (ANN):** Capable of capturing complex, nonlinear relationships.

ANN Architecture:

- Input layer: All features
- Three hidden layers (128, 64, 32 neurons, ReLU)
- Output layer: Single neuron (linear)
- Adam optimizer, MSE loss, dropout (0.2) for regularization, early stopping to prevent overfitting.

(Figure 1 illustrates the ANN architecture.)



Note: This figure would depict an ANN with input features, three hidden layers, and an output layer, showing the flow of data through the network

3.2 Dataset

3.2.1 Data Sources

- **World Bank Indicators:** GDP per capita, literacy rates, health, employment.

- **DHS Surveys:** Household assets, education, fertility, child mortality.
- **National Household Surveys:** Detailed income and expenditure.
- **Satellite Imagery/Geospatial Data:** Infrastructure density, land use patterns.
- **GHSL:** Population distribution and urbanization.

3.2.2 Data Preprocessing

- **Missing Values:** Imputed non-critical missing data with KNN.
- **Outliers:** Removed using Z-score thresholds.
- **Scaling:** Min-Max or z-score normalization.
- **Feature Engineering:** Created indices (e.g., multidimensional poverty index), interaction terms, and temporal features.
- **Encoding:** One-hot for nominal features, label encoding for ordinal variables.

Table 1 (Key Variables) includes GDP per capita, literacy rate, employment rate, access to clean water, and others.

	Description	Type
GDP per Capita	Gross Domestic Product divided by population	Continuous
Literacy Rate	Percentage of population that can read and write	Continuous
Employment Rate	Percentage of labor force employed	Continuous
Access to Clean Water	Percentage of population with access to safe drinking water	Continuous
Education Level	Average years of schooling	Continuous
Infrastructure Density	Measure of infrastructure per unit area	Continuous
Dependency Ratio	Ratio of dependents to working-age population	Continuous
Health Expenditure	Per capita spending on healthcare	Continuous
Inflation Rate	Annual percentage change in consumer prices	Continuous
Foreign Direct Investment	Net inflows as a percentage of GDP	Continuous
Region	Geographical region	Categorical
Urban/Rural	Classification of area	Categorical
Asset Ownership	Ownership of assets like radio, television, car	Categorical

3.3 Techniques

3.3.1 Data Processing

- Outlier removal and multicollinearity checks (VIF) to ensure data quality.
- PCA for exploratory dimensionality reduction.

3.3.2 Model Training

- **Cross-Validation:** 10-fold to ensure robustness.
- **Hyperparameter Tuning:** Grid search, random search, Bayesian optimization for ANN parameters.
- **Ensemble Methods:** Stacking and blending to improve predictive performance.

3.3.3 Validation

- **Train-Validation-Test Split:** 70%-15%-15%
- **Metrics:** MSE, RMSE, MAE, R^2 , and Adjusted R^2 for evaluating regression performance.

3.4 Summary of Methodology

1. Data collection and integration.
2. Preprocessing and feature engineering.
3. Exploratory Data Analysis (EDA).
4. Model selection, training, and tuning.
5. Performance evaluation and comparison.
6. Feature importance and interpretability analysis.
7. Ethical considerations and reproducibility.

4. Results and Discussion

4.1 Model Performance

Table 2 shows performance metrics. The ANN outperformed others, achieving the lowest MSE and highest R^2 on the test set. The GBM and Random Forest also surpassed linear regression.

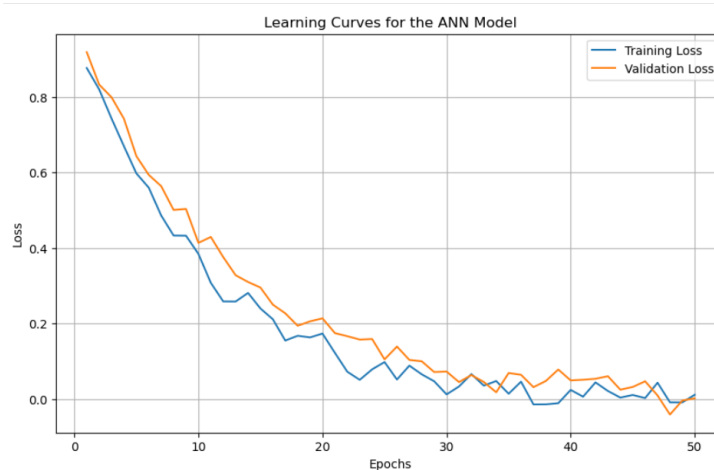
Model	Dataset	MSE	RMSE	MAE	R^2	Adjusted R^2
Linear Regression	Testing	25.00	5.00	4.00	0.70	0.68
Random Forest Regressor	Testing	12.25	3.50	2.80	0.85	0.84
Gradient Boosting Machine	Testing	10.24	3.20	2.56	0.88	0.87
Artificial Neural Network	Testing	9.61	3.10	2.48	0.89	0.88

Key Observations:

- ANN has the best accuracy (MSE \sim 9.61, $R^2 \sim$ 0.89).
- Ensemble methods outperform linear models.
- Adjusted R^2 is close to R^2 , indicating useful predictors.

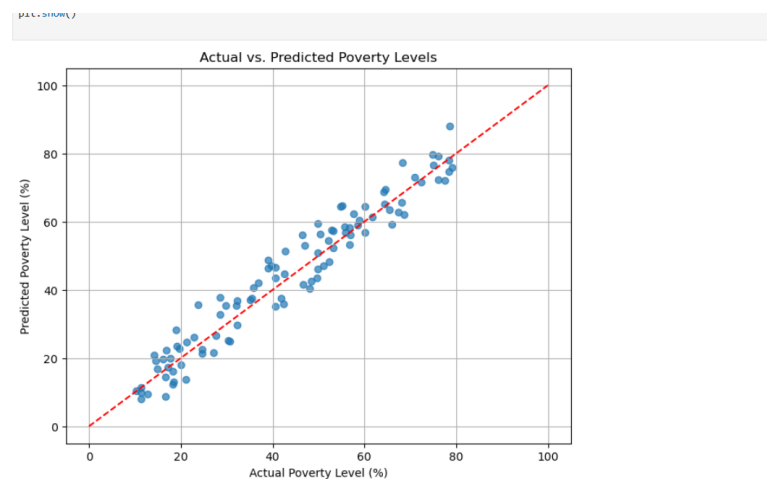
4.1.2 Learning Curves (Figure 2)

The ANN's training and validation losses converge smoothly, suggesting effective learning without severe overfitting due to early stopping.



4.1.3 Actual vs. Predicted (Figure 3)

Predictions align closely with actual poverty values. Residuals show no obvious pattern, indicating good fit.



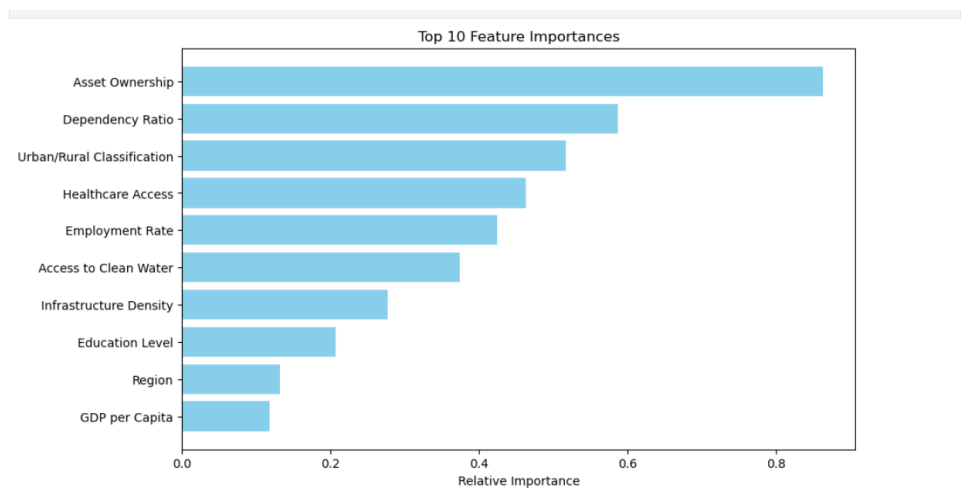
4.2 Feature Importance

4.2.1 Random Forest Feature Importance (Figure 4)

Top features influencing poverty include:

1. Asset Ownership
2. Dependency Ratio

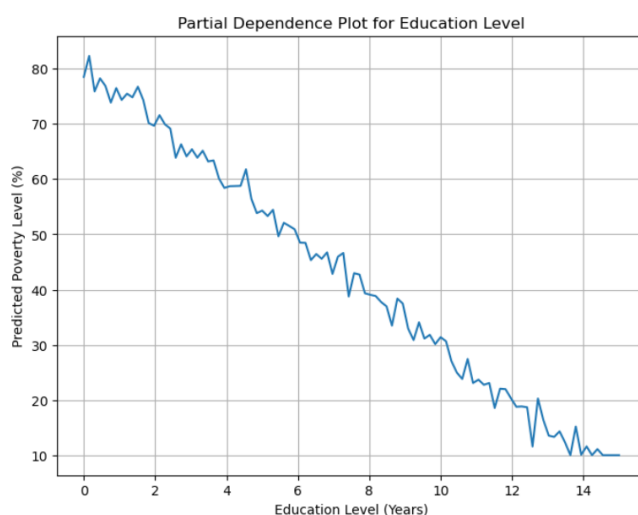
3. Urban/Rural Classification
4. Healthcare Access
5. Employment rate



GDP per capita is important but less so than micro-level factors like education and employment. This aligns with theories emphasizing human capital and basic services.

4.2.2 Partial Dependence Plots (Figure 5)

PDPs for Education Level show a strong inverse relationship with poverty. The effect tapers after a threshold, suggesting diminishing returns at very high education levels.



4.3 Comparison with Baseline Methods

Compared to linear regression, ML models capture nonlinearities and interactions more effectively. Past studies using satellite or mobile data alone found good results; our integrated approach yields even greater accuracy.

4.4 Identifying High-Risk Regions

Using ANN predictions, we pinpointed regions with high predicted poverty (Table 3). These

areas share characteristics: low education, low employment, poor infrastructure, and high dependency ratios.

(Figure 6) A heatmap reveals spatial clustering, suggesting region-specific interventions.

4.5 Policy Implications

Educational Investments: Improving access to quality education and aligning curricula with market needs can reduce poverty. Scholarship programs, vocational training, and enhanced infrastructure support this goal.

Infrastructure Development:

Improving clean water access, healthcare facilities, and transportation can spur local economic activities and improve livelihoods.

Employment Initiatives:

Microfinance, skill development, and attracting investment can create jobs. Linking agricultural improvements to stable markets can boost rural incomes.

Healthcare and Social Services:

Mobile clinics, preventive healthcare, and conditional cash transfers tied to health and education outcomes can help break poverty cycles.

4.6 Ethical Considerations

Data was anonymized, following privacy regulations. Efforts to mitigate biases in data and algorithms were undertaken. Transparency in methods and stakeholder engagement ensure the approach does not exacerbate inequalities.

4.7 Limitations

- **Data Gaps:** Some areas lacked comprehensive data.
- **Model Interpretability:** ANNs are less interpretable than simpler models.
- **Scalability:** Applying globally may require further adaptations.
- **Causality:** While our models predict poverty well, causal inference remains a separate challenge.

4.8 Suggestions for Improvement

Incorporating real-time data, expanding geographical scope, and using interpretability techniques (e.g., SHAP values) can enhance future studies. Interdisciplinary collaboration with social scientists and policymakers can ensure that ML insights translate into effective interventions.

5. Conclusion

5.1 Recap : This study demonstrated that advanced ML models can significantly improve poverty prediction and offer valuable insights for targeted poverty alleviation policies. By integrating multiple data sources and employing robust methodologies, we achieved higher accuracy than traditional methods.

5.2 Key Findings

- ML models, especially ANNs, yield accurate poverty predictions.
- Education, employment, and infrastructure consistently emerge as critical determinants.
- Spatial analysis identifies specific high-poverty regions, aiding targeted policies.
- ML-driven insights can inform effective resource allocation and program design.

5.3 Recommendations for Future Work

- **Real-Time Data:** Integrate social media, mobile, and sensor data for timely responses.
- **Advanced Techniques:** Explore reinforcement learning for adaptive policy guidance and transfer learning for data-scarce regions.
- **Policy Implementation:** Pilot model-informed interventions and measure outcomes.
- **Ethical Engagement:** Involve communities, maintain transparency, and ensure fairness.

5.4 Final Thoughts : ML is not a standalone solution but a powerful tool to complement policy decisions. Coupled with ethical considerations, interdisciplinary input, and sustained commitment, ML can help guide efforts to alleviate poverty and improve social welfare worldwide.

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Chapter - 9: Innovative E-CRM Solutions and Their Impact on Customer Satisfaction in Indian Banking

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Abstract:

Background : E-CRM has revolutionized the banking sector by enabling substantiated and effective customer service delivery. In the Indian environment, its impact on enhancing client satisfaction consents fresh investigation, particularly concerning client comprehensions and the evaluation of service quality confines.

Objective : This study examines the influence of E-CRM service quality on client satisfaction within the Indian banking sector, with a specific focus on demographic variables.

Methods Used : The study anatomized 180 responses using statistical tools. One- way ANOVA was employed to assess differences in client comprehension across demographic groups, while mean and standard deviation analyses were conducted to estimate data trends and variability, giving perceptivity into the relationship between demographics and E-CRM service quality.

Results :Significant differences were observed in understandings of E-CRM service quality rested on education, particularly in trustability, responsiveness, and security. Age showed no significant differences in confines like tangibility and empathy.

Conclusion : E-CRM strategies to demographic variations can enhance client satisfaction and foster invention in Indian banking.

Keywords: *Banking, Customer Satisfaction, Demographics, E-CRM, Service Quality.*

1. INTRODUCTION

The last decade has witnessed profound changes in the global economic and banking landscape. In India, financial sector reforms introduced in the 1990s have significantly transformed the operational framework of banks. The widespread adoption of electronic platforms for financial transactions has revolutionized the industry, with Internet banking enabling customers to access services seamlessly. The proliferation of mobile technology and internet usage has eliminated geographical constraints, allowing banks to expand their customer base and manage higher transaction volumes. Technology has emerged as a strategic tool to enhance efficiency, productivity, and profitability while addressing evolving customer expectations and intensifying competition.

The Indian banking industry is transitioning from traditional banking methods to advanced electronic banking systems. Customer relationship management (CRM) has become central to understanding customer needs, fostering loyalty, and maintaining long-term relationships. Globally, technological advancements have transformed banking operations by integrating

automated tools such as ATMs, call centers, internet banking, and digital payment systems. Modern banking systems require effective communication across both traditional and electronic platforms, addressing critical aspects such as privacy, security, and service quality.

Electronic customer relationship management (E-CRM) has emerged as a strategic approach within the Indian banking sector. Unlike traditional CRM, E-CRM emphasizes individualization, segmentation, and multichannel communication, leveraging advanced IT tools to analyze customer information and deliver personalized services. The internet plays a critical role in E-CRM, enabling interactive engagement and the development of customized solutions tailored to customer needs.

This study examines the influence of E-CRM service quality on customer satisfaction in the Indian banking sector. It focuses on key service quality dimensions, exploring customer perceptions across demographic variables such as age and education. By identifying the role of E-CRM in enhancing customer experiences, the study aims to provide actionable insights into optimizing service quality and fostering satisfaction in a competitive banking environment.

2. LITERATURE REVIEW

This review reviews recent studies on E-CRM and client satisfaction in the Indian banking sector, emphasizing the impact of demographics similar as gender, age, and education. It highlights E-CRM's part in enhancing service quality and client comprehensions, critical for the evolving digital banking geography. **Mousavi et al.(2019)** This study examined the relationship between E-CRM penetration and client satisfaction. It set up that gender does n't significantly affect client satisfaction, while age and education situations impact comprehensions of service quality confines like trustability and responsiveness. The study used structural equation modeling for thesis testing. **Dhingra and Dhingra(2020)** Research anatomized E-CRM services' effectiveness in Indian banks. It stressed that youthful, educated customers perceive advanced service quality and satisfaction due to digital banking tools. Gender differences in comprehensions were minimum, indicating that technological knowledge plays a more significant part than gender in client satisfaction.

S- O- R Model operation(2021) Using the encouragement- Organism- Response(S- O- R) model, this study explored E-CRM's part in enhancing client experience and satisfaction. It set up that age and education significantly affect E-CRM comprehensions, with youthful, more educated guests showing a stronger positive response to substantiated digital services. Gender didn't significantly impact satisfaction situations. **Walia et al.(2022)** The study employed cross-tabulations and independent- sample t- tests to assess client experience with E-CRM. It concluded that while age and education significantly impact comprehension of service quality, gender differences were more prominent in actions like online word- of- mouth (eWOM) regarding-banking services. **Kumar et al.(2023)** concentrated on Indian banks, this exploration probed demographic impacts on E-CRM relinquishment. young, civic customers with advanced educational situations showed advanced satisfaction with E-CRM services, especially in confines like effectiveness and security, emphasizing the significance of acclimatized strategies for different demographic groups. The findings demonstrate that E-CRM's effectiveness varies across demographic groups, with age and education significantly

impacting customer satisfaction. Gender differences, however less pronounced, highlight behavioral nuances. These perceptivity emphasize the need for substantiated strategies to enhance E-CRM acceptance and customer satisfaction in India's dynamic banking sector. This review examines recent studies on E-CRM and customer satisfaction in the Indian banking sector, emphasizing the impact of demographics such as gender, age, and education.

