D Y PATIL INTERNATIONAL UNIVERSITY
AKURDI PUNE

FUTURE PROOFING BUSINESS

Embracing Talent, Innovation and Disruptive Technologies

Editors: Dr. Madhavi Deshpande, Dr. Priyanka Dhoot and Dr. Kranti Shingate

Publisher

JOURNAL PRESS INDIA

Journal Press India

Future Proofing Business: Embracing Talent, Innovation and Disruptive Technologies

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Book Title: Future Proofing Business: Embracing Talent, Innovation and Disruptive Technologies

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About the Book

"Future Proofing Business: Embracing Talent, Innovation, and Disruptive Technologies" is an edited book that delves into the transformative impact of talent management, innovative practices, and disruptive technologies on the business landscape. The book provides a comprehensive overview of strategies, methodologies, and research work that illustrate how businesses can future-proof themselves by leveraging these key elements. It covers topics such as digital payments, the integration of innovative technologies in business processes, corporate adaptability, and the role of disruptive innovations in driving competitive advantage. This book is an in-depth exploration of how businesses can navigate and thrive amidst rapid technological changes and evolving market demands.

By compiling diverse perspectives through research papers, the book aims to foster a deeper understanding of how talent, innovation, and disruptive technologies can be harnessed to address contemporary business challenges and promote sustainable growth. Offering a blend of theoretical insights and practical applications, it analyses how emerging technologies and innovative management practices can act as catalysts for future success. Through elucidating the potential of digital innovation, the book presents a revolutionary approach to building resilient and forward-thinking organizations.

This book navigates the paradigm shifts in business, exploring the future landscape by elaborating on the relationship between talent management, innovation, and disruptive technologies. It reveals the potential, challenges, and practical solutions that lie ahead. More than a book, this is a comprehensive roadmap for policymakers, academicians, business leaders, and change-makers who are dedicated to fostering business resilience and growth through effective technological and managerial interventions.

About the Editors

Dr. Madhavi Deshpande stands as a stalwart in the realm of academia, renowned for her multifaceted expertise and unwavering commitment to nurturing individual talents. With an illustrious career spanning over 28 years, Dr. Deshpande has left an indelible mark on the landscape of education and human resource management. As a Professor and Dean of Academics at DY Patil International University (DYPIU), her leadership has led to the introduction of innovative courses and certifications, including pioneering programs in data analytics and Microsoft Excel proficiency. Her expertise in talent management, recruitment, and training has been instrumental in driving organizational success and fostering a culture of excellence. Her insightful research on topics ranging from talent management to digital HR has garnered awards, widespread acclaim and recognition.

Dr. Priyanka Dhoot is an Assistant Professor at D Y Patil International University, Pune Her area of Teaching and research in Finance, Investment Management and FinTech. She has more than 10 years of experience in Academics. Dr. Priyanka received her Ph.D degree in Business Administration from Shivaji University Kolhapur. Her other Qualification include MBA (Finance and marketing and M.Phil (Financial Management). She has recently completed Post graduate certificate course in FinTech from National Stock Exchange (NSE) in collaboration with IMT, Hyderabad. Dr. Priyanka has published two patents and authored two books. She has written good number of research papers and got published in in ABDC and UGC listed journals. Also she has presented various research papers in National and international conferences. She believes "Dedication is the fuel that propels belief into action, transforming dreams into reality."

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. Also a subject mentor & research seminar evaluator 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 a Verified International Academic Qualifications from World Education Services.

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Preface

In an era defined by rapid technological advancements and increasing global interconnectedness, the pursuit of innovation and talent development has emerged as a paramount challenge and opportunity for the business sector. This edited book, "Future Proofing Business: Embracing Talent, Innovation, and Disruptive Technologies," brings together a diverse array of perspectives and insights from leading scholars and practitioners across these fields. At its core, this book endeavours to bridge the gap between theory and practice, offering practical strategies, innovative solutions, and critical analyses that address the complexities of future-proofing businesses in today's dynamic landscape. Through a series of meticulously curated chapters, we explore how organizations can integrate talent management, innovation, and disruptive technologies into their core strategies, operations, and decision-making processes.

"Future Proofing Business: Embracing Talent, Innovation, and Disruptive Technologies" encompasses a wide spectrum of critical topics shaping contemporary discourse. From an examination of cutting-edge talent acquisition strategies to a review of innovative leadership models, the book navigates through the evolution of business practices in the context of disruptive technologies, emphasizing sustainable development. The transformative shifts in digital innovation and the rise of AI and machine learning are explored alongside changing paradigms in employee engagement and organizational culture. The impact of big data and analytics on decision-making processes is scrutinized, highlighting the role of digital technologies in driving competitive advantage and fostering inclusive growth. Each contribution reflects the contributors' deep commitment to advancing business goals while navigating the challenges posed by a rapidly changing world.

We extend our gratitude to all the authors who have contributed their expertise and dedication to this book, as well as to the readers who share our vision of a more innovative and resilient future. Together, let us be a part of this transformative journey as we explore and embrace the pivotal roles of talent, innovation, and disruptive technologies in shaping the future of business.

Editors

Dr. Madhavi Deshpande
Dr. Priyanka Dhoot
Dr. Kranti Shingate

Acknowledgments

Editors

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CHAPTER 1

Transforming Insurance Landscapes: Exploring User Adoption and User Satisfaction in the Era of Insurtech

Abhilasha Ravindra Tikone* and Anuradha Patil**

ABSTRACT

Insurtech encompasses a wide range of technologies, including artificial intelligence, machine learning, blockchain, Internet of Things (IoT), and data analytics, which are leveraged to streamline insurance processes, improve underwriting accuracy, personalize customer experiences, and optimize claims management. The insurance industry is undergoing a significant transformation driven by technological advancements, leading to the emergence of Insurtech. This shift is reshaping traditional insurance practices, offering innovative solutions to enhance efficiency, risk management, and user satisfaction. This study investigates the factors influencing user adoption of Insurtech solutions, assesses user satisfaction with Insurtech-enabled insurance services, and explores the relationship between Insurtech adoption and user satisfaction. Through data collected from 102 respondents, both alternate and null hypotheses are examined to understand the impact of Insurtech technologies and regulatory support on user satisfaction. The alternate hypothesis suggests that Insurtech technologies positively influence user satisfaction, while regulatory support for Insurtech adoption enhances user satisfaction. Through empirical analysis, this paper offers insights into the dynamics of insurtech adoption, regulatory support, and user satisfaction, aiming to provide recommendations for improving the user experience in the evolving insurance landscape.