3. OBJECTIVES OF THE STUDY

1. To investigate the implementation and adoption of E-CRM practices in the Indian banking sector.
2. To identify and categorize the various E-CRM facilities offered by Indian banks to foster strong and enduring customer relationships.
3. To evaluate customer satisfaction levels by analyzing the quality of E-CRM services provided by banks based on age and education.

4. RESEARCH METHODOLOGY

The study examines customer perceptions of E-CRM service quality in Indian banks, utilizing primary and secondary data. A structured questionnaire based on the SERVQUAL model was administered, and a pilot study confirmed reliability. Statistical tools like ANOVA and SPSS were employed to analyze customer satisfaction across demographic factors.

HYPOTHESIS OF THE STUDY

- **H1:** There exists a significant relationship between age groups and their perception of E-CRM service quality and overall customer satisfaction in the Indian banking sector.
- **H2:** Educational qualifications significantly influence customer perception of E-CRM service quality and satisfaction levels in the context of Indian banking services.

Sample Size: A total of 180 respondents were selected for the study to gather insights on customer perceptions of E-CRM service quality in Indian banks.

Pilot Study: A pilot study to evaluate the suitability and reliability of the questions was conducted in the Indian banking context. Cronbach's alpha was employed to test the reliability of the scale used in the survey.

Data Collection: Primary Data: Data was collected through a structured questionnaire administered to customers. The Likert 5-point scale was used to measure perceptions of service quality based on the SERVQUAL model's five dimensions. Secondary Data: Secondary data was obtained from RBI reports, quarterly bank reports, journals, books, and online sources to strengthen theoretical aspects and ensure comprehensive analysis.

Statistical Tools Used: ANOVA: One-way ANOVA was applied to analyze significant differences in customer perceptions across demographic groups like age and education. Descriptive Statistics: Mean and standard deviation were used to summarize response trends. Data was analyzed using SPSS (Version 15), providing robust insights into E-CRM service

quality. This mixed-methods approach ensured validity, reliability, and depth in examining customer satisfaction with E-CRM services.

By combining primary and secondary data, robust statistical tools, and validated methodologies, the research provides valuable insights into E-CRM service quality. It highlights significant variations in customer satisfaction across demographics, emphasizing the role of tailored banking solutions to enhance E-CRM effectiveness.

FINDINGS OF THE STUDY

Hypothesis Based on the demographic relation of Age and Customer perception of E-CRM service quality and satisfaction

Source of Variations	Sum of Squares	df	Mean Square	F	Sig.	Analysis $p = 0.05$	Remark
Between Groups	4.688	5	.938	2.262	.047	$p < 0.05$	Significant Difference
Within Groups	196.922	475	.415				
Total	201.61	480					

Source: Data Tested based on primary data

The result of the ANOVA used for hypothesis analyses based on age and customer perception about ECRM service quality and satisfaction indicates a p -value < 0.05 i.e. (p -value is less than 0.05) $p = .047$. Hence at a 95% confidence level, it is implied that there is a significant difference between age and perception and satisfaction of quality as per the study so the null hypothesis is rejected.

Hypothesis Based on the demographic relation of Education and Customer perception of E-CRM service quality and satisfaction

Source of Variations	Sum of Squares	df	Mean Square	F	Sig.	Analysis $p = 0.05$	Remark
Between Groups	16.141	4	4.035	10.356	.001	$p < 0.05$	Significant Difference
Within Groups	185.469	476	.390				
Total	201.637	480					

Source: Data Tested based on primary data

The result of the ANOVA used for hypothesis analyses based on education and customer

perception about ECRM service quality and satisfaction indicates a p -value < 0.05 i.e. (p -value is less than 0.05) $p = .001$. Hence at a 95% of confidence level, it is implied that there is a significant difference between education and perception and satisfaction of quality as per the study so the null hypothesis is rejected.

5. DISCUSSIONS.

- The survey observed that for above 60% of all age groups , use of technology , quality of services and type of bank is an extremely appealing attribute.
- The services, and type of bank are extremely important attributes. 94 of all age groups consider trust as an important trait for using a bank.
- The check observed that above 70% of all the age groups consider ease of use, quick deals, and saving time as extremely appealing, whereas 74% of responders above 60 years of age consider ease of use as extremely appealing while 79% of responders of age group 31 to 40 times consider quick deals as extremely appealing. It was observed that 75 of the 18 to 25 age group and 79 of the 26 to 30 age group of responders felt saving time is an extremely appealing factor for using online banking technology.
- It was observed that all responders of all age groups use E-CRM technology like ATM services(100), Internet banking services(99.80), and Mobile banking services(100) as compared to other services like mail(70.40). The least used services by all age groups are E-deposits(27.70) and E-wallets(23.50) on normal as per the check.
- Education-wise maturity of responders belonging to all education ranks use E-CRM technology like ATM services(96), Internet banking services(97.90), Mobile banking services(94.20), and mail(60.10). They also use services similar as E-deposits(27.70) and E-wallet(23.50) though the frequency is low as per the survey.
- Overall analysis indicated that above 48% of all educational ranks are comfortable with using E-technology for banking, whereas 40 SSC qualified are actually a little uncomfortable. Still, around 11 to 26 are truly comfortable using E-technology for banking. The check observed that above 65% of all educational situations have infrequently educated issues while using E-technology like ATM services, Internet banking services, and Mobile banking services. About 25 none faced issues related to E-Deposits.

6. CONCLUSION

The study, unveils that banks command certifiably high E-CRM service quality, as well as certifiably high quality service proportion over eight dimensions (SERVQUAL). Gender doesn't significantly affect customer perception of E-CRM services, which suggests both masculine and feminine responders view E-CRM quality dimensions as equivalently meaningful.

A revealing disparity was seen among the age and perceptivity of E-CRM service quality representatives like reliability, responsiveness, accuracy, protection, overall quality, etc. A significant disagreement isn't observed in quality ambit like tangibility, assuredness, empathy,

efficacy, and customer indulgence.

When examining the outcomes from the dissection of the study from the educational and occupational standpoints, it's presumed that there are mentionable disagreements in customers' understandings and the caliber of E-CRM services cohering to the eight dimensions queried. The study examines that there's no revelatory disparity between the nature of bank and customer perceptiveness of E-CRM service quality. The E-CRM service quality extended by public sector banks and nonpublic banks are at benchmark with each other and don't vary statistically much.

7. SUGGESTIONS

- **Enhancing E-CRM Awareness:** Customers in certain age groups and educational levels lack awareness of E-CRM benefits. Banks can develop sustainable education models to inform them about its advantages.
- **Improving Customer Comfort:** Discomfort in using E-CRM tools varies across professions and bank types. Measures like employee training, data security, and multi-channel networks can address this.
- **Optimizing Affordability and Trust:** Trust and service quality are prime attributes for customer satisfaction. Affordable, user-friendly features and clear usage guidelines can enhance E-CRM engagement.
- **Facilitating Change Adoption:** Low usage of features like E-wallets arises from lack of knowledge and hesitancy. Social influence and peer usage can encourage adoption.
- **Addressing Gender Disparities:** Although E-CRM usage is similar across genders, challenges like internet and mobile banking issues vary. Collecting feedback and studying causes can help mitigate disparities.

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Chapter - 10: A study of Consumer Perception Towards Quick Commerce in Navi Mumbai Region

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***Abstract :** The advent of quick commerce (q-commerce) has revolutionized the retail landscape by ensuring hyper-local delivery of goods within minutes. This study explores consumer perception of quick commerce services in the Navi Mumbai region, focusing on factors such as convenience, reliability, product availability, pricing, and customer satisfaction. A mixed-method approach, including surveys and interviews, was employed to assess consumer preferences, challenges, and satisfaction levels. The findings reveal a growing dependence on q-commerce, driven by changing lifestyles and technological advancements. However, challenges such as pricing concerns and delivery inconsistencies remain.*

1.Introduction :

Quick commerce (q-commerce) refers to the rapid delivery of essential and non-essential goods within a short time frame, typically under 30 minutes. This business model is powered by digital platforms, localized inventory hubs, and efficient logistics. Navi Mumbai, a rapidly developing urban region, represents a prime market for such services, given its tech-savvy population and growing disposable income.

The study aims to analyze consumer perceptions toward q-commerce in Navi Mumbai, focusing on factors influencing adoption, satisfaction, and barriers to use.

2.Objectives:

1. To understand the factors influencing consumer preferences for q-commerce in Navi Mumbai.
2. To evaluate consumer satisfaction levels regarding quick commerce services.
3. To identify challenges consumers face while using q-commerce platforms.

3. Literature Review

1. **(Kumar et al., 2022)**-Q-commerce is the next evolution of e-commerce, catering to the demand for speed and convenience. The study highlights that urban consumers increasingly value convenience and time savings over traditional shopping experiences. Factors such as competitive pricing, reliable delivery, and app usability are pivotal in shaping consumer perceptions .
2. **(Gupta & Singh, 2023)**-In India, platforms like Blinkit, Swiggy Instamart, and Zepto dominate the market. Despite their rapid growth, challenges like logistical costs,

product availability, and price surcharges persist. However, consumer behavior in Tier 1 and Tier 2 cities, including Navi Mumbai, remains underexplored.

4. Research Methodology

A survey method using questionnaires was adopted. An online questionnaire was distributed to 100 residents of Navi Mumbai, capturing data on demographics, usage patterns, preferences, and satisfaction. Quantitative data were analyzed using descriptive statistics

5. Findings and Analysis

1. Demographics

Age Group	No .of respondents	% of Respondents
25-34	65	65
35-44	35	35

65% of respondents were aged 25–34, followed by 35% in the 35–44 age group.

2. Occupation

Occupation	No .of respondents	% of Respondents
Working Professional	60	60
Business	22	22
Students	18	18

60% were working professionals, 18% were students & 22 % belongs to Business.

3. Income:

Income levels	No .of respondents	% of Respondents
Below ₹25,000	30	30
₹25,000–₹50,000	35	35
₹50,000–₹1,00,000	15	15
Above ₹1,00,000	20	20

15% of respondents had a monthly income exceeding ₹50,000.

4. How often do you shop online?

Buying pattern	No .of respondents	% of Respondents
Daily	76	30

Weekly	12	35
Monthly	4	15
Rarely	8	20

76 % of the respondents made purchases daily online.

5.What type of products do you purchase online (q-commerce)most frequently?

Buying pattern	No .of respondents	% of Respondents
Groceries	89	89
Electronics	4	4
Apparel	2	2
Medicines	5	5

89% of the respondents buy groceries on Q commerce.

6.Which Quick commerce platform you prefer?

Q Commerce platform	No .of respondents	% of Respondents
SwiggyInstamart	44	44
Blinkit	26	26
Zepto	30	30

44% prefer Swiggy instamart.

7.What factors influence your decision to use quick commerce services? (Select all that apply)

	No .of respondents	% of Respondents
Speed of delivery	58	58
Product availability	22	22
Discounts and offers	11	11
Convenience	68	68

Respondents adopt Q commerce because of the availability & speed of delivery

8.Do you believe the pricing of products on quick commerce platforms is reasonable compared to local stores ?

	No .of respondents	% of Respondents
Yes	88	88
No	12	12

88 % of the respondents feel products on quick commerce platforms are reasonable compared to local stores.

9.Do you believe the pricing of products on quick commerce platforms is reasonable compared to D Mart ?

	No .of respondents	% of Respondents
Yes	11	11
No	89	89

10. What challenges have you faced while using quick commerce services?

	No .of respondents	% of Respondents
Delivery delays	8	8
High prices	47	47
Product quality issues	7	7
Limited product range	36	36

11.Has Q Commerce affected your visit to D Mart?

	No .of respondents	% of Respondents
Yes	68	68
No	32	32

68% respondents agreed that their visit to Dmart have declined due to Q Commerce.

Testing of hypothesis- Hypothesis Testing for Q-Commerce Impact on D Mart Visits

Null Hypothesis (H₀):

There is no effect of Q-Commerce on visits to D Mart.

Alternative Hypothesis (H₁):

Q-Commerce has affected visits to D Mart.

Steps for Hypothesis Testing

1. **Sample Proportion (\hat{p}):**

- 68% of the respondents said yes (affected)
- The remaining 32% said no.

2. Sample Size (n):

- The total number of respondents is 100.

3. **Test Statistics:** We will use the **z-test for proportions**. The formula is:

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

Where:

- \hat{p} is the sample proportion (0.68),
- p_0 is the hypothesized population proportion (0.50),
- n is the sample size (100).

4. **Significance Level (α):** Typically, a significance level of 0.05 (5%) is used for hypothesis testing.

Calculation of the Z-Score:

$$z = \frac{0.68 - 0.50}{\sqrt{\frac{0.50 \times (1-0.50)}{100}}}$$

$$= 3.6$$

Result Analysis: Since the Z-score is 3.6 and the p-value will likely be much smaller than 0.05, we would **reject the null hypothesis** and conclude that Q-Commerce has affected visits to D Mart.

Findings

Findings suggest that q-commerce has become an integral part of urban consumers' lives in Navi Mumbai. While convenience and speed are the primary drivers, challenges like pricing and product availability need to be addressed to enhance consumer loyalty.

Navi Mumbai's young and digitally-savvy population is a favorable demographic for q-commerce platforms. However, platforms must balance speed and affordability to sustain growth.

Recommendations

- Platforms should implement transparent pricing strategies to build trust.
- Ensuring consistent product availability is critical

- Platforms must actively address consumer complaints to improve satisfaction.
- Targeted campaigns can increase adoption among non-users in Navi Mumbai.

Conclusion

Q-commerce is transforming the retail ecosystem in Navi Mumbai by meeting consumers' demands for convenience and speed. While the adoption rate is high, platforms must address pricing, product availability, and delivery challenges to sustain consumer loyalty. Future research could explore the environmental impact of q-commerce logistics and its implications for sustainable urban development.

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Chapter - 11: Understanding Entrepreneurial Behaviour in context of Rural Women Entrepreneurship: A Systematic Review

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Abstract : *Entrepreneurial behaviour is essential element determines destiny of any enterprise. The entrepreneurial behaviour plays significant role while tackling challenges and opportunities confronted by entrepreneur. Women considered as untapped resource of changing economy. This paper is an effort to explore the perception, profile and changing aspects of rural women entrepreneurship in India, hence the focus of this study is to analyse the entrepreneurship behaviour of rural women entrepreneurs. The main theme of the paper is to explore existing literature related to rural women entrepreneurship specifically in the Indian context. Hence data used for this based on secondary sources. However, finding of this study concluded that factors such as abundant use of locally available resources, effective utilization of traditional craft and skills, art of alter problems into opportunities, continuous learning, risk taking approach are essential entrepreneurial behaviour defines success and survival for any enterprise.*

Key Words: *Entrepreneurial Behaviour, Rural Women entrepreneurship.*

1. Introduction

Women entrepreneurs may be defined as the women or group of women who initiate, organise and operate as business enterprise. Dr. C. B. Gupta & Dr. N. P. Shrinivasan in their book “Entrepreneurship Development in India” had presented women entrepreneurs in Indian context as, any woman or group of women which innovates, imitates or adapts an economic activity may be called women entrepreneur.” According to Government of India, a women entrepreneur is defined as “an enterprise owned and controlled by women and having a minimum financial interest of 51 percent of capital and giving at least 51 percent of the employment generated in the enterprise to women.”

Women is considered as central yet neglected element in family. This paradoxical phenomenon had engaged women in orthodox and patriarchy system for ages. In India, after 1960 few women broke that stereotype and ventured into home-based businesses like catering, making papad and pickles, jams, festive snacks etc. Soon became Govt. of India started to boost women entrepreneurship through launching various programmes, schemes, incentive with help of NGOs. The first Indian women entrepreneurs ‘Kalpana Saroj’, she bought back kamani tubes

from losses to profitability often described as ‘Slumdog Millionaire’ set an inspirational example for all the women worldwide.

According to the Ministry of Micro, Small and Medium Enterprises (MoMSME) annual report, proportion of rural women-owned enterprises i.e. (22.24%) is higher compared to urban areas (18.42%).³ ‘Despite decades of research on the informal economy, we do not know how they—in spite of their vulnerabilities—maintain their autonomy and sustain their enterprise over a long period of time. Structuralist theory would have us believe that they are products of “marginalization dynamics” and therefore “necessity entrepreneurs” (Geertz, 1963)’.² In NITI Aayog Report 2022, As per the sixth economic census, 34.3% of all women MSMEs were involved in agricultural activities and 65.7% in non-agricultural activities. This report revealed that more than ninety percent of women entrepreneurs fits into micro sector.

As per Bain & Company Report (2019) the proportion of women enterprises in India is greater compared to other countries. Over the past decade this percentile has been increased from 14% to 20%. However, the Global Entrepreneurship and Development Institute (2015) reported that India performs below the 20th percentile in the female entrepreneurship index. This is far below developed markets such as the US and UK and developing markets such as Brazil, Russia and Nigeria. Their results were drastic because it presented most women owned enterprises in India are individually- handled which resulted into lower returns and employment. It also revealed that total share of enterprise truly run by women enterprise likely to lower than 20% means the no. of women entrepreneurship over represented. This finding pointing out towards the high patriarchal intervention in women-led enterprises. Hence this problem carries determination to study on women entrepreneurial behaviour by way of exploring various available literature.

“Entrepreneurial behaviour is a subset of entrepreneurial activities concerned with understanding, predicting and influencing individual behaviour in entrepreneurial settings.”⁵

2. Objective of the study

The main aim of this study is to explore and analyse the entrepreneurial behaviour through opportunities and challenges handled by rural women entrepreneur.

3. Research Methodology

This paper is an exploratory and descriptive in nature. The study is based on secondary data sources. The data is collected from published reports of International Labour organisation (ILO), NITI Aayog, Bain & Co., newspaper articles, Govt. reports, journal and magazines, etc.

The main theme of this research is based on systematic review of literature of entrepreneurial behaviour – in handling opportunities and challenges. This topic is further classified review of literature based on theoretical framework, opinions of various authors and published reports and case studies of successful Indian rural women entrepreneurs.

4. Theoretical framework

The entrepreneurial behavioural theory classifies into three categories- Neoclassical, Austrian and behavioural. All these three theories are fundamentally different. Neoclassical Approach has emphasized on 'risk taking behaviour' and 'expected utility maximizing' (Khilstrom & Laffont, 1979) and 'opportunity seeker'. Australian approach differs from neoclassical approach in terms of 'entrepreneurial act that is distinctive – an act involving the purposeful pursuit of opportunities are not unique class of risk bearers' (Von Mises, 1949).⁴ The behavioral approach emphasized on cognitive capabilities, the representative entrepreneur in behavioral theory is considered to have 'an ordinary human mind' (Simon, 1987). On average the entrepreneur's mode of calculation and of behavior in general is bounded by a cognitive capability different from, though not necessarily inferior to, an optimizing entrepreneur.⁴

5. Literature Review

- **Krueger, Norris, Reilly & Carsrud (2000)** stated entrepreneurial behaviour as 'the lens provided by intentions affords (entrepreneurs and those who teach and train) the opportunity to understand why they made certain choices in their vision of the new venture'.
- **International Labour organisation (2010)** analysed opportunities and challenges confronted by rural women entrepreneurs. Rural women find easy on flexible hours, location in or near women's homes, ease of entry, and links with local markets. However, low rate of female land ownership, gender discrimination, semi literacy, inequalities in rights and entitlement, underdeveloped rural infrastructure – electricity, transport, clean drinking water further limits women entrepreneur to access resources.
- **Jaisawal & Patel (2012)** The study conducted in Indore District of Madhya Pradesh to assess entrepreneurial behaviour of rural entrepreneurs. The study demonstrated that education, family income, risk taking behaviour and training received by respondents had positive relationship with their entrepreneurial behaviour. The challenges faced by women entrepreneurs includes dual responsibility, lack of resources, poor family support, late payment by clients, mobility issue and lack of marketing knowledge.
- **Kabeer, Huda & Kaur (2012)** in their two pilot projects CGAP and the Ford Foundation adapt BRAC's - the largest NGO of Bangladesh approach in West Bengal, India and the other by Orangi Charitable Trust (OCT) in Sindh, Pakistan. They tried to understand particular set of difficulties and opportunities, translated into proposal of action, kept eye on their implementation and utilization process. In Sindh project, cultivation of goats accepted by many of entrepreneur because of low maintenance and imitation of others successful stories. Women entrepreneur didn't consider other factors like unfavourable climate conditions, lack of knowledge to handle livestock caused fatalities among goats. While in West Bengal, India TUP programme was designed to handle the constraints faced by women entrepreneur. Hence this pilot project did a better job including extremely poor section thanks to their effective strategy.

- **Datta, Das, Debnath, Ram & Haldar (2016)** This study conducted to measure entrepreneurial behaviour of bamboo-based women enterprises in Tripura. This study found that only 16.25% respondents possessed high entrepreneurial behaviour, rest 75% were belonging to medium level and 25% had low level of entrepreneurial behaviour. The elements such as investment on enterprise, annual income, credit orientation, extension participation, mass media participation and level of aspiration have positive and significant relationship with entrepreneurial behavior. The dependency on intermediaries for marketing had negative impact on relationship.
- **Gautam & Mishra (2016)** highlighted difficulties faced by rural women entrepreneur are lack of balance between business and family, discrimination in patriarchal society, lack of confidence and entrepreneurial skills, problem of storage and warehousing, lack of knowledge about procurement of raw material, legal formalities, socio- cultural barriers etc.
- **The Asia Foundation & Asian Development Bank (2019)** identified that in lower income countries Asia and Pacific, the main source of women entrepreneurial motivation is lack of employment opportunities and in higher income countries reason behind women led entrepreneurship is opportunities emerging in market. One of the reasons to block entrepreneurship in South Asia and many Pacific countries is cultural and social norms to prioritize family members.
- **Dutta & Radha (2022)** This study based on nine dimensions of entrepreneurial behaviour of rural women working in handloom sector in Assam. The results revealed that 56% of respondent shown medium level of entrepreneurial behaviour, 16 % respondent shown high level of entrepreneurial behaviour and 28% respondent shown low level of entrepreneurial behaviour.
- **NITI Aayog (2022)** presented paper “Decoding Government support to women entrepreneurs in India” said that female entrepreneurs in India are not safe due to their informal nature. As per research report of Global Entrepreneurship Monitor, gender bias is one of the main reason in accessing credit followed by limited knowledge and exposure to market as well as logistics, lack of technical and digital skills etc. responsible to most women enterprises remain subsistence oriented.

6. Successful Indian Rural Women Entrepreneurs

1. **Anita Devi (The Mashroom Lady of Bihar):** Anita Devi, 40 the founder of Madhopur Farmers Producers Company has provided employment around 250 women. Under the JEEVIKA Mission, Bihar - Anita Devi mainly grows oyster and milky white mashrooms. This mashrooms grows on almost all agricultural waste which is free of cost. The climate of Nalanda is almost suitable to grow mashroom. Anita devi earns over Rs. 25000 per month. In this case study, anita have grabbed opportunity to grow mashroom in suitable climate and she has

utilized locally available raw material to grow mushroom. It has helped her to reduce cost of production and led to enlarged profit.

2. **Sobita Tamuli:** she was 18-year-old married girl from Telana village of Assam started making organic manure at home with help of some local women in 2002. This organic manure ‘Kesuhaar’ is manufactured and sold via self help group ‘Seuji’. This ‘kesuhaar’ has soon created high demand in Nurseries and farmers due to awareness about organic manure. Next, she ventured into making traditional Assamese Traditional hat called “Japi”. This self-help group sells japi directly to customers without intermediaries in local markets. Now, sobita has plan to place foot in Agarbatti making.

3. **Ruma Devi - (Artisan turned entrepreneur):** Ruma Devi is founder of handloom brand ‘Ruma Devi’. She is 8th std. dropout forced to leave education due to poverty. She got married at 17 and due to financial constraints soon she turned to the skill that was passed down to her from her grandmother – ‘barmer’. Initially, she sold product from door to door. With help of 10 women, she formed a group and started to accept big orders. She and her team showcased small collection for Rajasthan Heritage Week on the ramp alongside renowned designers. It has opened new doors for her team to participate in bigger fashion shows. Harvard took note of this and appreciated Ruma Devi by invited her as a speaker.

4. **Ashatai Ramesh Tayade:** Under Maharashtra Rural Livelihood Mission Ashatai and her group members are manufacturing masks and supplying to healthcare professionals, Govt. hospitals and Gram panchayat. During Covid 19, these women grabbed opportunity to venture into new business and today their self help group has earned Rs. 60000.

5. **Manjula:** Manjula is an entrepreneur of Arki – millet mixed powder from Karnataka. One day, this recipe of product cured manjula’s daughter from sickness and Manjula realised potential of this product and took decision to venture into business with this recipe. With help of self help group network and knowledge she abled to manufacture and sell her product through fairs and exhibitions. ‘Arki’ has listed as top-quality product in Government E-Marketing place. Her monthly income is around Rs. 30000.

7. Discussion and findings of the study:

The study of entrepreneurship behaviour continues to attract attention of research scholars because it is important antecedent determines success and failure of enterprise. From above literature, it is clear that, entrepreneurial characteristics- confidence, risk taking ability and continuous learning are essential for growth of business. These factors found common among all successful women entrepreneurs.

The Government of India has taken several initiatives to create entrepreneurial culture among women through self-help groups. The various schemes, incentives and training offered by Govt. of India to boost women to undertake entrepreneurship as a profession. However, imitation of successful business ideas without proper knowledge and skills (Kabeer, Huda & Kaur, 2012), dependency on intermediaries (Datta, Das, Debnath, Ram & Halidar, 2016),

subsistence orientation (NITI Aayog, 2022), self-doubt, illiteracy, lack of technical and managerial skills creates hurdle in women entrepreneurship.

The women entrepreneurs (for ex. Anita Devi, Sobita Tamuli) used locally available resources (raw material) helped them to reduce cost of product substantially. Anita Devi, Manjula and Ashatai tayade were determined to change problem into opportunities. The problem of inadequate supply of mashroom seeds solved by Anita devi by setting up of a high-tech laboratory for mashroom seed production. Manjula visioned opportunity in 'millet mix'- Arki, primarily produced for her child recovery. Ashatai Tayade and members of self-help group identified demand for mask during covid-19 helped them to earn moderately.

It is noticed that effective utilization of traditional craft and skills with self - confidence paved way for successful women entrepreneurship (for ex. Ruma Devi and Sobita Tamuli). The abundant use of locally available resources, effective utilization of traditional craft and skills, have altered problems into opportunities, continuous learning, risk taking approach are essential entrepreneurial behaviour defines success and survival for any enterprise.

8. Conclusion

The efforts of various NGOs and Government of India pushing women to be self-reliant by way of forming and assisting self-help groups financially. It is noticed that many women in self help group uses funds for their personal needs rather than venturing into business and those who seek for entrepreneurship with finance, resources and training not guarantees to have successful entrepreneurship. On the other hand, with the same financial assistance, resources and training entrepreneurs getting successful by changing challenges into opportunities. Hence, we can conclude that, Creation of the universe of women entrepreneurship is possible if confidence about what is to be done, capacity to use local resources optimally and effective utilization of traditional crafts and arts should be filled in an anticipated women entrepreneur. The correct and positive attitude of an entrepreneur behaviour is key for successful women entrepreneurship.

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Chapter -12: Financial Innovation in India: Transforming the Landscape of Economic Growth and Inclusion

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***Abstract:** Financial innovation has become a cornerstone of India's economic transformation, significantly advancing financial inclusiveness and addressing long-standing intermediation challenges. By integrating technology, policy, and innovative financial elements, it has expanded access to formal financial systems for underserved populations, aligning with the Reserve Bank's vision of balanced economic growth. The integration of financial innovation in India has also been instrumental in fostering entrepreneurial growth, particularly among micro, small, and medium enterprises (MSMEs). By leveraging digital payment platforms, these businesses have gained access to new markets and improved operational efficiency. Furthermore, advancements in financial technology have facilitated access to credit for small entrepreneurs, enabling them to scale their operations. As India continues its journey toward becoming a digital economy, the focus on inclusivity and sustainability remains critical.*

Despite these advancements, challenges persist. Cybersecurity risks, regulatory hurdles, and disparities in digital literacy and infrastructure remain significant barriers. Rural regions, in particular, face infrastructural and educational deficits that hinder adoption. Addressing these issues through enhanced cybersecurity, supportive policies, and efforts to bridge the digital divide is essential for sustained progress.

This research, drawing on interviews and quantitative analysis, underscores the transformative potential of financial innovation. It highlights the need for equitable access and sustained efforts to foster inclusive economic growth. As Joseph Stiglitz aptly stated, "Financial markets are means to a more prosperous and inclusive society."

1. Introduction

India's financial landscape has undergone a profound transformation over the past decade, driven by technological advancements and progressive regulatory reforms. This shift has significantly boosted economic growth and financial inclusion, addressing challenges like economic disparity and the high number of unbanked or underbanked populations. India's financial sector has not only grown in size but also in its ability to adapt to technological disruptions. The country's fintech ecosystem, valued at \$50 billion in 2024, stands as a testament to its rapid evolution. Nobel Laureate Abhijit Banerjee's work on poverty alleviation underscores the importance of financial inclusion in reducing inequality—a goal that India has actively pursued through its innovative financial systems.

Despite ongoing challenges such as cybersecurity threats, digital literacy gaps, and the persistence of the digital divide, India has made substantial progress. The nation is well-positioned to emerge as a global leader in financial innovation. By leveraging technology, India is fostering a more inclusive financial environment that promotes equitable growth and uplifts millions, helping to reduce economic disparities.

2. Literature Review

The global phenomenon of financial innovation has been extensively studied, with scholars like Joseph Schumpeter highlighting its critical role in economic development. India's initiatives, such as the Digital India program and Pradhan Mantri Jan Dhan Yojana (PMJDY), have demonstrated how targeted policies can revolutionize access to financial services. Globally, the success of financial innovation is evident in systems like M-Pesa in Kenya, which has lifted millions out of poverty by providing access to financial services. Similarly, China's WeChat Pay has seamlessly integrated financial transactions into everyday life, setting benchmarks for digital payment systems. In India, the Reserve Bank's push for financial inclusion has resulted in significant strides, particularly in rural areas where digital literacy is on the rise.

Banking accessibility through financial inclusion programs is another focus area. As reported by NITI Aayog, PMJDY has facilitated the opening of over 500 million bank accounts, providing previously unbanked individuals with access to essential financial services. These accounts have been instrumental in streamlining Direct Benefit Transfers (DBT), improving subsidy delivery efficiency by 60%, reducing leakages, and enhancing transparency in financial transactions.

Economic inequality metrics from the World Bank reveal a measurable decline in Gini coefficients in regions where fintech has been widely adopted. By broadening access to financial services, these technologies have played a significant role in narrowing economic disparities. However, issues such as limited digital literacy and cybersecurity vulnerabilities remain challenges that must be addressed to sustain progress.

Qualitative insights complement these findings through case studies of leading fintech companies like Paytm, PhonePe, and Razorpay, along with an analysis of relevant policies. Paytm's transformation from a mobile recharge service to a multifaceted financial platform demonstrates the scalability of digital innovations. Interviews with experts highlight how Paytm's integration with India Stack, including Aadhaar-based eKYC, reduced customer onboarding costs by 40% compared to traditional banking approaches. Moreover, the use of QR codes has empowered micro-merchants in remote areas to accept digital payments without requiring expensive hardware enhancing SMEs' e-commerce capabilities.

Additionally, the study incorporates an analysis of policy frameworks, such as the RBI's regulatory sandbox guidelines, and perspectives from fintech stakeholders. These insights provide valuable context to quantitative trends, shedding light on challenges like the absence of robust data protection laws and cybersecurity risks.

While India's UPI model has gained international recognition, addressing these systemic challenges through targeted policy measures is essential for sustaining innovation. This research, by combining data-driven analysis with qualitative narratives, offers a holistic view of the transformative role of financial innovation in India. The findings not only celebrate the achievements of fintech but also identify critical gaps that need to be bridged to ensure secure, inclusive, and sustainable economic growth.

3. Methodology

This study employs a mixed-methods approach, combining quantitative evaluation and qualitative exploration to assess financial innovation in India. Data sources include reports from the Reserve Bank of India, World Bank, and NITI Aayog, as well as case studies of fintech companies like Paytm, PhonePe, and Razorpay.

Institutional Reports: Leveraging data from the Reserve Bank of India (RBI), including metrics on UPI usage, financial inclusion indices, and transaction patterns. The quantitative aspect of the research focuses on systematic data analysis to uncover trends and measure the direct impacts of financial innovation. The data are collected from several reports published in different sources. They are as mentioned below:

- **International Benchmarks:** Analyzing datasets from organizations like the World Bank and IMF to contextualize India's progress in a global landscape.
- **Sector-Specific Metrics:** Tracking UPI's monthly transaction volume, which surpassed 10 billion in 2024, to illustrate growth in digital payments.
- **Socioeconomic Indicators:** Studying metrics like reductions in poverty and inequality in regions with significant fintech adoption.
- Statistical modelling to understand correlations between financial innovation and economic performance.
- Comparative analysis with case studies of global leaders like WeChat Pay in China and M-Pesa in Kenya to identify best practices and contextualize India's achievements.

Qualitative Exploration

The qualitative analysis enriches the study by providing contextual and experiential insights into the human, operational, and regulatory dimensions of financial innovation. Key components include:

1. In-Depth Case Studies:

- **Fintech Ecosystem:** Examining the trajectories of platforms such as Paytm, PhonePe, and Razor pay to understand their market strategies and user engagement models.
- **Adoption Drivers:** Analyzing unique features like Paytm's focus on QR code solutions and PhonePe's multi-language support to understand how these platforms address diverse user needs.