Keywords: Innovation, Insurtech, Technological Advancements, Efficiency.

1.0 Introduction

The insurance industry is currently experiencing a profound transformation catalyzed by rapid technological advancements, leading to the emergence of Insurtech—a fusion of insurance and technology. This paradigm shift is fundamentally reshaping conventional insurance practices, offering innovative solutions that enhance operational efficiency, bolster risk management capabilities, and elevate user satisfaction. Insurtech encompasses a diverse array of technologies, including artificial intelligence, machine learning, blockchain, Internet of Things (IoT), and data analytics.

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Leveraging these technological innovations, Insurtech pioneers are revolutionizing traditional insurance processes, augmenting underwriting accuracy, personalizing customer experiences, and optimizing claims management. This research paper endeavors to unravel the intricacies of Insurtech adoption and user satisfaction, serving as a compass to navigate the complexities of this dynamic landscape. By embarking on this exploration, we aim to not only elucidate the drivers and barriers shaping users' decisions to embrace Insurtech but also to gauge their levels of satisfaction with the services and platforms offered. Through a holistic examination of these dimensions, we seek to illuminate the symbiotic relationship between Insurtech adoption and user satisfaction, uncovering insights that hold the key to unlocking the transformative potential of technology in insurance. Against the backdrop of rapid technological advancement and shifting consumer preferences, this research represents a timely endeavor to chart a course for insurers and Insurtech providers alike. By gaining deeper insights into the needs, preferences, and experiences of users, we aim to equip industry stakeholders with the knowledge and understanding needed to drive meaningful change, enhance user experiences, and chart a course towards a more agile, responsive, and customer-centric future for the insurance industry.

2.0 Literature Review

2.1 Adoption of Insurtech

The adoption of InsurTech, particularly in the Indian insurance sector, is a growing trend with significant potential for reducing information asymmetry and improving risk assessment (Malik, 2022). This is particularly relevant in the motor insurance sector, where telematics devices can play a key role in this process (Malik, 2022). The COVID-19 pandemic has also accelerated the adoption of InsurTech globally, with a focus on technology factors and value chain activities (Ching, 2020). However, despite the potential benefits, there are still challenges and opportunities to be addressed in the InsurTech revolution (Suryavanshi, 2022).

2.2 Enhancing user satisfaction

A range of studies have explored methods for enhancing user satisfaction in various contexts. Sukamto (2020) and Lynn (2020) both emphasize the importance of user-centered design and usability testing in improving the user experience of websites and mobile applications. Kleppmann (2007) further discusses technical considerations for enhancing the mobile web experience. Kwon (2019) extends this discussion to the physical and psychological factors that can increase user satisfaction in office renovations. These studies collectively highlight the significance of user-focused approaches, usability testing, and the integration of physical and psychological factors in enhancing user satisfaction.

2.3 Emergence of technology in Insurtech

The emergence of InsurTech, a subdimension of FinTech, is transforming the

insurance sector by providing cost-effective policy solutions and innovative technologies (Yildirim, 2019). This trend is particularly significant in India, where the uninsured population is substantial, and in Indonesia, where digital transformation is driving the development of InsurTech (Suryavanshi, 2022; Susanto, 2022). However, the rapid expansion of InsurTech also brings potential risks and regulatory concerns, which need to be addressed to facilitate its development (Lin, 2019).

2.4 Regulatory framework

Regulatory frameworks and policy developments play a significant role in influencing InsurTech adoption and user satisfaction. Chhabra (2020) and Simpson (2015) both highlight the importance of technology characteristics, user traits, and government policies in shaping technology satisfaction and adoption behavior. Kennedy (2013) and Mukherjee (2020) further emphasize the need for balanced renewable energy policies, considering a range of determinants such as economic factors, consumer preferences, and built-environment characteristics. These findings suggest that a comprehensive approach, including financial measures, information provision, and support for technology compatibility, is crucial in promoting InsurTech adoption and user satisfaction.

2.5 Relationship between user adoption and user satisfaction in insurtech

Research has consistently shown a positive relationship between user satisfaction and user adoption in the context of InsurTech. Kaur (2023) found that the adoption of InsurTech positively impacts customer satisfaction in the Indian life insurance industry. This is further supported by Amoako-Gyampah (1993), who demonstrated that user involvement, a key factor in user satisfaction, is positively related to system success. However, Olson (1981) highlighted the complexity of this relationship, suggesting that the type and degree of user involvement can significantly impact user satisfaction and system usage. Therefore, while user satisfaction is a key driver of user adoption in InsurTech, the specific factors influencing this relationship require further exploration.

3.0 Research Methodology

3.1 Objectives
1. To investigate the factors influencing user adoption of Insurtech solutions in the insurance industry.
2. To assess user satisfaction with Insurtech-enabled insurance services and platforms.
3. To explore the relationship between Insurtech adoption and user satisfaction.

3.2 Research methodology / approach
1. *Research Approach:* This study adopts a quantitative approach to investigate and analyze user adoption, and satisfaction regarding Insurtech solutions in the

insurance industry. This approach facilitates the collection of numerical data, which can be statistically analyzed to derive meaningful conclusions.

2. *Research Design:* The research design is cross-sectional, aiming to gather data at a specific point in time. This design is well-suited for examining user satisfaction towards Insurtech solutions and understanding the factors influencing their adoption in the insurance sector.

3. *Sampling Technique:* Convenience sampling is utilized to gather data from respondents. This method involves selecting individuals who are easily accessible and available. Given the scope of the study, convenience sampling is deemed appropriate for efficiently reaching a diverse range of participants.

4. *Sample Size:* The target sample size for this study is 102 respondents. While convenience sampling may introduce some bias, this sample size is considered sufficient to obtain valuable insights into user adoption, and satisfaction regarding Insurtech solutions in the insurance industry.

5. *Data Collection:* Data is collected through a structured questionnaire distributed to respondents online. The questionnaire comprises closed-ended questions designed to assess user satisfaction and factors influencing their adoption of Insurtech solutions.