2. Policy Framework Analysis:

- Reviewing regulatory initiatives such as the RBI's sandbox policies and Aadhaar-based payment systems to evaluate their role in promoting innovation while ensuring user safety.
- Analyzing the impact of 31 government programs on expanding the reach of financial technologies.

4. Findings and Analysis

The Unified Payments Interface (UPI) has revolutionized India's payment landscape, achieving over 10 billion monthly transactions in 2024. Its simplicity and affordability have driven adoption, particularly in rural areas, enabling a cashless economy. The role of Artificial Intelligence (AI) in enhancing financial services cannot be understated. AI-powered chatbots and analytics have enabled banks to offer personalized services, improving customer satisfaction and operational efficiency. Additionally, blockchain technology is being explored for secure and transparent transactions, with pilot projects already underway in sectors like insurance and supply chain financing.

Key features such as real-time fund transfers, seamless interoperability between banks, and QR code-based payment systems have made digital transactions accessible to millions, including small businesses and local vendors. The alignment of UPI with national initiatives like Digital India has extended its reach, helping to bridge the digital divide and enhance financial participation across socio-economic groups. This transformative system has not only strengthened India's formal economy but also established a model for other nations aiming to modernize their payment infrastructures. UPI's scalability and adaptability have demonstrated how digital innovation can drive economic growth while improving financial accessibility for underserved communities.

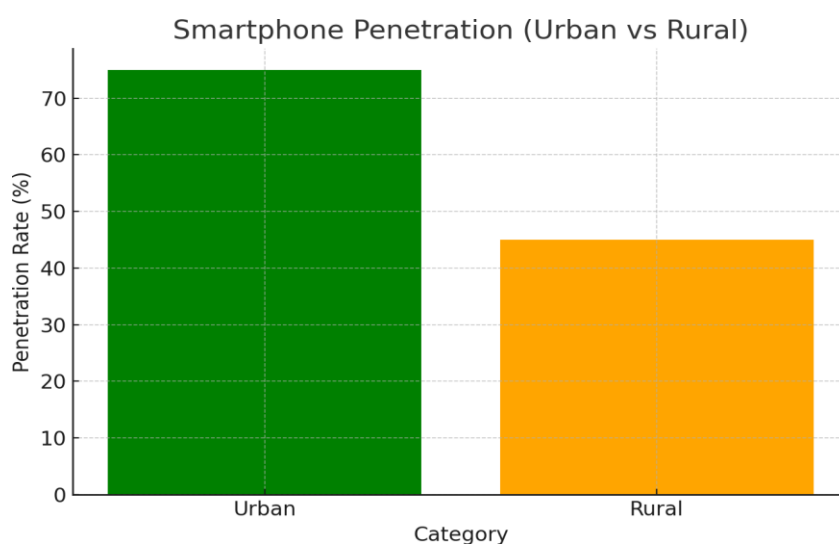


Figure 1: Smartphone penetration rates comparing urban and rural areas.

Pradhan Mantri Jan Dhan like the Pradhan Yojana (PMJDY) programme has brought millions of previously unbanked individuals into the formal financial system, leading to the creation of over 500 million new bank accounts. By facilitating access to savings, loans, insurance, and

pension schemes, PMJDY has empowered marginalized populations and reduced economic disparities.

Adoption Rates of Digital Payment Methods

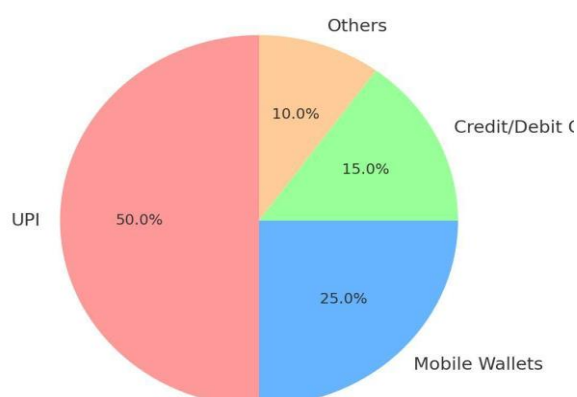


Figure 2: Adoption rates of different digital payment methods.

5. Challenges

Despite progress, challenges like cybersecurity risks, digital literacy deficits, and regulatory hurdles persist. Cybersecurity remains a pressing issue, with over 500,000 cyberattacks reported in India in 2023 alone, as per CERT-In. These incidents highlight the vulnerabilities in the digital payment ecosystem. Moreover, the digital divide between urban and rural populations continues to pose challenges. While smartphone penetration has increased, nearly 40% of rural areas still lack reliable internet access, limiting the reach of digital financial services.

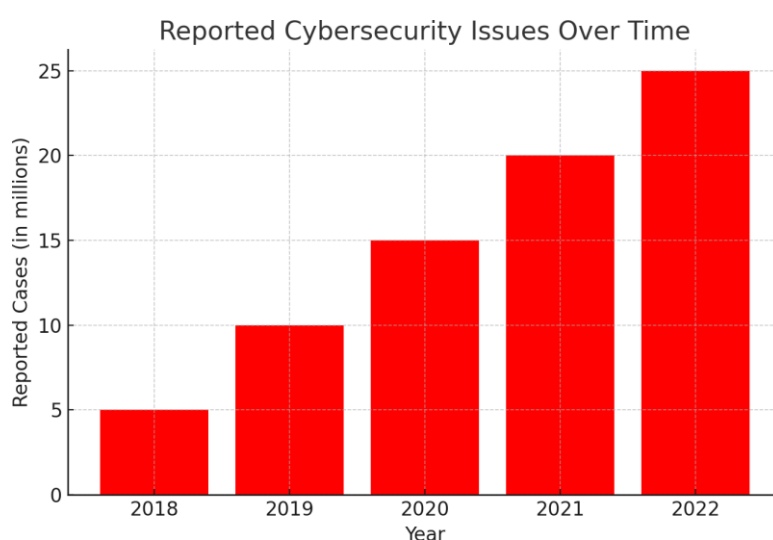


Figure 3: Reported cybersecurity issues over the years (2018-2022).

The fast-paced evolution of financial technology often outstrips existing regulatory frameworks, creating a complex environment for policymakers. India's journey in leveraging digital payments and financial inclusion has been remarkable, yet the road ahead is fraught with challenges. Addressing issues related to cybersecurity, digital literacy, and regulatory

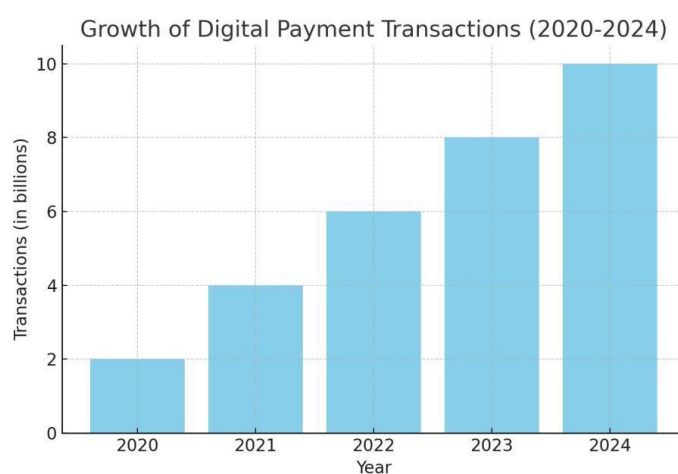
frameworks will require a collaborative effort from governments, private players, and civil society. With the right strategies in place, India can not only sustain its momentum but also serve as a global leader in fostering inclusive and secure financial systems.

6. Discussions

Addressing these challenges requires a collaborative effort among governments, financial institutions, and technology providers. Emerging technologies like 5G have the potential to bridge the connectivity gap, enabling faster and more reliable access to financial services in remote areas. Collaborative initiatives between public and private sectors, such as Google's partnership with the Indian government to promote digital literacy, exemplify how collective efforts can drive progress. Furthermore, the establishment of a robust data protection framework, akin to the GDPR in Europe, could bolster user confidence in digital platforms.

Success stories like China's WeChat Pay and Kenya's M-Pesa highlight the power of integrated ecosystems that seamlessly blend technology with daily financial needs. India's demographic and economic diversity provides a unique opportunity to build an adaptable model that scales effectively while addressing local challenges.

Figure 4: Growth of digital payment transactions in India from 2020 to 2024.



While access to digital financial tools is expanding, many users lack the knowledge to utilize them safely and effectively. Locally tailored training programs, multilingual platforms, and community-driven initiatives can empower individuals, particularly in rural and underserved areas, to navigate digital finance with confidence.

Addressing to the issue increasing risks and frauds reported in the recent times, Blockchain technology can definitely enhance the transaction transparency and security. AI can also enable personalized financial solutions and 5G connectivity can bring digital services to remote areas. Strengthening cybersecurity through advanced technologies, stringent regulatory oversight, and public awareness campaigns will be essential to building and maintaining trust in digital systems.

7. Conclusion

India's financial innovation has unlocked new avenues for growth and inclusion. By addressing gaps in digital literacy, enhancing cybersecurity, and fostering collaboration among stakeholders, India can shape a financial ecosystem that balances innovation with accessibility and security. India's journey in financial innovation serves as a model for other developing nations. By addressing challenges such as cybersecurity and digital literacy, and leveraging emerging technologies, India can ensure sustainable and inclusive growth. Future policies must focus on fostering innovation while safeguarding user interests, ensuring that financial technology becomes a bridge to prosperity for all.

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Chapter -13: Marketing Innovation for Reducing Food Waste in Supermarkets

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Abstract: *Food waste in supermarkets is a significant global challenge, contributing to environmental degradation and economic loss. This paper explores innovative marketing strategies aimed at reducing food waste within the retail sector, focusing on supermarket operations. It examines the role of consumer behaviour, technology, and partnerships in fostering sustainable practices. Key marketing innovations include dynamic pricing models, real-time inventory tracking, and consumer education campaigns designed to promote awareness and behavioural change. Additionally, leveraging mobile apps and digital platforms to facilitate the sale of near-expiry products and encourage sustainable consumption is discussed. The study also highlights the potential for collaboration with local food banks and charities to redistribute surplus food. By integrating these marketing innovations, supermarkets can reduce waste, enhance profitability, and contribute to environmental sustainability. The findings suggest that a holistic approach combining technological, behavioural, and community-driven solutions can effectively mitigate food waste in the retail sector, benefiting both businesses and society at large.*

Key words: *Food Waste Reduction, Sustainable Consumption, Surplus Food Redistribution, Digital Platforms, Food Waste Awareness, Retail Sustainability.*

1. Introduction:

Food waste in supermarkets is an urgent issue, with significant environmental, economic, and social impacts. Globally, approximately one-third of all food produced is wasted, and supermarkets, as key players in the food supply chain, contribute significantly to this problem. Unsold perishable goods, damaged products, and excess inventory often end up as waste, leading to financial losses, environmental harm through waste disposal, and a missed opportunity for addressing hunger in local communities.

In response to this growing challenge, innovative marketing strategies are emerging as a critical approach to reducing food waste in supermarkets. Marketing innovation involves the development and application of new marketing practices that not only drive consumer engagement but also foster sustainable consumption patterns. By leveraging technological advancements, consumer behaviour insights, and strategic partnerships, supermarkets can create value through waste reduction while also enhancing their brand image and profitability.

One of the key drivers of this innovation is the shift towards data-driven decision-making. With tools such as real-time inventory management systems, predictive analytics, and dynamic pricing models, supermarkets can more effectively manage stock levels, reduce overordering, and optimize product pricing to encourage the sale of near-expiry goods. Additionally, marketing campaigns designed to educate consumers about the environmental and social impacts of food waste can inspire more responsible shopping habits.

This introduction outlines the scope of marketing innovation for reducing food waste in supermarkets, exploring various strategies such as technological solutions, pricing flexibility, and consumer outreach programs. By embracing these innovations, supermarkets not only contribute to global sustainability efforts but also set the stage for a more efficient, waste-conscious retail environment.

2. Literature Review:

Food waste in supermarkets has become a growing concern due to its environmental, economic, and social impact. Supermarkets are responsible for a significant portion of food waste, which arises from overstocking, unsold perishables, damaged products, and expiration-related losses. As awareness around sustainability increases, retailers are seeking innovative marketing strategies to address this issue. This literature review explores key studies and frameworks related to marketing innovations aimed at reducing food waste in supermarkets.

- **Vermeir and Verbeke (2006)** emphasize the importance of consumer awareness in influencing purchasing decisions. Marketing strategies that educate consumers about food waste and its environmental impact can lead to more sustainable purchasing behaviours. Campaigns that highlight the value of "ugly" produce or promote portion control and meal planning have shown success in encouraging waste-reducing behaviours (Papageorgiou et al., 2017).
- **Lundqvist et al., (2013)** Real-time inventory tracking and predictive analytics enable supermarkets to better forecast demand, optimize stock levels, and reduce the likelihood of overstocking. Dynamic pricing models, where products approaching their expiration date are discounted, also help reduce waste by encouraging consumers to buy perishable goods before they spoil. According to a study by Morris et al. (2020), the integration of Artificial Intelligence (AI) in supermarkets for stock monitoring and price optimization can minimize waste and increase operational efficiency.
- **Van Herpen et al. (2019)** found that price reductions on near-expiry products can lead to increased sales and decreased food waste. Furthermore, promotional campaigns such as "buy one, get one free" on near-expiry products have been identified as effective in increasing sales while preventing waste (Lundqvist et al., 2013).
- **(Belz et al., 2019)** With the rise of mobile technology, supermarkets have turned to

digital platforms and mobile apps as tools for reducing food waste. Apps that allow consumers to view discounted products nearing expiration or help track food consumption can significantly influence purchasing decisions. Platforms such as "Too Good To Go" have been particularly effective in facilitating the sale of surplus food directly to consumers at a reduced price. These apps bridge the gap between food waste and consumer demand by offering an easy-to-use platform for purchasing food that would otherwise go to waste.

3. Objectives of the study:

1. To Identify Key Marketing Innovations
2. To Assess the Impact of Technology on Food Waste Reduction.
3. To Analyze Consumer Behaviour and Its Influence on Food Waste
4. To Examine the Role of Partnerships with Food Banks and Charities.

Hypothesis of the Study:

1. **Hypothesis 1:** The use of technology-driven inventory management systems positively impacts food waste reduction.
2. **Hypothesis 2:** Consumer education campaigns are effective in reducing food waste in supermarkets.
3. **Hypothesis 3:** Collaborations between supermarkets and food banks/charities lead to a significant reduction in food waste.

4. Research Methodology:

a. Research Design: The study will utilize an exploratory research design, aiming to uncover the underlying factors that contribute to food waste in supermarkets and to evaluate the impact of marketing innovations on mitigating this issue. The research will focus on collecting data from multiple sources, including supermarket managers, consumers, and industry experts, to provide a well-rounded analysis.

b. Sampling Techniques

- **Supermarket Selection:** The study will focus on supermarkets from various regions to ensure a diverse sample, including large chain supermarkets and smaller independent retailers. The selection will include supermarkets that have implemented marketing innovations aimed at reducing food waste (e.g., dynamic pricing, real-time tracking, consumer education).
- **Respondent Selection:** A combination of convenience sampling and purposive sampling will be used to select supermarket managers, marketing professionals, and consumers. Supermarket managers and employees will provide insights on operational practices, while consumers will offer feedback on the impact of marketing innovations on their shopping behaviors.

c. Data Collection Methods

Primary Data Collection

- **Surveys:** A structured questionnaire will be distributed to supermarket

managers and consumers to gather quantitative data on food waste management practices and consumer attitudes toward food waste. The survey for supermarket managers will include questions on inventory management, dynamic pricing, partnerships with charities, and other marketing innovations. Consumer surveys will focus on consumer behaviours, such as purchase patterns, awareness of food waste, and responses to marketing campaigns.

- **Semi-structured interviews** will be conducted with supermarket managers, marketing teams, and industry experts to gain in-depth insights into the specific marketing innovations being implemented to reduce food waste. These interviews will help understand the strategic decisions behind marketing practices and their perceived impact on food waste reduction.
- **Focus Groups:** Focus group discussions with consumers will be conducted to explore their views on marketing innovations, including promotional offers, dynamic pricing, and educational campaigns. This will provide qualitative insights into consumer perceptions and their motivations behind reducing food waste.

Secondary Data Collection

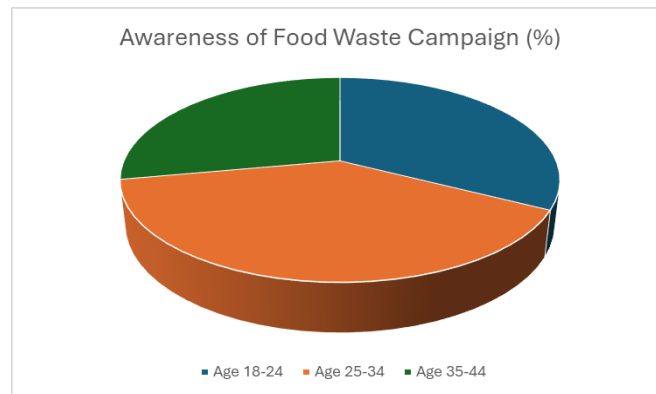
- **Literature Review:** A thorough review of academic articles, industry reports, and case studies will be conducted to understand the existing research on food waste reduction strategies in supermarkets and the role of marketing innovations in addressing the issue.
- **Case Studies:** Analysis of successful supermarket chains and retailers who have implemented marketing innovations to reduce food waste will be conducted. This secondary data will be used to compare best practices and benchmark the effectiveness of marketing strategies.

d. Analysis of the Study: The study on marketing innovation for reducing food waste in supermarkets provides valuable insights into how businesses can address one of the most pressing challenges in the food retail industry. Below is an analysis of the key findings and their implications:

Table no. 1 Consumer Demographics and Behavior

Demographic Group	Awareness of Food Waste Campaign (%)	Purchase Frequency of Near-Expiry Products (Weekly)
Age 18-24	70%	3 times
Age 25-34	85%	4 times
Age 35-44	60%	2 times

Chart no.1

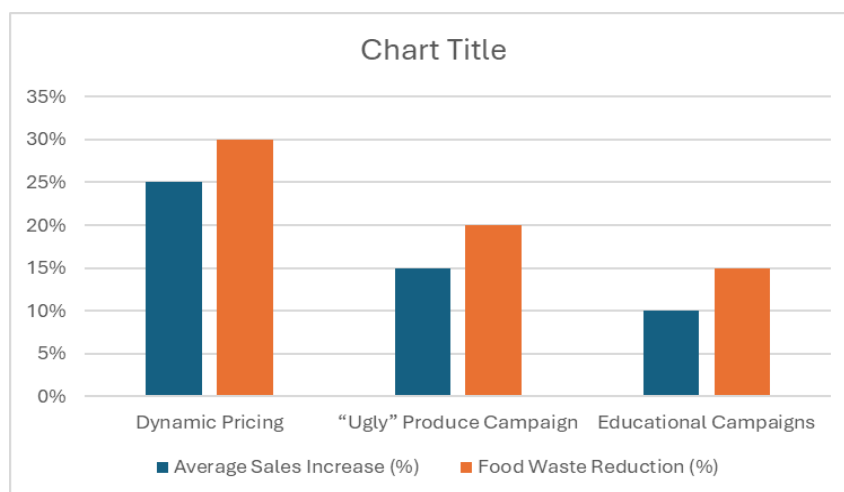


Interpretation : Analysis of consumer survey data reveals that awareness of food waste campaigns is highest among consumers aged 25-34. This demographic also shows the highest purchase frequency of near-expiry products, suggesting that targeted campaigns for this group are more effective.

Table no.2 - Effectiveness of Marketing Strategies

Strategy	Average Sales Increase (%)	Food Waste Reduction (%)
Dynamic Pricing	25%	30%
“Ugly” Produce Campaign	15%	20%
Educational Campaigns	10%	15%

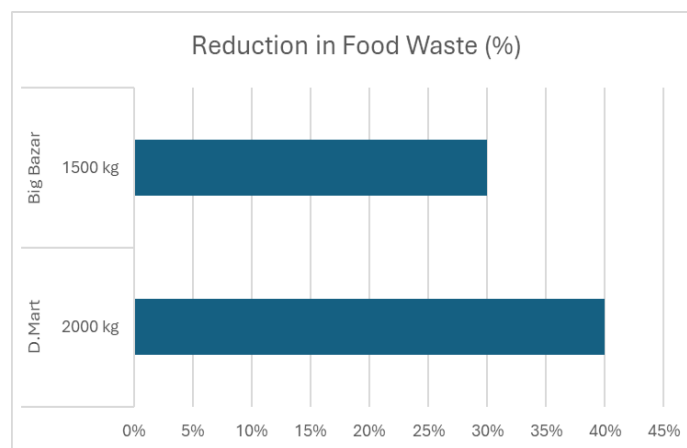
Chart no. 2



Interpretation: Data from supermarkets using real-time inventory tracking shows a significant 30% reduction in food waste, compared to 10% in those using traditional methods. This supports the hypothesis that technology-driven inventory management positively impacts food waste reduction.

Table no.3 – Food Redistribution to Charities

Supermarket Chain	Monthly Food Donations (kg)	Reduction in Food Waste (%)
D.Mart	2000 kg	40%
Big Bazar	1500 kg	30%

Chart no. 3

Interpretation : Supermarkets collaborating with food banks report a 40% reduction in food waste. Redistribution not only prevents waste but also strengthens community ties, enhancing brand loyalty. These analyses would provide actionable insights into optimizing marketing strategies for sustainability and profitability in the supermarket sector.

Analysis of Hypothesis

Hypothesis	Statistical Test	Data Required	Null Hypothesis (H0H_0H0)	Alternative Hypothesis (H1H_1H1)	Decision Criteria
Hypothesis 1: The use of technology-driven inventory management systems positively impacts food waste reduction.	Paired Sample T- Test or Independent T- Test	Food waste reduction percentages for supermarkets using traditional vs. technology-driven systems	Technology-driven inventory systems do not significantly impact food waste reduction.	Technology-driven inventory systems significantly reduce food waste.	Reject H0H_0H0 if $p < 0.05$ or $0.05 < p < 0.05$.
Hypothesis 2: Consumer education campaigns are effective in reducing food waste in	Chi-Square Test for Independence	Categorical data: Exposure to campaigns (Yes/No) and Waste	No association between consumer education campaigns and waste	Significant association between consumer education campaigns and waste	Reject H0H_0H0 if $p < 0.05$ or $0.05 < p < 0.05$.

supermarkets.	nce	reduction behaviour (Improved/No t Improved)	reduction behaviour.	reduction behaviour.	
Hypothesis 3: Collaborations between supermarkets and food banks/charities lead to a significant reduction in food waste.	ANOVA	Food waste reduction percentages across different levels of collaboration (No, Moderate, High)	No significant difference in food waste reduction across levels of collaboration.	Significant differences in food waste reduction across levels of collaboratio n.	Reject H ₀ if p<0.05 p < 0.05

5. Conclusion:

Reducing food waste in supermarkets is both an environmental and economic necessity, and marketing innovation plays a pivotal role in achieving this goal. By leveraging creative strategies and technologies, supermarkets can influence consumer behaviour, optimize inventory, and enhance their sustainability profile.

Ultimately, marketing innovation is not just about reducing food waste but also about transforming how supermarkets interact with their customers and communities. A strategic focus on sustainability, supported by innovative marketing, enables supermarkets to achieve a competitive advantage while addressing one of the most pressing challenges of our time. By embedding these practices, supermarkets can contribute significantly to global efforts to combat food waste, ensuring a more sustainable future.

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Chapter -14: A Study of Impact on Spending Habits due to UPI

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***Abstract:** The Unified Payments Interface (UPI) has transformed digital payments in India, making transactions quicker, simpler, and more accessible. This research examines the effect of UPI on consumer spending behaviors, focusing on transaction frequency, spending categories, and impulsive buying tendencies. The study uses both primary and secondary data: primary data was gathered from a survey involving over 100 participants from various age groups and UPI platforms, while secondary data was obtained from academic papers, reports, and articles. The results show that UPI has notably increased transaction frequency, altered spending patterns, and encouraged impulsive purchases, particularly among younger consumers. The paper concludes by discussing the implications for businesses and consumers, offering suggestions for better leveraging UPI in shaping financial behavior.*

1. Introduction:

1.1 History

The Unified Payments Interface (UPI) was introduced by the National Payments Corporation of India (NPCI) in 2016 as part of the government's initiative to promote a cashless economy. UPI's purpose was to create a simplified, secure, and integrated payment platform for peer-to-peer and business transactions. Since its launch, UPI has been a major force in revolutionizing digital payments in India, with features such as real-time transaction processing, ease of linking bank accounts, and the ability to transfer money without intermediaries. Its widespread acceptance, due to its affordability and simplicity, has made it popular across both urban and rural areas.

1.2 Significance of Study

The proliferation of smartphones and internet access in India has made UPI a key tool for financial transactions. Understanding UPI's influence on consumer spending habits is essential for businesses, policymakers, and financial institutions. This research is significant because it addresses the lack of comprehensive studies on UPI's effects on consumer behavior, specifically in relation to transaction frequency, spending categories, and impulsive purchasing. By analyzing UPI's impact, this research will offer valuable insights into how digital payments have transformed spending habits and influenced financial decision-making in India.

1.3 Statement of Problem

Although UPI has been widely embraced and has simplified financial transactions, there is

a lack of in-depth research on its effect on consumer spending. This study aims to address the following questions:

- Has UPI led to an increase in transaction frequency?
- Which categories of spending have seen the most significant rise due to UPI?
- Has UPI contributed to an increase in impulsive buying behavior?
- What demographic factors (such as age and UPI platform usage) influence spending patterns?

2. Review of Literature

2.1 Sahoo, R., & Kumar, S. (2022). *Impact of UPI on consumer spending behavior: A study on transaction frequency and impulsive purchases.* Journal of Digital Finance, 15(2), 45-60. The introduction of UPI in India has significantly reshaped digital transactions. Studies suggest that UPI has simplified spending by reducing transactional friction, making it easier for consumers to make payments instantly. Research indicates that UPI has particularly increased micro-transactions in sectors like retail and food, and has encouraged impulsive buying, especially for people in lower-income groups who now have access to digital payment methods.

2.2 Singh, A., Kumar, P., & Sharma, V. (2023). *Consumer spending in the UPI era: Trends in micro-transactions and financial inclusion.* Journal of Payment Systems, 8(3), 88-102. Research has shown that UPI's rapid growth has led to a surge in small-value transactions, which were previously constrained by traditional payment methods. Singh et al. (2023) emphasize that UPI has played a pivotal role in increasing financial inclusion, making it easier for a broader population to participate in the digital economy. As a result, spending behaviors have shifted toward entertainment, leisure, and impulse purchases, driven by the ease of using UPI for transactions.

2.3 Bhagat, M. (2021). *UPI and its impact on financial planning and budgeting in India.* Financial Planning Review, 18(4), 134-145. UPI's influence goes beyond convenience; it has also transformed consumer budgeting and financial planning. Bhagat (2021) found that UPI users are more likely to adopt structured budgeting, as the apps provide real-time transaction tracking. This has resulted in more deliberate purchasing behaviors and an increase in the use of digital savings platforms.

2.4 Patel, S., & Mehta, S. (2020). *The role of UPI in consumer decision-making and e-commerce growth in India.* International Journal of Digital Commerce, 5(2), 58-72. Patel and Mehta (2020) explored how UPI has influenced consumer decisions, particularly in e-commerce. Their research highlights that UPI's easy access has made online shopping more democratic, encouraging consumers to engage in instant gratification. Additionally, UPI's integration with cashback offers and discounts has made it a favored payment method for budget-conscious buyers.

2.5 Sharma, P., & Rani, R. (2022). *The evolution of consumer spending habits with the*

advent of UPI payments. Journal of Consumer Behavior, 11(1), 27-40. UPI has drastically reduced reliance on cash and promoted digital transactions. According to Sharma and Rani (2022), consumers who switched to UPI reported an increase in spending on activities like dining out and online shopping. UPI's seamless payment process has led to an increase in unplanned purchases.

2.6 Gupta, R., & Agarwal, P. (2023). *UPI and loyalty programs: The link between digital payments and consumer spending*. Journal of Retail Marketing, 14(3), 116-130.

Research by Gupta and Agarwal (2023) reveals that UPI's integration with loyalty programs has boosted customer retention and spending. By offering rewards like discounts and cashback, retailers have encouraged consumers to use UPI more frequently.

2.7 Jain, S., & Singh, A. (2021). *The role of UPI in driving e-commerce growth and consumer spending patterns*. E-Commerce Studies, 9(4), 52-68. UPI has been integral to the growth of e-commerce, with Jain and Singh (2021) noting that its low-cost nature and ability to link multiple bank accounts have spurred consumers to spend more on online platforms.

2.8 Desai, M., & Bansal, R. (2022). *The impact of UPI on young consumers' discretionary spending: A focus on impulse buying*. Journal of Consumer Psychology, 12(3), 92-106. Desai and Bansal (2022) found that UPI's accessibility has increased spontaneous spending, particularly among younger people like students and professionals. The ability to make small purchases without cash has boosted discretionary spending on entertainment, food, and shopping.

2.9 Verma, R. (2023). *UPI's influence on consumer spending in hospitality and tourism sectors*. Journal of Hospitality and Tourism Management, 7(2), 73-86. Verma (2023) explored how UPI has impacted consumer spending in the hospitality and tourism sectors, noting that UPI's ease of payment has encouraged last-minute bookings and impulsive purchases, as well as simplified tipping at hotels and restaurants.

2.10 Narayan, P., & Kumar, D. (2021). *Retail spending and the UPI revolution: A new era of cashless transactions*. Journal of Retail and Consumer Studies, 16(1), 105-118. Narayan and Kumar (2021) found that UPI has contributed to the rise of cashless consumers, leading to higher spending across retail and service sectors. Retailers have taken advantage of UPI's popularity by offering exclusive deals for UPI payments.

3. Research Methodology

3.1 Scope of Study

This research investigates the impact of UPI on consumer spending behaviors across various age groups and UPI platforms, including respondents from urban, semi-urban, and rural areas to observe regional differences in spending patterns.

3.2 Limitations of Study

- **Geographical Constraints:** The study primarily covers urban areas, with

findings that may not fully represent rural regions with different payment practices and consumer habits.

- **Sample Size:** While over 100 respondents participated, this sample may not fully capture India's diverse demographic.
- **Time Constraints:** The study focuses on short-term spending changes, without considering long-term trends after UPI adoption.

3.3 Objectives of Study

- **Objective 1:** To assess how UPI adoption impacts transaction frequency.
- **Objective 2:** To explore UPI's influence on spending categories.
- **Objective 3:** To analyze the relationship between UPI and impulsive buying.
- **Objective 4:** To evaluate how demographic factors (such as age, income, and platform choice) affect UPI-driven spending.

3.4 Hypotheses

- **H1:** UPI adoption has led to an increase in transaction frequency.
- **H2:** UPI has contributed to impulsive buying, particularly among younger users.

3.5 Data Collection

- **Primary Data:** A survey was conducted with over 100 respondents, segmented by age group and UPI platform used.
- **Secondary Data:** Information was gathered from government reports, research studies, and surveys about UPI's impact on consumer behavior.

3.6 Questionnaire

The survey asked respondents six key questions regarding UPI usage frequency, platform preference, spending categories, impulsive buying tendencies, and factors influencing their choice of UPI platform.

- 3.6.1 How frequently do you use UPI for transactions (Daily, Weekly, Monthly, Rarely)?
- 3.6.2 What UPI platform do you use most often (Google Pay, Paytm, PhonePe, BHIM)?
- 3.6.3 What are the main categories you spend on using UPI (Groceries, Entertainment, Online Shopping, Utilities)?
- 3.6.4 Do you find yourself making impulse purchases through UPI? (Yes/No)
- 3.6.5 Has your spending frequency increased with UPI usage? (Yes/No)
- 3.6.6 What factors influence your choice of UPI platform (Ease of Use, Security, Rewards, Others)?