4.0 Data Analysis and Interpretation

4.1 Gender of respondent

Table 1: Gender of Respondents

Gender	No. of Respondents	Percentage
Male	62	60.80%
Female	40	39.20%
Total	102	100.00%

Source: Primary data

Figure 1: Gender of Respondents
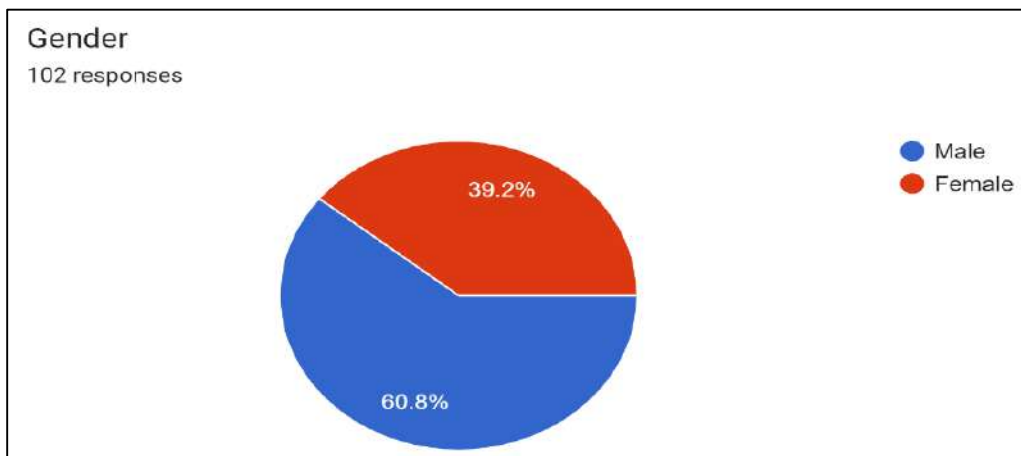
Source: Primary data

Interpretation: The gender distribution among respondents, with 60.80% male and 39.20% female, provides insight into the demographic makeup of the study sample. This breakdown prompts consideration of potential gender-specific attitudes and behaviors towards Insurtech adoption and user satisfaction.

4.2 Age Group of Respondents

Table 2: Age group of Respondents

Age	No. of respondents	Percentage
18-24	38	37.30%
25-34	31	30.40%
35-44	8	8%
45-54	21	20.60%
55 and above	4	3.90%
Total	**102**	**100.00%**

Source: Primary data

Figure 2: Age group of Respondents
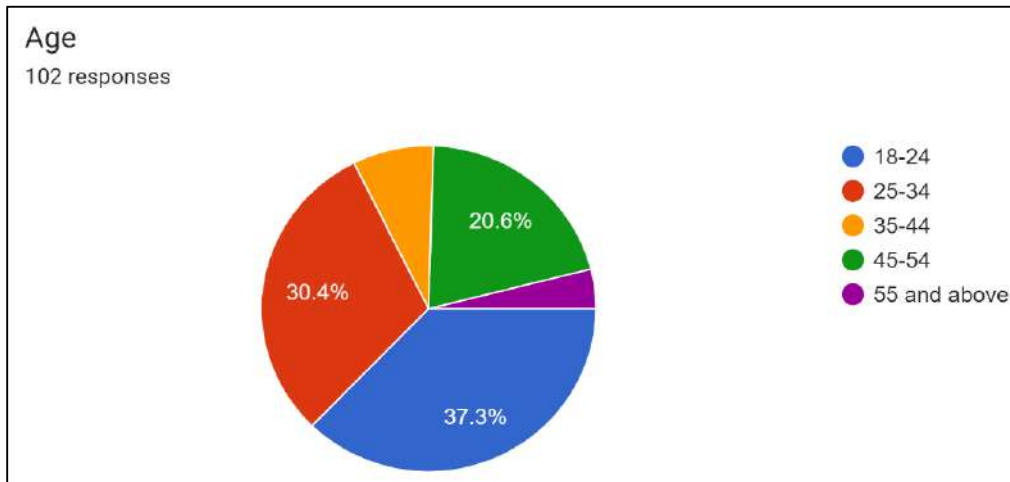
Source: Primary data

Interpretation: The age distribution of respondents in the study reveals a diverse sample, with the majority falling within the 18-24 and 25-34 age brackets, comprising 37.30% and 30.40% respectively. While participants aged 45-54 also represent a significant portion at 20.60%, smaller percentages are seen in the 35-44 and 55 and above categories (8% and 3.90% respectively). This demographic breakdown underscores the necessity of considering age-related factors in understanding attitudes towards Insurtech adoption and user satisfaction.

4.3 Education Level

Table 3: Education Level

Education Level	No. of respondents	Percentage
High School Diploma or equivalent	3	2.90%
Bachelor's Degree	40	39.20%
Master's Degree	56	54.90%
Other	3	2.90%
Total	**102**	**100%**

Source: Primary data

Figure 3: Education Level
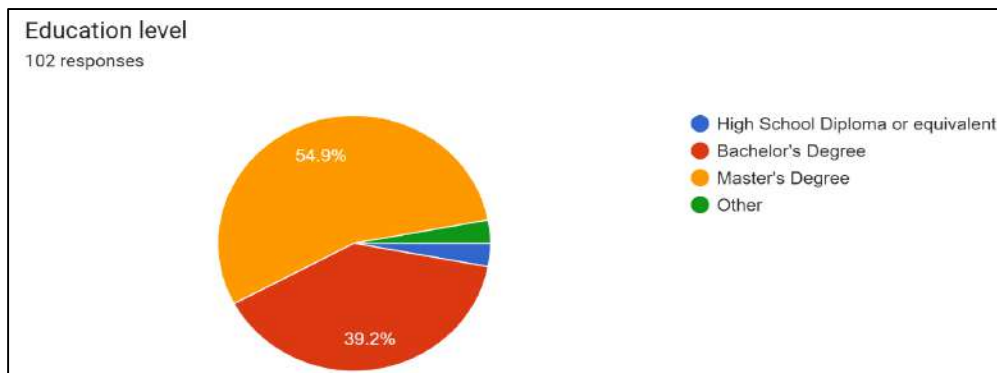
Source: Primary data

Interpretation: The distribution of respondents' education levels indicates a highly educated sample, with the majority holding either a Bachelor's Degree (39.20%) or a Master's Degree (54.90%). A smaller proportion reported having a High School Diploma or equivalent (2.90%), while a similar percentage falls under the "Other" category (2.90%). This breakdown underscores the importance of considering educational backgrounds when examining attitudes and behaviors towards Insurtech adoption and user satisfaction. Higher levels of education may correlate with greater familiarity and comfort with technology, potentially influencing individuals' perceptions and preferences regarding Insurtech solutions.