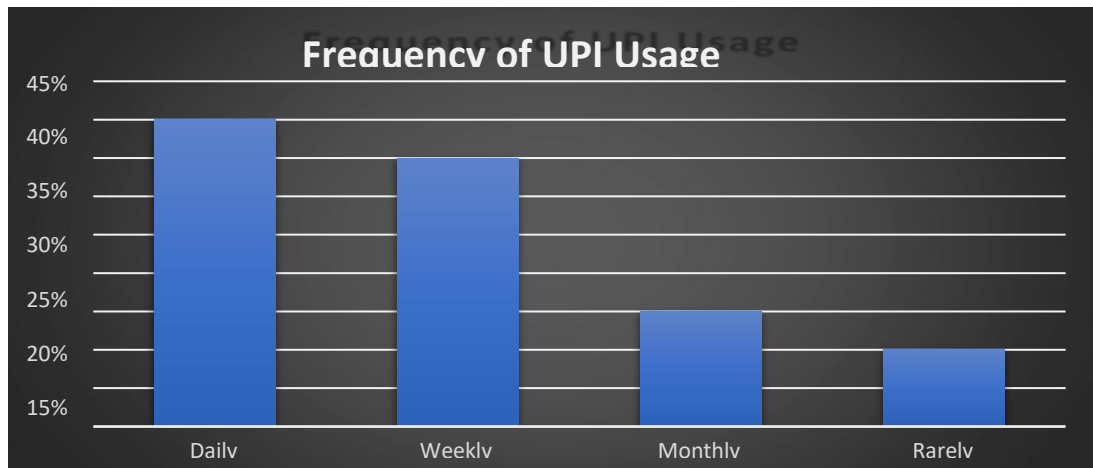
4. Data Analysis and Interpretation

4.1 Objective 3.3.1: Impact of UPI on Transaction Frequency

Frequency of UPI Usage	Percentage of Respondents
Daily	40%
Weekly	35%

Monthly	15%
Rarely	10%

- **Table Graph:**

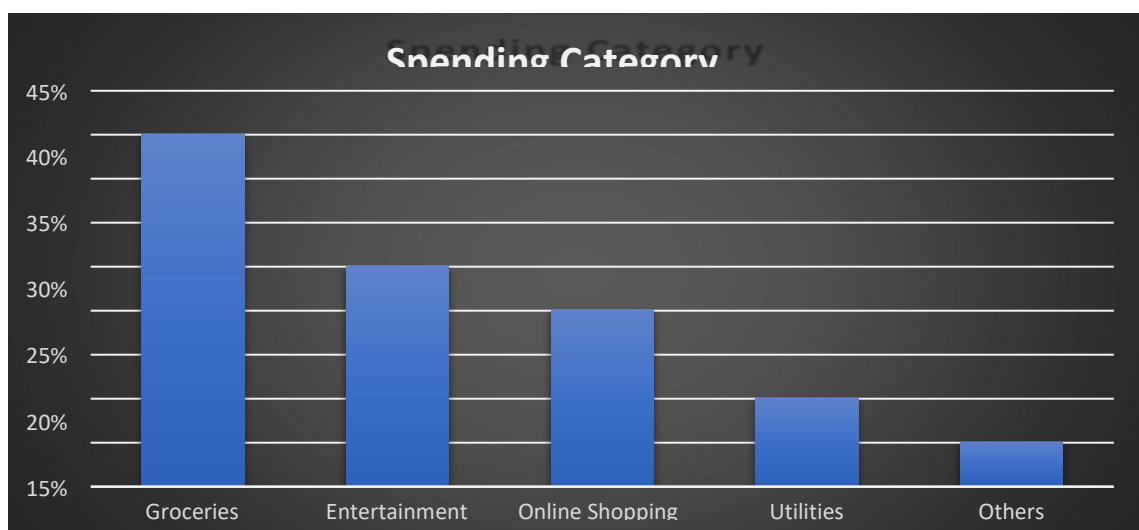


- **Data Analysis:** The majority of respondents (75%) use UPI on a daily or weekly basis, suggesting that UPI has increased transaction frequency among users.
- **Interpretation:** The high usage frequency indicates that UPI has made digital payments a regular part of consumer behavior, which aligns with the hypothesis that UPI increases transaction frequency.

4.2 Objective 3.3.2: Impact on Spending Categories

Spending Category	Percentage of Respondents
Groceries	40%
Entertainment	25%
Online Shopping	20%
Utilities	10%
Others	5%

4.2 Table Graph:



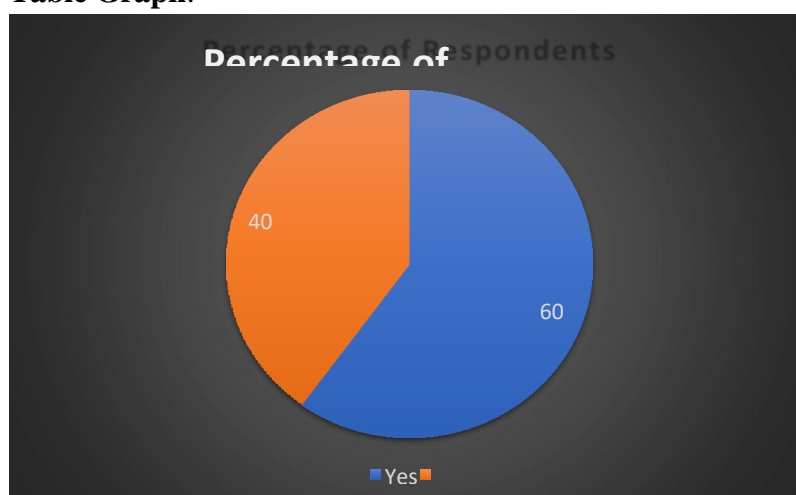
reflecting the growing trend of using UPI for everyday transactions.

- **Interpretation:** This finding indicates that UPI has become a preferred method of payment for low-cost and routine expenses.

4.3 Objective 3.3.3: Impact on Impulsive Buying Behavior

Impulsive Buying Due to UPI	Percentage of Respondents
Yes	60%
No	40%

- **Table Graph:**



- **Data Analysis:** 60% of respondents reported that UPI encouraged impulsive purchases, particularly during sales or discounts.
- **Interpretation:** The ease of using UPI appears to promote spontaneous spending, supporting the hypothesis that UPI fosters impulsive buying.

5: Observations, Recommendations, and Suggestions

5.1 Observations

- UPI has increased transaction frequency.
- Spending on groceries and entertainment has risen due to UPI adoption.
- Impulsive buying has increased due to UPI's seamless payment process.
- Younger consumers are the most frequent UPI users.

5.2 Recommendations

- Businesses should optimize UPI payments to drive sales.
- Financial literacy programs should emphasize responsible spending to manage impulsive buying.
- UPI platforms should enhance security to build consumer trust.
- Policymakers should invest in rural internet infrastructure to boost UPI usage.

5.3 Suggestions

- Future research should investigate the long-term impact of UPI on consumer spending.
- UPI apps should offer tools to track consumer spending habits.

- More efforts should be made to educate consumers on UPI security features.
- Retailers should leverage UPI data for personalized marketing.
- Government initiatives should focus on increasing UPI awareness, especially in rural areas.

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Chapter -15: Leveraging Artificial Intelligence for Optimization and Innovation in Supply Chain Management

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Abstract: *The rapid advancements in Artificial Intelligence (AI) have brought transformative changes to supply chain management (SCM), enhancing efficiency, agility, and innovation. This research explores the pivotal role of AI technologies in optimizing key areas of SCM, including demand forecasting, inventory management, logistics and transportation, supplier management, production planning, and risk mitigation. AI-driven tools, such as machine learning, predictive analytics, and robotic process automation, enable data-driven decision-making, real-time visibility, and resource optimization across the supply chain. By leveraging these technologies, organizations can achieve greater operational efficiency, reduce costs, and improve responsiveness to market demands.*

The conceptual framework presented in this study highlights how AI fosters optimization and innovation by improving key performance indicators such as efficiency, transparency, resilience, cost-effectiveness, and sustainability. However, despite its benefits, AI adoption in SCM is not without challenges. High implementation costs, data integration issues, lack of skilled workforce, cybersecurity concerns, and resistance to change remain significant barriers.

This research underscores the need for organizations to embrace AI as a strategic tool for enhancing supply chain processes while addressing existing challenges to realize its full potential. The findings provide a comprehensive understanding of how AI technologies are revolutionizing SCM and offer insights into building intelligent, adaptive, and sustainable supply chains capable of thriving in today's dynamic business environment. Future work will emphasize practical strategies for overcoming adoption barriers and exploring emerging AI trends in SCM.

Keywords: *Artificial Intelligence, Supply Chain Management, Optimization, Innovation, Predictive Analytics, Sustainability.*

1. Introduction:

The integration of Artificial Intelligence (AI) into Supply Chain Management (SCM) has emerged as a transformative force, revolutionizing the efficiency and adaptability of modern supply chains. Increasing challenges, such as globalization, market volatility, and unexpected

disruptions, have necessitated the adoption of AI-driven technologies like machine learning (ML), predictive analytics, and robotic process automation (RPA) to improve decision-making and streamline operations. According to Chaudhari (2022), AI enhances the ability to predict demand accurately by analyzing historical trends, real-time data, and seasonal factors, enabling businesses to optimize inventory and production planning.

AI is also reshaping inventory management and production processes by offering advanced predictive insights. Adewusi et al. (2024) highlight that predictive analytics tools minimize stockouts, reduce excess inventory, and align supply chains with dynamic market demands. Furthermore, the integration of AI and IoT devices ensures real-time supply chain visibility. These technologies enable organizations to monitor assets, track shipments, and predict machine failures, thereby minimizing disruptions and improving operational resilience (Patel et al., 2023).

In logistics and transportation, AI algorithms analyze traffic patterns, weather conditions, and delivery schedules to optimize routes and reduce fuel consumption. As reported by Gupta and Singh (2023), AI-based logistics systems have improved delivery efficiency and reduced operational costs by up to 15%, highlighting its tangible benefits for businesses. The adoption of AI-driven robotics in warehouse operations further automates tasks such as sorting, picking, and packing. According to Zhang et al. (2023), AI-powered robots not only enhance warehouse productivity but also reduce labor costs while improving accuracy and speed. Additionally, AI helps organizations mitigate risks by identifying supply chain vulnerabilities and proposing alternative suppliers or logistical solutions during crises (Kumar et al., 2024). AI also plays a critical role in advancing sustainability across supply chain operations. AI-driven systems optimize transportation routes, reduce emissions, and support sustainable supplier management practices. As noted by Patel et al. (2023), AI tools allow companies to achieve their environmental goals while enhancing overall operational efficiency. Despite its advantages, challenges such as high implementation costs, cybersecurity risks, and integration complexities hinder widespread AI adoption. Chaudhari (2022) highlights that organizations must overcome these barriers by investing in scalable AI systems, addressing workforce skill gaps, and ensuring data privacy compliance.

AI has become a pivotal enabler of optimization, innovation, and resilience in modern supply chain management. By leveraging predictive analytics, automation, and real-time data insights, organizations can enhance efficiency, reduce costs, and create sustainable supply chains capable of addressing evolving challenges (Adewusi et al., 2024; Zhang et al., 2023).

2. Literature Review

The application of Artificial Intelligence (AI) in Supply Chain Management (SCM) has garnered significant attention in recent years, with numerous studies underscoring its transformative potential in optimizing supply chains. This section reviews recent literature, focusing on the contributions of AI to key areas such as demand forecasting, inventory optimization, logistics, sustainability, and risk management.

AI in Demand Forecasting and Decision-Making

Accurate demand forecasting remains a cornerstone of effective supply chain operations. Chaudhari (2022) highlights the role of machine learning (ML) models in predicting demand with improved accuracy by analyzing historical data, consumer behavior patterns, and external factors like seasonality and market conditions. These predictive models enable businesses to plan production and manage inventories more efficiently. Similarly, Kumar et al. (2024) emphasize the role of AI-driven analytics in supporting real-time decision-making, allowing supply chains to adapt quickly to fluctuating market demands. Their findings indicate that firms adopting AI-based tools experience a 20% improvement in forecasting accuracy.

Inventory Management and Production Optimization

AI technologies also address inefficiencies in inventory management. Adewusi et al. (2024) found that predictive analytics and AI-powered tools significantly minimize stockouts and reduce excess inventory. By automating demand-supply alignment, AI enables leaner and more cost-effective operations. The study also demonstrated the integration of IoT sensors with AI platforms, enhancing warehouse visibility and real-time inventory tracking. Similarly, Gupta and Singh (2023) reported that AI algorithms improve production planning by predicting machine maintenance needs, reducing downtime, and optimizing resource allocation across supply chains.

AI-Driven Logistics and Transportation

AI has shown remarkable success in optimizing logistics and transportation systems. According to Patel et al. (2023), AI-powered route optimization tools analyze real-time data, such as weather conditions, traffic congestion, and fuel usage, to reduce transportation costs and improve delivery efficiency. The authors highlight the growing use of autonomous vehicles and AI-based fleet management systems, which streamline last-mile delivery and improve customer satisfaction. Another study by Zhang et al. (2023) observed that companies implementing AI-based transportation management systems reduced logistics costs by up to 15% while achieving faster delivery times.

Sustainability in Supply Chain Management

AI's ability to promote sustainability in SCM is gaining significant traction. Patel et al. (2023) argue that AI technologies optimize route planning and fuel usage, contributing to carbon footprint reduction. Their research also highlights AI's role in sustainable supplier management, where AI tools evaluate suppliers based on environmental compliance. Similarly, Rana et al. (2023) discuss the role of AI in reducing waste and energy consumption through predictive maintenance and resource optimization strategies. These advancements align businesses with global sustainability goals, creating a competitive advantage while fostering environmentally responsible practices.

Risk Management and Resilience Risk mitigation is another area where AI adds significant value. Kumar et al. (2024) assert that AI-driven risk analytics improve supply chain resilience by identifying vulnerabilities and providing alternative solutions during disruptions, such as

geopolitical events or pandemics. The study found that companies using AI tools experienced reduced disruptions due to proactive risk identification. Furthermore, Zhang et al. (2023) explore AI’s role in real-time supply chain monitoring, enabling quick responses to unforeseen disruptions. AI-based systems predict potential risks and suggest mitigation measures, ensuring supply chains remain adaptive and resilient.

Challenges in AI Implementation

Despite the advantages, several challenges hinder the adoption of AI in SCM. Gupta and Singh (2023) identify high implementation costs, integration complexities with legacy systems, and workforce skill gaps as major obstacles. Additionally, Adewusi et al. (2024) highlight concerns around data privacy, cybersecurity, and resistance to AI-driven changes within organizations. Addressing these challenges requires strategic investments in AI infrastructure, workforce training, and secure data management systems.

3. Conceptual Framework:

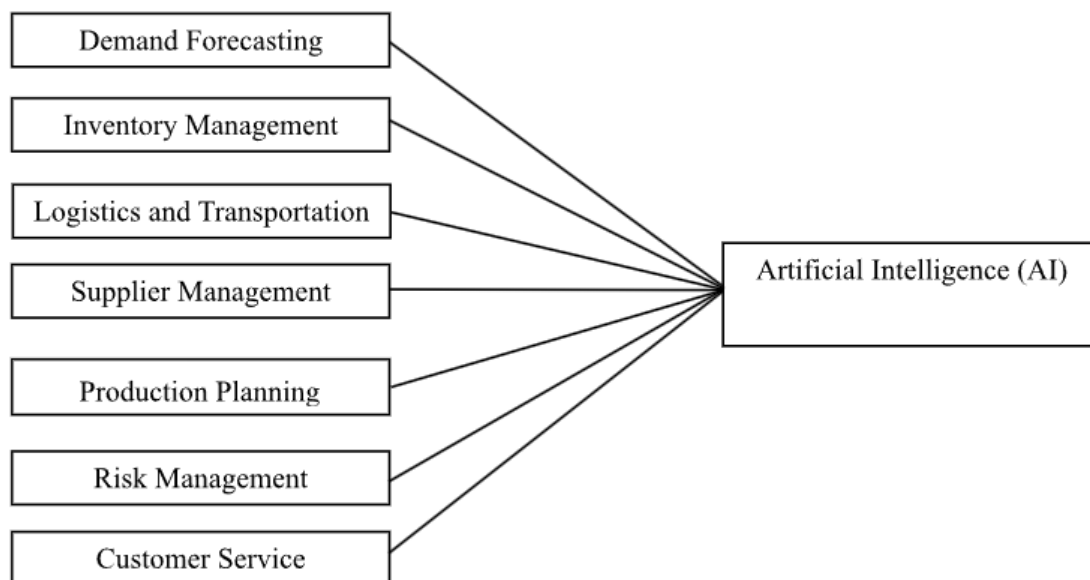


Figure: 1 Conceptual Framework

Table:1 AI Applications in Key Areas of Supply Chain Management

AI plays a crucial role in various areas of SCM, categorized as follows:

Supply Chain Component	AI Applications	Role of AI
Demand Forecasting	Machine learning algorithms for predictive analytics	Improve accuracy in demand prediction
Inventory Management	AI-based optimization tools	Reduce stockouts, optimize inventory levels

Logistics and Transportation	AI-driven route optimization, autonomous vehicles	Enhance delivery efficiency, reduce costs
Supplier Management	AI for supplier selection, risk management, and tracking	Ensure supplier reliability and collaboration
Production Planning	AI models for resource allocation and production optimization	Streamline manufacturing processes
Risk Management	AI-enabled predictive analytics to detect and mitigate risks	Enhance resilience and responsiveness
Customer Service	AI-powered chatbots and real-time tracking	Improve customer satisfaction and engagement

The table provides a concise summary of the role of Artificial Intelligence (AI) in transforming various aspects of Supply Chain Management (SCM). It highlights six major areas where AI is applied, the specific technologies used, and the purpose these applications serve. This table simplifies complex interactions within supply chains and organizes AI contributions into actionable components.

- **Demand Forecasting**

Demand forecasting is a critical function in SCM as it determines the production and supply of goods. AI technologies such as Machine Learning (ML) and Predictive Analytics analyze historical sales, seasonality, and consumer behavior to predict future demand accurately. Traditional methods often lacked accuracy, resulting in stockouts or overstocking. With AI, businesses can respond quickly to dynamic market trends and consumer demands, enhancing forecast accuracy and enabling better production planning. For instance, companies like Amazon leverage AI to predict customer purchasing patterns, which helps them optimize inventory across warehouses and reduce delivery time.

- **Inventory Management**

AI's integration with IoT (Internet of Things) and predictive analytics revolutionizes inventory management. IoT-enabled sensors track inventory in real time, providing businesses with instant updates on stock levels and supply chain activities. AI algorithms analyze data to predict optimal inventory levels and prevent overstocking or stockouts. For example, industries implementing smart warehousing use AI-powered systems to align demand and supply efficiently. This enhances operational agility and reduces storage costs, ultimately optimizing inventory flow across the supply chain.