4.4 Employment Status

Table 4: Employment Status

Employment Status	No. of respondents	Percentage
Full time	48	47.10%
Part time	19	18.60%
Student	24	23.50%
Retired	1	1%
Unemployment	10	9.50%
Total	**102**	**100%**

Source: Primary data

Figure 4: Employment Status
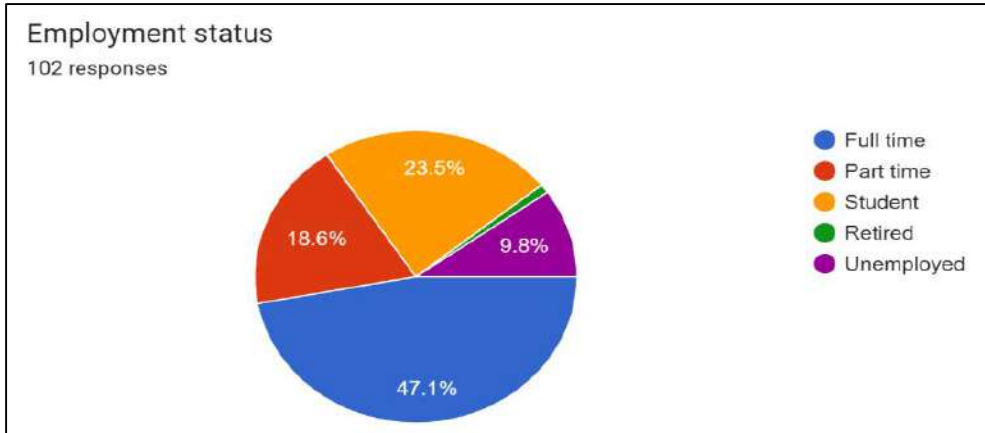
Interpretation: The breakdown of respondents' employment status illustrates a diverse representation within the sample. The majority of respondents are employed full-time, constituting 47.10% of the total. Additionally, a significant portion of the sample comprises students (23.50%), followed by part-time employees (18.60%). A smaller percentage reported being unemployed (9.50%), while retirees represent the smallest proportion (1%). This distribution underscores the importance of considering employment status when examining attitudes and behaviors towards Insurtech adoption and user satisfaction. Different employment statuses may entail varying levels of exposure to technology and insurance-related experiences, potentially influencing individuals' perceptions and interactions with Insurtech solutions.

4.5 Income level

Table 5: Income Level

Income Level	No. of respondents	Percentage
Less than ₹2,00,000	41	40.20%
₹2,00,000 - ₹3,99,999	19	18.60%
₹4,00,000 - ₹5,99,999	18	17.60%
₹6,00,000 - ₹7,99,999	13	12.70%
₹8,00,000 and above	11	10.80%
Total	**102**	**100%**

Interpretation: The distribution of respondents' income levels reveals a diverse range within the sample. The largest proportion of respondents reported earning less than ₹2,00,000, comprising 40.20% of the total. Following this, 18.60% fell within the income bracket of ₹2,00,000 to ₹3,99,999, while 17.60% reported incomes between ₹4,00,000 and ₹5,99,999. A smaller proportion of respondents fell

into the income brackets of ₹6,00,000 to ₹7,99,999 (12.70%) and ₹8,00,000 and above (10.80%). This distribution highlights the importance of considering income levels when examining attitudes and behaviors towards Insurtech adoption and user satisfaction. Income levels may influence individuals' access to and willingness to invest in technological solutions, thereby shaping their perceptions and preferences regarding Insurtech.

Figure 5: Income Level
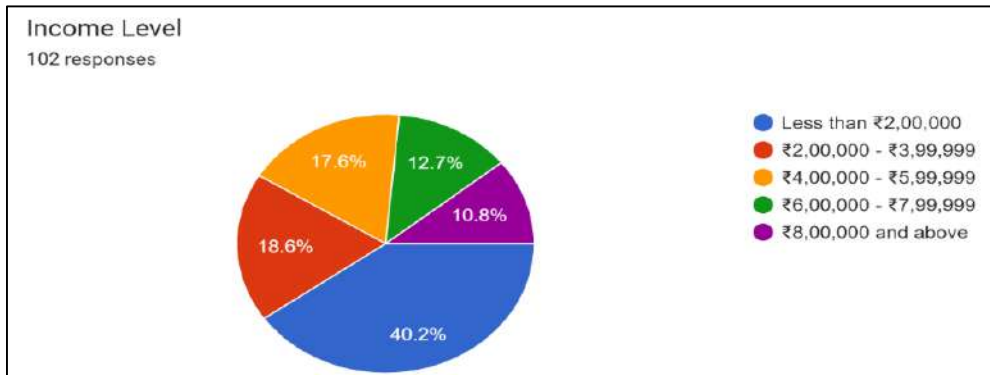
Source: Primary data

4.6 Familiarity with Insurtech

Table 6: Familiarity with Insurtech

Familiarity with Insurtech	No. of respondents	Percentage
Very familiar	45	44.10%
Somewhat familiar	49	48%
Not familiar at all	8	7.80%
Total	**102**	**100%**

Source: Primary data

Figure 6: Familiarity with Insurtech
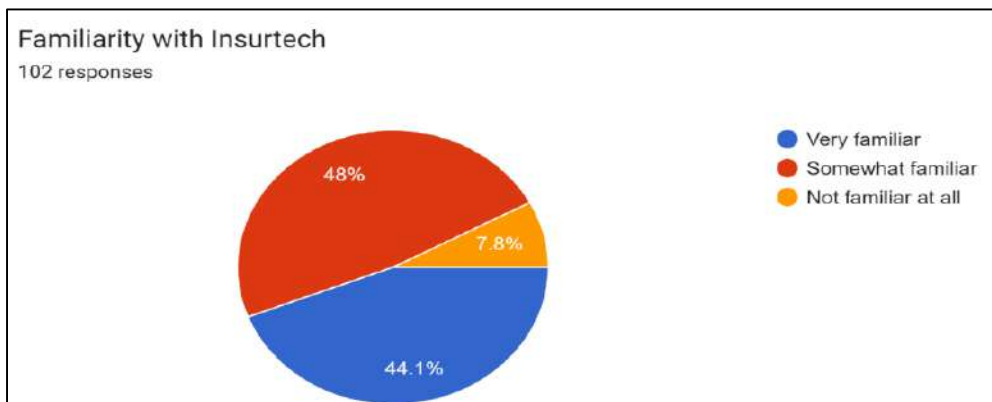
Source: Primary data

Interpretation: The data on respondents' familiarity with Insurtech indicates a notable level of awareness and understanding within the sample. A significant portion, comprising 44.10% of respondents, reported being "very familiar" with Insurtech. Additionally, 48% of respondents indicated being "somewhat familiar" with Insurtech. A smaller proportion, accounting for 7.80% of respondents, reported being "not familiar at all" with Insurtech. This breakdown underscores the importance of considering familiarity levels when examining attitudes and behaviors towards Insurtech adoption and user satisfaction.

4.7 Insurtech platforms

Figure 7: Insurtech Platforms
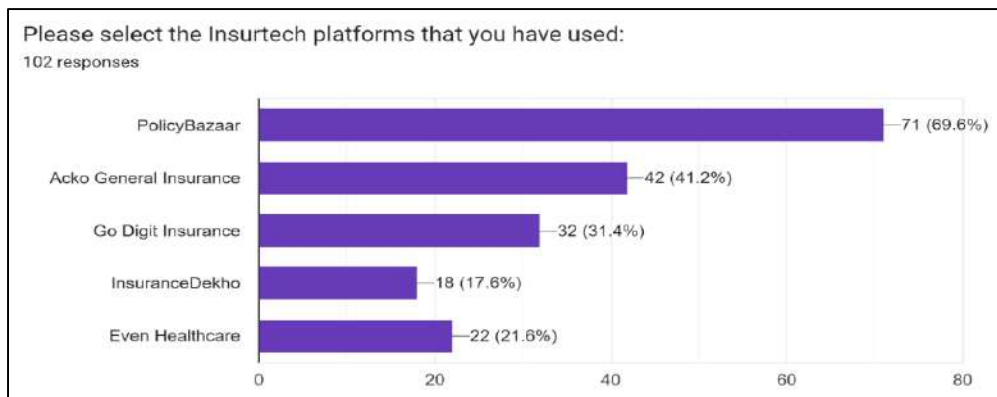
Source: Primary data

Interpretation: The bar graph shows the results of a survey question about which insurtech platforms people have used. The survey question appears to have been a multiple choice question, allowing people to select all of the platforms that they had used. The most popular platform was PolicyBazaar, with 69.6% of respondents indicating that they had used it. Acko General Insurance was the second most popular platform, with 41.2% of respondents indicating that they had used it.

4.8 How frequently do you use Insurtech platforms for your insurance needs?

Table 7: Frequency

Frequency	No. of respondents	Percentage
Daily	3	2.90%
Weekly	13	12.70%
Monthly	29	28.40%
Occasionally	46	45.10%
Never Used	11	10.80%
Total	102	100%

Source: Primary data

Figure 8: Frequency
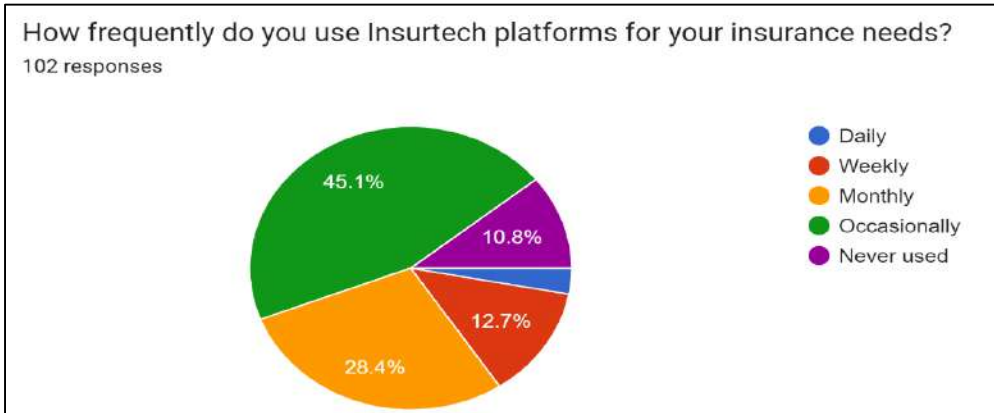
Source: Primary data

Interpretation: The distribution of respondents' frequency of Insurtech usage provides insight into the extent of adoption and utilization within the sample. A majority of respondents, comprising 45.10%, reported using Insurtech solutions occasionally. Additionally, 28.40% reported using Insurtech on a monthly basis, while 12.70% reported weekly usage. A smaller proportion of respondents reported daily usage (2.90%) or indicated never having used Insurtech (10.80%). This breakdown underscores the varying levels of adoption and engagement with Insurtech among respondents. Understanding the frequency of usage can offer valuable insights into the extent to which Insurtech solutions are integrated into users' daily lives and workflows.

4.9 User adoption ease of use

Figure 9: Ease of Use
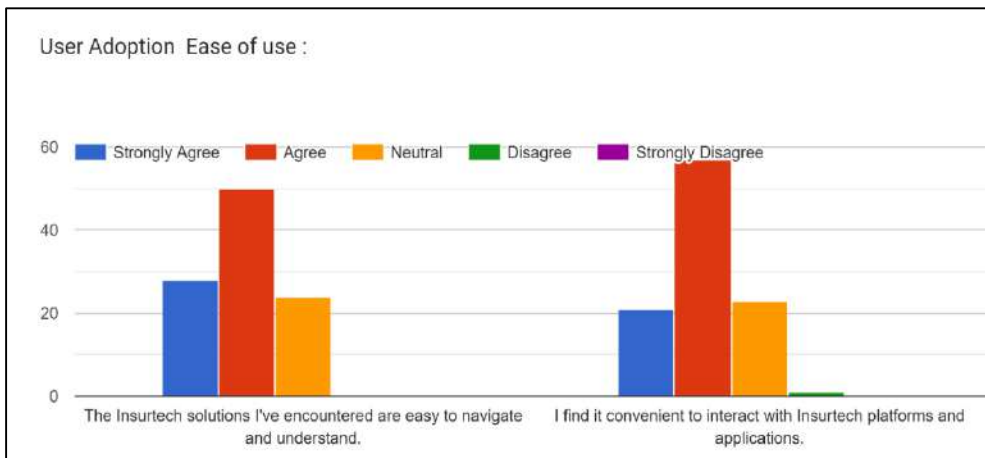
Source: Primary data