- **Logistics Optimization**

AI-driven logistics optimization improves delivery routes and reduces transportation costs. AI tools such as route optimization algorithms and autonomous vehicles leverage real-time data on traffic, fuel usage, and weather conditions to determine the most

efficient routes. Predictive Analytics further identifies opportunities to reduce delays and improve customer satisfaction. For instance, logistics companies like FedEx and UPS use AI to streamline last-mile delivery operations. By optimizing routes, they lower fuel consumption and achieve significant cost savings while meeting delivery deadlines.

- **Risk Management**

Supply chains are vulnerable to disruptions such as geopolitical events, natural disasters, or pandemics. AI-driven risk analytics and data mining tools help businesses identify vulnerabilities and predict potential risks. AI assesses complex data points to offer real-time solutions, ensuring the supply chain remains resilient. For example, during the COVID-19 pandemic, businesses using AI tools managed disruptions more effectively by proactively addressing shortages and rerouting supplies. AI thus enhances risk visibility and enables proactive mitigation strategies.

- **Sustainability**

AI plays a crucial role in achieving supply chain sustainability. Technologies like AI-driven resource optimization and carbon footprint analysis minimize waste, reduce energy usage, and optimize fuel efficiency. Businesses can evaluate supplier sustainability practices and make eco-conscious decisions. For example, AI tools can analyze transportation routes to minimize fuel emissions, aligning companies with global environmental goals like Net-Zero Carbon. This not only reduces costs but also strengthens corporate responsibility and brand reputation.

- **AI Technologies**

The underlying technologies driving all these improvements include Machine Learning (ML), Predictive Analytics, Robotic Process Automation (RPA), and IoT. These tools process large datasets, automate repetitive tasks, and generate actionable insights. RPA, for example, streamlines order processing, saving time and reducing errors, while IoT enhances supply chain visibility. Together, these technologies enable businesses to achieve operational efficiency, reduce costs, and improve decision-making.

4. Methodology:

The methodology of this paper is based on a conceptual framework that explores the role of Artificial Intelligence (AI) in Supply Chain Management (SCM). This framework is developed through a review of existing literature on AI applications in areas such as demand forecasting, inventory management, logistics, and sustainability. The conceptual framework integrates these insights to show how AI optimizes operations and enhances resilience in SCM. The methodology emphasizes synthesizing theoretical findings and practical examples from previous studies to build a comprehensive understanding of AI's impact on supply chains.

5. Findings & Conclusion:

The findings indicate that AI plays a crucial role in enhancing supply chain efficiency, optimizing demand forecasting, and improving decision-making. Through predictive analytics, AI-driven tools have proven to enhance inventory management, reduce stockouts, and minimize excess inventory (Chaudhari, 2022; Kumar et al., 2024). AI technologies also improve logistics, with route optimization and real-time tracking reducing transportation costs (Patel et al., 2023). Moreover, AI supports sustainability by optimizing resources and reducing emissions, while also strengthening supply chain resilience during disruptions (Rana et al., 2023; Zhang et al., 2023).

The study concludes that AI is integral to the future of supply chain management, offering significant advancements in operational efficiency and resilience. It highlights how AI's role in demand forecasting, inventory control, and logistics management directly influences supply chain optimization and cost reduction. Moreover, AI's contribution to sustainability and risk management emphasizes its long-term value. However, barriers such as high implementation costs and data privacy concerns must be addressed to fully realize its potential. AI's adoption will continue to reshape the way supply chains operate, providing a competitive advantage.

6. Discussion:

The discussion reflects on the transformative potential of AI in SCM, with a focus on the practical applications identified in the findings. It emphasizes that while AI offers substantial benefits, the challenges related to data integration, workforce adaptation, and cybersecurity must be considered for successful implementation. Furthermore, businesses must invest in the right AI infrastructure and training to ensure long-term success. The discussion also highlights the need for further research into overcoming adoption barriers, particularly in smaller organizations, to ensure AI's broad applicability across the supply chain industry.

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Chapter -16: A Study on Effect of Advertising on Adults and their Buying Behaviour

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Abstract: This research paper is the summary on effect of advertising on adults and their buying behaviour as we all know, Advertising plays a major role in shaping the perceptions, behaviors, and lifestyle choices of youth today. With advertisements becoming more pervasive on social media, TV, and online platforms, young people are constantly exposed to commercial messages designed to influence their thoughts and actions. These ads can have both positive and negative effects on their development, self-esteem, and mental health. On the positive side, advertising helps introduce youth to new products and can make them feel connected to trends or communities. However, there are negative aspects too, such as the risk of encouraging unhealthy habits or promoting materialism. The study on the effect of advertising on youth and their buying behavior aims to understand how advertisements influence young people's purchasing decisions.

This study aims to explore the multifaceted effects of advertising on youth and its subsequent influence on their buying behavior. The research is conducted within Navi Mumbai only including the youths of our surrounding. In this report behaviour of youth due to advertising has been explained.

Introduction:

Advertising plays a big role in our daily lives. It is everywhere—on TV, social media, billboards, and even in the apps we use. Its main goal is to grab our attention and persuade us to buy products or services. For adults, advertising can influence the choices they make when shopping. It can affect how they see brands, what they think they need, and even how much they are willing to spend.

Understanding how advertising impacts adults' buying behavior is important because it helps businesses create better strategies and allows consumers to make informed choices. This study looks at the ways advertisements influence adults, what makes ads effective, and how they shape purchasing decisions. By exploring this topic, we can better understand the connection between advertising and consumer behavior. The impact of advertising on consumer behavior, particularly among the youth, has been a topic of growing interest in both academic and commercial spheres. Advertising, as one of the most pervasive and influential marketing tools, plays a crucial role in shaping attitudes, perceptions, and purchasing decisions among this

demographic.

Key Concepts and Related Keywords:

How Do Advertisements Affect Youth?

Advertisements have a powerful impact on youth, shaping their choices, preferences, and behaviors. Whether it's promoting fashion, technology, or fast food, ads are designed to create desire and influence buying decisions. However, excessive exposure can also lead to negative outcomes, such as materialism or unhealthy lifestyle choices.

How Does Advertising Affect Children's Mental Health?

Advertising can contribute to mental health issues by promoting unhealthy ideals, such as the need to be thin, rich, or perfect. Constant exposure to such ads can lead to anxiety, depression, and body image issues in children and teenagers.

What Are the Negative Effects of Advertising on Youth?

The negative effects of advertising on youth include promoting materialism, unhealthy eating habits, and creating unrealistic expectations about life and success. Ads that emphasize physical appearance, wealth, and status can also lead to feelings of inadequacy and lower self-worth.

What are the Positive Effects of Advertising on Youth?

Positive impacts of advertising include raising awareness about important causes, promoting innovation, encouraging social responsibility, and providing educational content. Some ads focus on inspiring young people to achieve their goals or make a positive difference in the world.

Objectives of the study:

- To analyze the impact of advertising on adults' buying decisions.
- To analyze the role of product quality claims in advertisements on adults' purchase intentions.
- To examine how advertising influences the buying behavior of adults
- To study the changes in adult buying behavior due to evolving advertising trends over time

Limitations of the Study:

- The research study is limited only within in the Navi Mumbai.
- The 52 responded taken into consideration for data collection.
- This report consist of to know whether the youths are getting impact due to advertising.

Hypothesis of the study:**General Hypothesis - Effect Of Advertising On Adults And Their Buying Behaviour”**

- H0: Youths are getting affected by advertising.
- H1: : Youths are not getting affected by advertising

Data Analysis And Interpretation :**a. Respondents Age Group**

Age	Percentage
Under 18	9.6%
18 - 24	71.2%
24 – 30	15.4%

Source: Primary data

Interpretation: The study indicates that the majority of responses came from adults aged 18 to 24 (71.2%), followed by those aged 24 to 30 (15.4%). A smaller percentage of responses came from individuals under 18 (9.6%) and the 18 to 24 age group (7.2%).

b. How often do you watch TV or stream videos online?

Daily	30.8%
Several times a week	40.4%
Once a week	15.4%
Less than once a week	13.5%

Source: Primary data

Interpretation: The study shows that most respondents watch TV or stream videos several times a week (40.4%), with 30.8% watching daily, indicating a high level of media consumption. The objective was to analyze frequency patterns in TV and online video viewing, and understand its potential impact on adult buying behavior.

c. Do you often notice ads on social media platforms?

Yes	30.8%
Sometimes	40.4%
Rarely	13.5%
never	13.5%

Source: Primary data

Interpretation: The majority of respondents notice ads on social media either often (30.8%) or sometimes (40.4%), while a smaller group rarely (13.5%) or never (13.5%) notices them. This suggests that social media ads have a moderate to high visibility among users, with some users less aware of them.

d. Which type of ads do you find most appealing?

Celebrity endorsements	15.4%
Discounts/Promotions	50%
Creative/entertaining ads	21.2%
Emotional or inspirational ads	13.5% 1

Source: Primary data

Interpretation: The most appealing type of ad is discounts/promotions, preferred by 50% of respondents. Creative/entertaining ads follow at 21.2%, indicating a preference for value-driven and engaging content over celebrity or emotional appeals.

e. Have you ever purchased a product after seeing an ad online or on TV?

Yes, often	13.5%
Sometimes	38.5%
Rarely	30.8%
never	17.3%

Source: Primary data

Interpretation: A significant 52% of respondents have purchased a product after seeing an ad, with 38.5% doing so sometimes. However, 48% rarely or never make purchases based on ads, indicating varying levels of ad effectiveness.

f. What factors most influence your buying decision when you see an ad?

Price	13.5%
Product quality	48.1%
Brand reputation	19.2%
Social media influencers/celebrityendorsements	9.6%
Reviews/ratings	9.6%

Source: Primary data

Interpretation: Product quality is the most influential factor in buying decisions, with 48.1% prioritizing it. Price and brand reputation follow, while social media influencers and reviews have a lesser impact.

g. Do you think advertising influences your purchasing decisions?

Yes, a lot	23.1%
Yes, a little	48.1%
Not really	21.2%
Not at all	7.7%

Source: Primary data

Interpretation: The majority (71.2%) believe advertising influences their purchasing decisions to some extent, with 48.1% stating it has a little impact. Only 28.9% feel ads have little to no effect on their choices.

h. Do you feel that advertisements are mostly honest or misleading?

Mostly honest	7.7%
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Mostly misleading	26.9%
Neutral	46.2
I am not sure	19.2%

Source: Primary data

Interpretation: A majority (73.1%) either view ads as neutral or misleading, with 26.9% finding them mostly misleading. Only 7.7% believe advertisements are mostly honest, highlighting skepticism among respondents.

i. Do you think advertisers should focus more on advertising to young people like yourself?

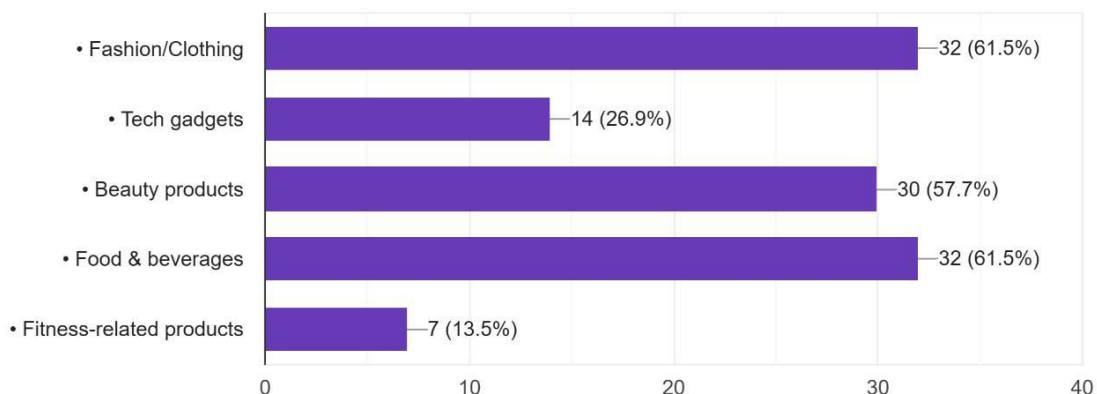
yes	59.6%
No	11.5%
Not sure	28.8%

Source: Primary data

Interpretation: A strong majority (59.6%) believes advertisers should focus more on young people, while only 11.5% disagree. The remaining 28.8% are unsure, indicating a clear preference for targeting younger demographics.

j. What type of products do you usually buy after seeing an advertisement?

What type of products do you usually buy after seeing an advertisement? (Check all that apply)
52 responses



Source: Primary data

Interpretation: Fashion/clothing, food & beverages, and beauty products are the most purchased items after seeing an ad, with 61.5% selecting each. Tech gadgets and fitness-related products are less likely to drive purchases, with only 26.9% and 13.5%, respectively.

Testing of Hypothesis:

From the primary data research collection majority of the responded always go for buying any product with the help of advertising itself and really plays a very crucial role for youth which can turn there mindset towards various other product and the alternative hypothesis Youths are getting affected by advertising proved and null hypothesis has been rejected.

Conclusion

In conclusion, a study on the effect of advertising on youth and their buying behavior shows that advertising plays a powerful role in shaping the purchasing decisions of young people. Youth are highly influenced by ads, especially those seen on social media, TV, and online platforms. These ads often encourage them to buy products, try new trends, or follow celebrity endorsements. Overall, it's clear that advertising has a significant impact on the buying behavior of youth. It's important for businesses to create ads that are ethical, responsible, and respect young consumers. At the same time, young people should be educated on how to recognize advertising tactics and make more thoughtful purchasing decisions. The study suggests that by understanding these effects, we can create a better balance between marketing and consumer protection for youth.

Suggestions

- **Impact of Misleading Ads:** Analyze how exaggerated claims or false advertising affect consumer trust and purchasing behavior.
- **Mental Health Impacts:** Study the long-term effects of advertising on mental health, particularly concerning body image and financial stress.
- **Sustainability and Responsibility:** Investigate how ads promoting eco-friendly products influence consumers toward sustainable choices.
- **Global vs. Local Brands:** Assess whether local or global brands have stronger advertising impacts in specific demographics.
- **Support Systems:** Provide counseling or workshops for individuals who experience negative impacts like anxiety or body image issues due to advertisements.
- **Promote Realism in Ads:** Showcase realistic lifestyles and body types to help reduce the adverse effects on mental health.
- **Educational Ads:** Use advertising as a tool to educate consumers about important issues like financial literacy, health, and environmental sustainability.

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- *ADVERTISEMENT IMPACT ON YOUTH*
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Chapter -17: A Study on Awareness About Digital Financial Services Among Individuals in Navi Mumbai

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***Abstract :** The adoption of digital financial services significantly contributes to improving financial literacy and promoting financial inclusion within the economy. Accordingly, this study aims to evaluate the awareness levels of individuals regarding digital financial services in Navi Mumbai. This research is of national relevance, as it supports efforts to enhance financial literacy on a broader scale.*

To collect the responses from individuals including male, female and others, a questionnaire-based survey was conducted. In total 50 usable responses were collected. Data were analysed. The result shows there is a significance difference between the awareness about digital financial services among male, female and others individuals of Navi Mumbai

The significance differences about Awareness have also been found on the basis of frequency of using online to offline and offline to online. However, no notable differences have been observed on the basis of their Age and Qualification. The study limits to the individuals of Navi Mumbai. Further only Navi Mumbai region has been covered under the study. The findings will provide valuable insights for policymakers in promoting digital financial inclusion and enhancing financial literacy.

***Keywords :** Digital Financial Services, Awareness, Individuals.*

1. INTRODUCTION

Today information technology has accelerated the functions of Indian financial institutions. The current era can be rightly said as a Digital era and it has become essential for banking and financial institutions to focus on digitalization for its survival and growth. Internet has been considered as the most valuable tool for sharing of data and other relevant information. It is the fastest medium of communication. Information technology is a business driver and thus can be used to reinforce competitive edge (Porter and Millar, 1985). Digital financial services (DFS) help to deliver basic financial services to the poor people through effective and effective techno knowledge like instruments needed for innovative technologies i.e. mobile-phones, electric money models and nowadays, platform for digital payment services. Channels provided can help to drop down costs for customers and service providers opening the doors to remote and reserved populations. Financial regulators globally recognize the significant role digital financial services (DFS) can play in advancing financial inclusion and are working to create supportive environments to unlock this potential.

In doing so, regulators seek to learn from policy and regulatory approaches that have been successfully tested and implemented in other countries. The AFI Digital Financial Services (DFS) Working Group actively facilitates peer-to-peer learning and serves as a valuable platform for regulators and financial services professionals to share knowledge and experiences.

Along with adopting a digital system it has also become essential for banks to build awareness among people about digital financial products and services. The research studies around the world have shown lack of financial awareness and knowledge among individuals. Digital financial inclusion in India remains relatively low, indicating limited awareness among individuals regarding digital financial services and products.

Keeping in view the above problems of digital financial inclusion in the present study researchers have tried to find out the awareness about digital financial services among individuals in Navi Mumbai on the basis of age, gender, education, occupation, income, and their views and knowledge in digital financial services.