Interpretation: Assessing user adoption regarding the ease of use of insurtech solutions reveals predominantly positive perceptions among respondents. A significant majority, 50 individuals, agree that the solutions they've encountered are easy to navigate and understand, with 28 strongly agreeing. Conversely, 24 respondents remain neutral. This spectrum underscores the perceived user-friendly nature of insurtech solutions, suggesting their effectiveness in providing intuitive user experiences. Assessing user adoption regarding the ease of interaction with insurtech platforms and applications reveals overwhelmingly positive perceptions among respondents. A significant majority, 57 individuals, agree that they find it convenient to interact with these platforms and applications, with 21 strongly agreeing. Conversely, only 1 individual disagrees, suggesting minimal dissatisfaction. Furthermore, 23 respondents remain neutral. This spectrum underscores the perceived convenience and user-friendliness of insurtech platforms and applications, highlighting their effectiveness in providing seamless and accessible user experiences.

4.10 Perceived trust

Figure 10: Perceived Trust
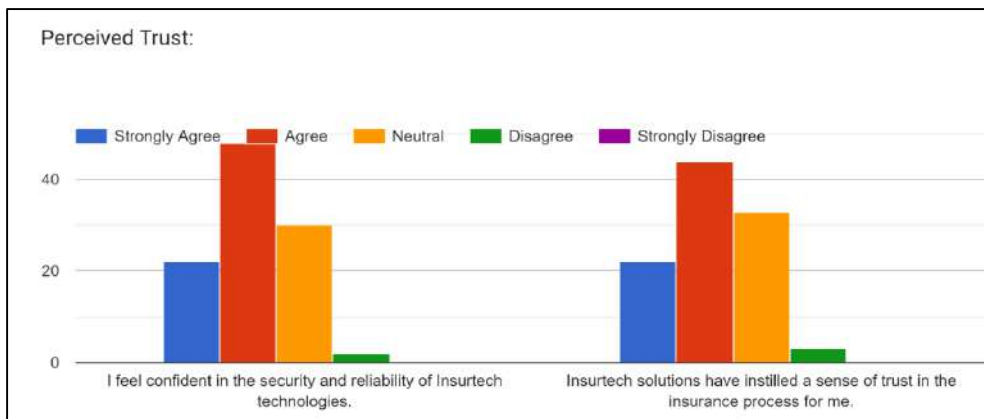
Source: Primary data

Interpretation: Perceptions of trust in insurtech technologies vary among respondents. A majority, 48 individuals, express confidence in their security and reliability, with 22 strongly agreeing. Only 2 individuals disagree, while 30 remain neutral. These diverse views highlight the need for transparency to enhance confidence in insurtech solutions, especially regarding security and reliability. Perceptions of trust in insurance processes facilitated by insurtech solutions vary among respondents. While 44 individuals agree that insurtech instills trust in the insurance process, only 22 strongly agree. Conversely, 3 individuals disagree, with 33 remaining neutral. This spectrum highlights the intricate relationship between technology and trust in insurance, emphasizing the need for transparency to bolster confidence in insurtech solutions.

4.11 Awareness /knowledge

Figure 11: Awareness / Knowledge
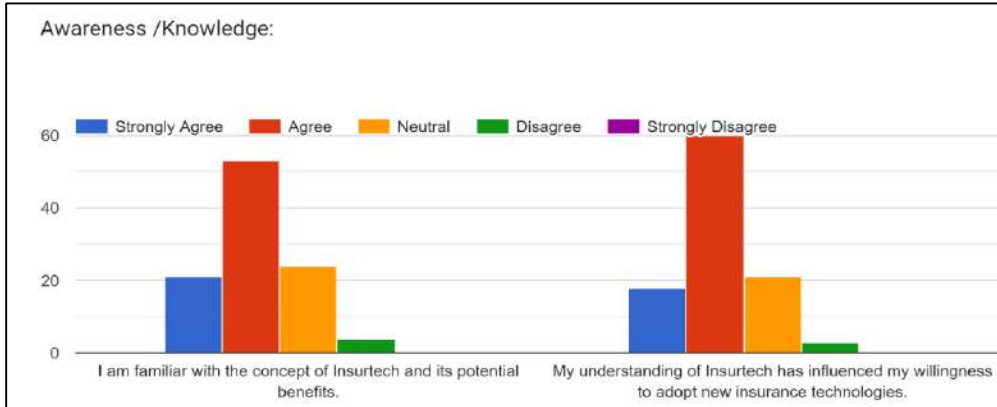
Source: Primary data

Interpretation: The assessment of awareness and knowledge concerning insurtech and its potential benefits reveals diverse viewpoints among respondents. A majority, 53 individuals, agree that they are familiar with insurtech and its advantages, with 21 strongly agreeing, indicating a robust understanding. Conversely, only 4 individuals disagree with this notion, while 24 remain neutral. This spectrum underscores varying levels of familiarity, suggesting the need for further education to enhance awareness of insurtech's benefits. The evaluation of awareness and knowledge regarding insurtech's impact on the adoption of new insurance technologies reveals varied perspectives among respondents. A majority, 60 individuals, agree that their understanding of insurtech influences their willingness to adopt new insurance technologies, with 18 strongly agreeing. Conversely, only 3 individuals disagree, while 21 remain neutral. This spectrum underscores the significant influence of insurtech awareness on adoption behavior, highlighting the importance of education and communication to facilitate wider acceptance of new insurance technologies.

4.12 User Satisfaction Regulation

Interpretation: User satisfaction with the regulatory adherence of insurtech platforms varies among respondents. A significant majority, 50 individuals, agree that they feel reassured by the platforms' adherence to regulatory standards, with 20 strongly agreeing. Conversely, only 2 individuals disagree, suggesting minimal concern. Additionally, 30 remain neutral. This spectrum underscores the importance of regulatory compliance in fostering user trust in insurtech platforms. User satisfaction with insurtech companies' compliance with regulations varies among respondents. A majority, 55 individuals, agree that regulatory compliance positively impacts their satisfaction with insurtech services, with 17 strongly agreeing.

Conversely, only 2 individuals disagree, suggesting minimal concern. Additionally, 28 remain neutral. This spectrum underscores the significance of regulatory compliance in shaping user satisfaction with insurtech services.

Figure 12: Regulation
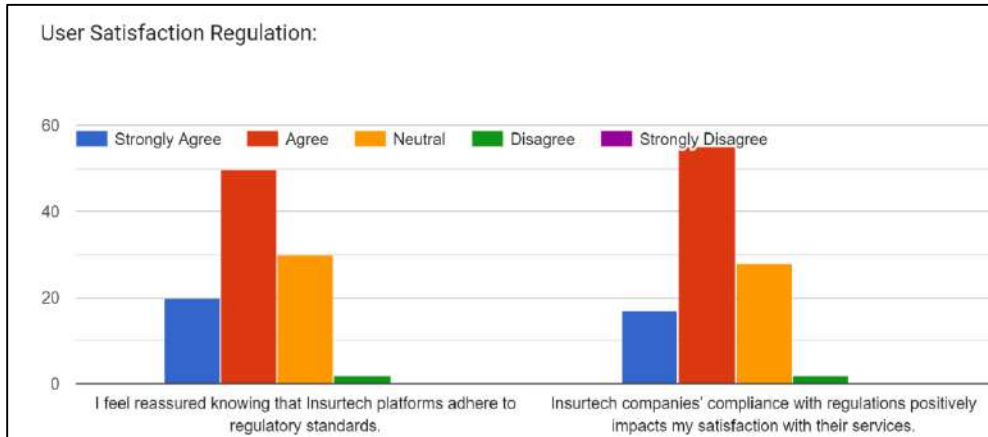
Source: Primary data

4.13 Risk

Figure 13: Risk
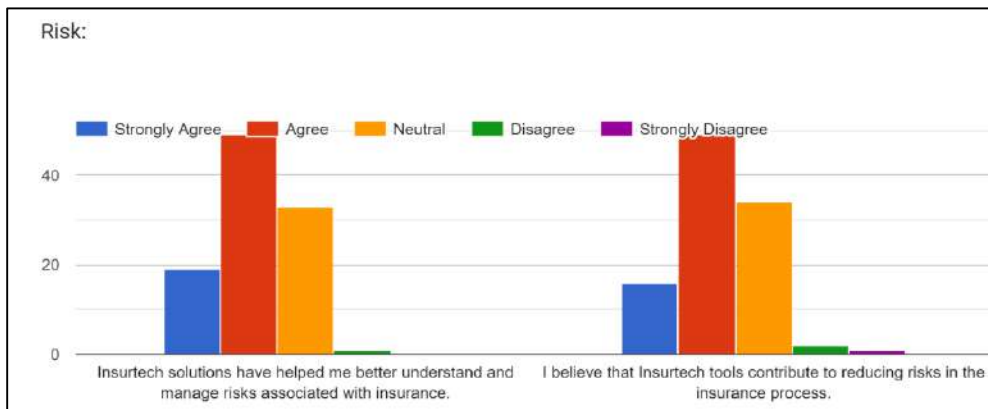
Source: Primary data

Interpretation: Perceptions on the impact of insurtech solutions on understanding and managing insurance-related risks vary among respondents. A majority, 49 individuals, agree that insurtech aids in better understanding and managing risks, with 19 strongly agreeing. Conversely, only 1 individual disagrees, indicating minimal skepticism. Additionally, 33 remain neutral. This spectrum underscores the potential of insurtech to enhance risk comprehension and

management, with room for further education and communication to address neutral or skeptical perspectives. Beliefs regarding the contribution of insurtech tools to reducing risks in the insurance process vary among respondents. A substantial majority, 49 individuals, agree that these tools contribute to risk reduction, with 16 strongly agreeing. Conversely, only 2 individuals express disagreement, suggesting some skepticism. Additionally, 34 remain neutral. Notably, only 1 individual strongly disagrees, indicating minimal dissent. This spectrum underscores the perceived potential of insurtech tools in enhancing risk management, with room for further education to address neutral or skeptical perspectives.

4.14 Availability

Figure 14: Availability
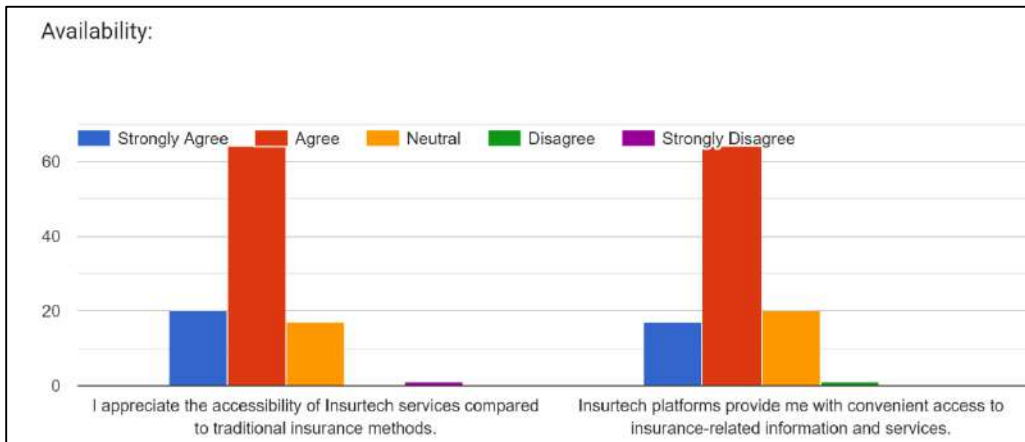
Source: Primary data

Interpretation: Attitudes towards the accessibility of insurtech services compared to traditional methods are predominantly positive among respondents. A significant majority, 64 individuals, appreciate the accessibility of insurtech services, with 20 strongly agreeing. Conversely, only 1 individual strongly disagrees, suggesting minimal dissent. Additionally, 17 remain neutral. This spectrum underscores the perceived advantages of insurtech services in accessibility, indicating their potential to meet evolving consumer needs. Perceptions regarding the convenience of accessing insurance-related information and services provided by insurtech platforms are predominantly positive among respondents. A significant majority, 64 individuals, agree that these platforms offer convenient access, with 17 strongly agreeing. Conversely, only 1 individual disagrees, indicating minimal dissatisfaction. Additionally, 20 remain neutral. This spectrum underscores the perceived benefits of insurtech platforms in providing convenient access to insurance-related resources, highlighting their potential to streamline and enhance the insurance experience for consumers.