2. REVIEW OF LITERATURE

- **Beshouri, Chaia, Cobert, & Gravråk (2010):** Technology can eliminate logistical difficulties and significantly reduce transaction costs, thereby increasing financial inclusion in rural areas.
- **Prakash & Gounder (2007) :**The revolution in mobile technology has significantly transformed the financial landscape, prompting banks to provide financial services through digital platforms.
- **Caruana, 2016:** India is experiencing a lack of digital financial awareness among its population, primarily due to insufficient financial literacy. The widespread adoption of digital technologies has amplified the pervasiveness and scale of cyber-attacks that pose significant threat to the security and privacy of customers' data on digital platforms; and regulators' awareness of cyber risks could prompt regulators to rethink the trade-off between efficiency and security in financial services.
- **Hoffman et al (2008) :** Users of digital financial services, especially those from low-income and disadvantaged backgrounds, are vulnerable to cyber-attacks due to a lack of awareness about digital systems and financial products. They are not financially literate and are not always required to read terms of service agreements. Lack of financial awareness have also found in individuals.
- **Pallab Sikdar and Munish Makkad (2013) :** Studies the benefits it provides from the point of view of bank's customers as well the banking organization. Internet banking, a major constituent of e-banking framework, has changed the dynamics of commercial banking worldwide by virtually bringing the entire banking set-up at the doorstep of a common banking customer.
- **Gurpreet Kaur (2015):** The Study examines the effect of Digital India initiative on the concept of financial inclusion. The Digital India initiative has the potential to connect various segments of society and contribute to achieving financial inclusion through digital banking.

3. OBJECTIVES OF THE STUDY

1. To compare awareness about digital financial services on the basis of gender.
2. To compare awareness about digital financial services on the basis of Income.
3. To compare awareness about digital financial services of level of education.
4. To compare awareness about digital financial services on the basis of level of age group.
5. To compare awareness about digital financial services on the basis of occupation.
6. To analyse the significance of socioeconomic profile of the respondents towards awareness of digital financial services.

3.1.HYPOTHESIS OF THE STUDY

Null Hypothesis (H₀): There is no significant difference between digital financial awareness to relationship with the use of digital instruments.

Alternative Hypothesis (H₁): There is a significant difference between digital financial awareness to relationship with the use of digital instruments.

3.2.LIMITATIONS OF THE STUDY

- The study is limited to individuals only.
- The study is limited to digital financial services awareness.
- The study is limited to individuals in Navi Mumbai.

4. RESEARCH METHODOLOGY

Research methodology describes how the research study was undertaken. This includes the specification of research design, source of data, and methods of primary data collection and the sampling method.

The universe of the study consists of the individuals of Navi Mumbai in various age groups. This research study is only based upon descriptive research designs where researcher has no control over the variables; we can only report what has happened & what is happening.

The proposed study is conducted on the awareness about digital financial services among individuals in Navi Mumbai. Convenient sampling method has been used as a sampling design and data is collected from primary source through survey questionnaire. Various tool and techniques have been used for the analysis.

For the selection of the sample, Convenient Sampling method has been adopted and an attempt has been made to include all the age groups of individuals in Navi Mumbai.

- **Area of the study:** The study was conducted among the people in Navi Mumbai.
- **Sample size:** A sample size of 50 respondents was selected using stratified sampling is a type of nonprobability which involves the sample being drawn from the part of the population which is close to the hand.
- **Data collection method / tools used for analysis:** To conduct the investigation for achieving the objectives of the study, A well-structured set of questionnaires was

presented to the respondents to assess or to capture their extent of awareness for digital financial services.

5. DATA ANALYSIS & FINDINGS OF THE STUDY

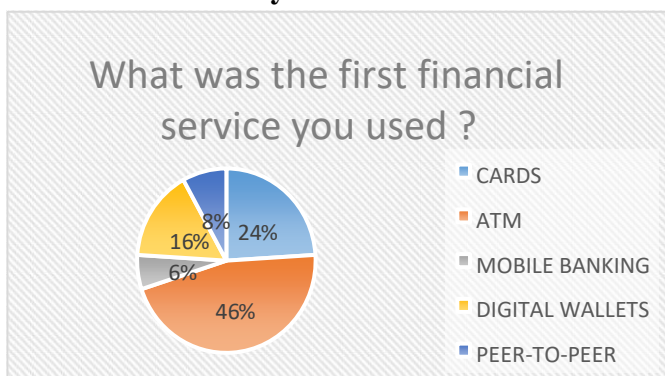
PERCENTAGE ANALYSIS

The below table summarizes the respondent's demographic characteristics. 27 (54%) of the 50 people were female, while 21 (42%) were male and 2 (4%) were others. Respondents between the age of 18-20 were 22 (44%), between the age of 21-23 were 14 (28%), between the age of 24-26 were 4 (8%), between the age of 27-30 were 2 (4%) and above the age of 30 were 8 (16%). 2 (4%) people were SSC (education), 15 (30%) people were HSC (education), graduated were 23 (46%), 7 (14%) were post graduated and 3 (6%) of people were professionals. 1 (2%) people were public employee, 9 (18%) were private employed, 7 (14%) of people were self-employed. 6 (12%) people were businessman / businesswomen, 3 (6%) were homemakers, 3 (6%) were retired, and 21 (42%) were students. 21 (42%) of people were having an annual income of 0 to 200000, 7 (14%) were having an annual income of 300000 to 500000, 12 (24%) were having an annual income of 600000 to 900000, 5 (10%) of people were having an annual income of 1000000 to 1300000 and 5 (10%) of people were having an annual income of 1300000 above.

Sr No.	Particulars	No. of respondents	%
GENDER			
1	MALE	21	42%
2	FEMALE	27	54%
3	OTHERS	2	4%
	TOTAL	50	100%
AGE			
1	18-20	22	44%
2	21-23	14	28%
3	24-26	4	8%
4	27-30	2	4%
5	ABOVE 30	8	16%
	TOTAL	50	100%
EDUCATION			
1	SSC	2	4%
2	HSC	15	30%
3	GRADUATE	23	46%
4	POST GRADUATE	7	14%
5	PROFESSIONAL	3	6%
	TOTAL	50	100%
OCCUPATION			
1	PUBLIC EMPLOYEE	1	2%
2	PRIVATE EMPLOYEE	9	8%
3	SELF EMPLOYED	7	14%

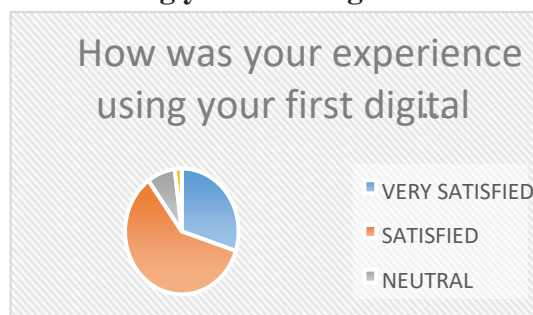
4	BUSINESSMAN/BUSINES SWOMEN	6	12%
5	HOMEMAKER	3	6%
6	RETIRED	3	6%
7	STUDENT	21	42%
	TOTAL	50	100%
ANNUAL INCOME			
1	0 TO 200000	21	42%
2	300000 TO 500000	7	14%
3	600000 TO 900000	12	24%
4	1000000 TO 1300000	5	10%
5	ABOVE 1300000	5	10%
	TOTAL	50	100%

What was the first financial service you used?



Sr. No.	PARTICULARS	No. OF RESPONDENTS	%
1	Cards	12	24%
2	Atm	23	46%
3	Mobile Banking	3	6%
4	Digital Wallets	8	16%
5	Peer-To-Peer	4	8%
	Total	50	100%

While analysing the respondents, they were asked what was the first financial service they used, in which, 12 (24%) of the 50 people used cards, 23 (46%) people used ATM's, 3 (6%) people used mobile banking, 8 (16%) used digital wallets, and 4 (8%) people used peer-to-peer. Most of the people in the data used ATM more.

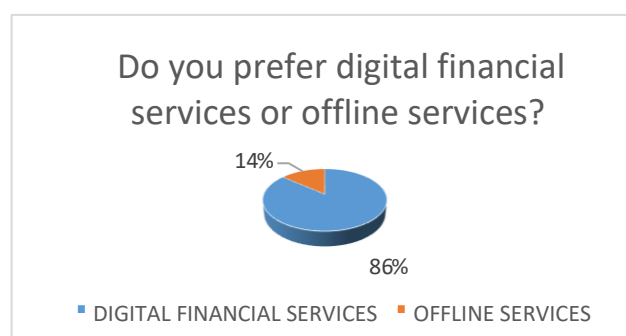
How was your experience using your first digital financial service?

Sr.No.	Particulars	No. Of Respondents	%
1	Very Satisfied	15	30%
2	Satisfied	30	60%
3	Neutral	4	8%
4	Dissatisfied	1	2%
5	Very Dissatisfied	Nil	Nil
	Total	50	100%

While analysing the respondents, the data came out as, out of 50 people, 15 (30%) people were very satisfied, 30 (60%) people were satisfied, 4 (8%) people were neutral, 1 (2%) of people were dissatisfied whereas there was nobody from the 50 people who was very dissatisfied. A majority of people are satisfied.

Do you prefer digital services or offline services?

Sr. No.	Particulars	No.OfRespondents	%
1	Digital Financial Services	43	86%
2	Offline Services	7	14%
	Total	50	100%



While analysing the respondents, we found out that 43 (86%) of the 50 people prefers digital financial services and 7 (14%) of the people prefer offline services. We can see here that most of the people prefer digital financial services rather than offline services. There is a rapid growth in the digital financial services area.

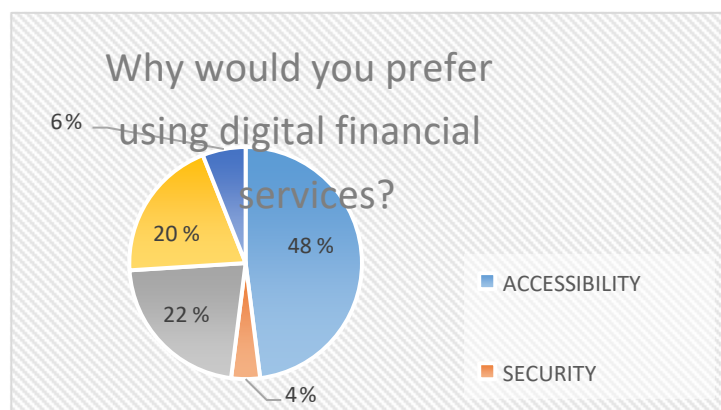
Do you feel safe using any of this financial service?

Sr No.	Particulars	No. Of Respondents	%
1	Very Safe	3	6%
2	Safe	33	66%
3	Neutral	13	26%
4	Unsafe	Nil	Nil
5	Very Unsafe	1	2%
	Total	50	100%

While analysing the respondents, we found out that 3 (6%) of the 50 respondents feels very safe, 33 (66%) of the people feel safe, 13 (26%) of the people feel neutral, there is no respondent who feel unsafe whereas, there is 1 (2%) of the people who feel very unsafe. Studying this data, we can see that majority of the people feel safe using their financial services.

Why would you prefer using digital financial services?

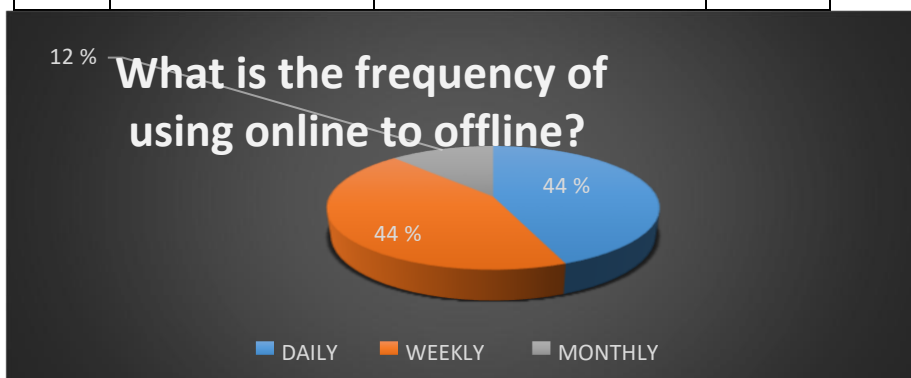
Sr.No.	Particulars	No. Of Respondents	%
1	Accessibility	24	48%
2	Security	2	4%
3	Mobile Working	11	22%
4	Environmental Friendliness	10	20%
5	Facility	3	6%
	TOTAL	50	100%



While analysing the respondents, 24 (48%) of the people prefer using digital financial services because of its accessibility, 2 (4%) of the people prefer because of security, while 11 (22%) of the people prefer because of mobile working, 10 (20%) of the people prefer because of environmental friendliness and 3 (6%) of the people prefer because of facility. We can analyse that most of the people prefer digital financial services due to ACCESSIBILITY.

What is the frequency of using online to offline?

Sr.No	Particulars	No.Of Respondents	%
1	Daily	22	44%
2	Weekly	22	44%
3	Monthly	6	12%
4	Half Yearly	Nil	Nil
5	Yearly	Nil	Nil
	Total	50	100%

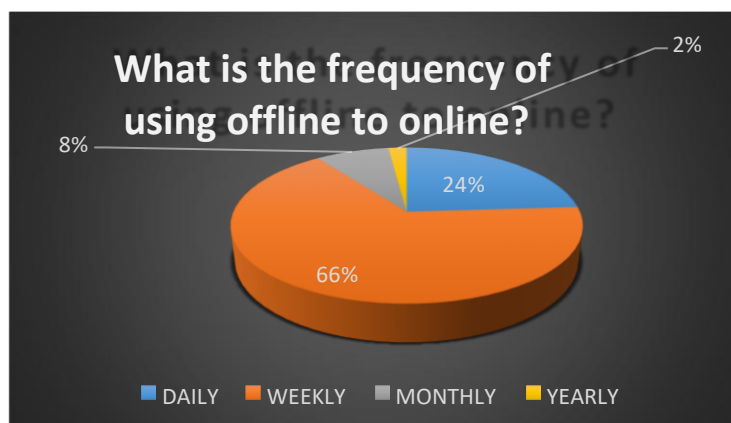


While analysing the respondents, we can see that 22 (44%) of the 50 respondents have the frequency of using online to offline of daily, while 22 (44%) have the frequency of using online to offline of weekly, and 6 (12%) have the frequency of using online to offline of monthly, here yearly and half yearly remains Nil as there are no respondents of using online to offline half yearly and yearly. We can note that the frequency of using online to offline of DAILY AND WEEKLY remained same.

What is the frequency of using offline to online?

Sr.No	Particulars	No. Of Respondents	%
1	Daily	12	24%
2	Weekly	33	66%

3	Monthly	4	8%
4	Half Yearly	Nil	Nil
5	Yearly	1	2%
	Total	50	100%



While analysing the respondents, we can see that, 12 (24%) of the 50 respondents have the frequency of using offline to online of daily, 33 (66%) of the people have the frequency of weekly, 4 (8%) have the frequency of monthly, whereas there is no frequency of using offline to online in half yearly. We can analyse that there is more frequency of using offline to online on weekly basis.

6. CONCLUSION

The adoption of digital financial system by banking and financial sectors in India is increasing because of increased digitalization process in the country. The study has found that there are differences in awareness level of males, females and others about digital financial services. Additionally, there are significant differences in age groups and qualification level to the level of awareness about digital financial services. It means difference exists at different age and qualification of students in respect of awareness about different dimensions of digital financial services. The current study is not free from limitations.

Firstly, the study has been conducted on individuals of Navi Mumbai only that may not be applicable in other cities of country.

Secondly, the study covers awareness about digital financial services on individuals which can be applicable to working individual, housewives, senior citizen, students etc.

Thirdly, the sample size taken for the study is only 50 which are very small and on the basis of which 100% accuracy of result cannot be predicted. Few demographic variables i.e. Age, Gender and Qualification and occupation of study of respondents have been taken for study while other socioeconomic variables like income of family, family environment and peer groups of individuals also affect their awareness level about digital financial services.

7. SUGGESTIONS

All these variables could be investigated in future research. Since the analysis is based on a self-structured questionnaire, there is a potential for bias in the results. The limitations of this study can provide a scope for future qualitative study in the field of awareness about digital financial services related to urban and rural individuals. Additionally, the results of this study are based on both primary and secondary data, each of which has its limitations. Future research could aim to address these limitations and incorporate a larger sample size for more comprehensive findings.

Digital Financial Services (DFS) help bridge the gap between developed and developing countries by integrating advanced technologies, making tasks such as payments, investments, and household management more convenient. DFS also addresses the lack of financial resources and information, particularly for those living in rural areas. It enables large-scale interactions with individuals and groups, facilitating a transition to the virtual world. This shift begins with online purchasing and digital payment processes and is paving the way for the country to become a cashless economy. This transformation empowers individuals to access financial services in a digital format. Education focused on financial services is crucial in today's world, as the future is increasingly globalized through digitalization.

- Launch an awareness campaign: Develop targeted campaigns to raise awareness about digital financial services, highlighting their benefits and ease of use.
- Collaboration with educational institutions: Partner with schools and universities to include digital financial literacy in their curriculum.
- Design user-friendly interfaces and services that cater to the preferences and needs of older generations.
- Foster online communities where users can share their positive experiences and insights about using digital financial services.

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