4.15 Claim Process

Figure 15: Claim Process
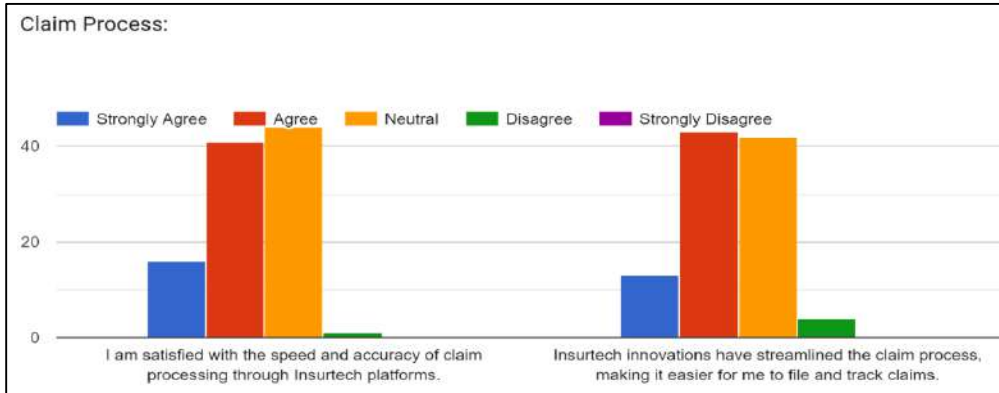
Source: Primary data

Interpretation: Satisfaction with the speed and accuracy of claim processing through insurtech platforms varies among respondents. A notable portion, 41 individuals, agree that they are satisfied with the process, with 16 strongly agreeing. Conversely, only 1 individual disagrees, suggesting minimal dissatisfaction. Additionally, 44 remain neutral. This spectrum underscores mixed perceptions, indicating opportunities for improvement to address neutral or dissatisfied perspectives and enhance overall satisfaction with claim processing through insurtech platforms. Evaluating the impact of insurtech innovations on the claim process reveals diverse perspectives among respondents. A notable portion, 43 individuals, agree that these innovations have streamlined the process, making it easier to file and track claims, with 13 strongly agreeing. Conversely, 4 individuals express disagreement, suggesting some skepticism. Additionally, 42 remain neutral. This spectrum underscores varied perceptions, indicating opportunities for enhancement to address neutral or dissatisfied perspectives and improve overall claim processing experiences with insurtech innovations.

4.16 How likely are you to recommend Insurtech-enabled insurance services to others?

Table 8: Likely to Recommend

Likely to recommend	No. of respondents	Percentage
Very Likely	17	15.70%
Likely to recommend	61	56.50%
Neutral	29	26.90%
Unlikely	1	0.90%
Not likely at all	0	0
Total	**102**	**100%**

Source: Primary data

Figure 16: Likely to Recommend

How likely are you to recommend Insurtech-enabled insurance services to others?
102 responses

- Very Likely
- Likely
- Neutral
- Unlikely
- Not Likely at All

26.9%
56.5%
15.7%
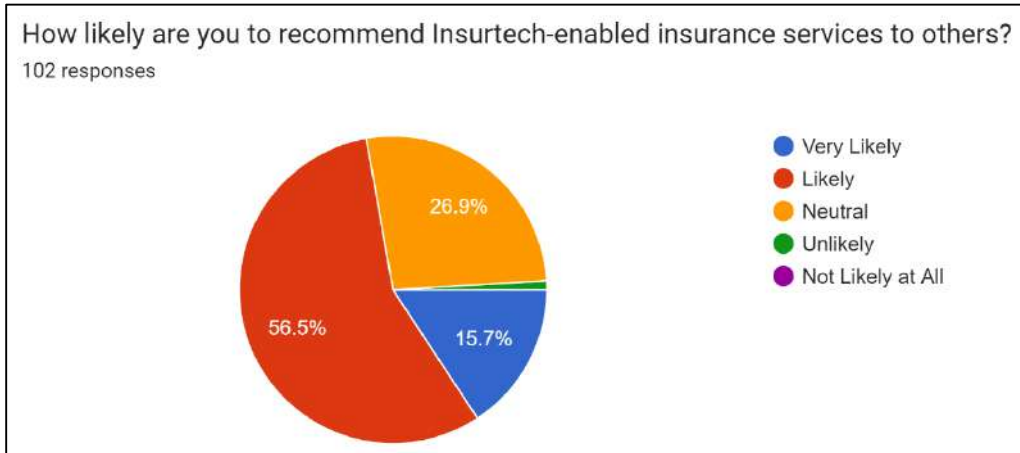
Source: Primary data

Interpretation: The data on respondents' likelihood to recommend Insurtech solutions provides valuable insights into the perceived value and satisfaction levels within the sample. Most respondents, comprising 56.50%, expressed being "likely to recommend" Insurtech solutions to others. Additionally, 15.70% reported being "very likely" to recommend Insurtech. A notable portion of respondents, accounting for 26.90%, remained neutral in their likelihood to recommend. Only a negligible percentage of respondents indicated being "unlikely" to recommend Insurtech, and none reported being "not likely at all" to recommend. This breakdown highlights generally positive sentiments towards Insurtech solutions among respondents, with a significant proportion indicating a willingness to endorse and promote their use to others.

5.0 Findings, Suggestions and Conclusion

5.1 Findings

Familiarity and Usage Patterns: The majority of respondents demonstrate a notable level of familiarity with Insurtech, with PolicyBazaar emerging as the most popular platform. However, usage patterns vary, with occasional usage being the most common pattern among respondents.

Perceptions and Satisfaction: Overall, respondents perceive Insurtech solutions favorably, with positive perceptions regarding ease of use, trust, availability, and convenience. However, perceptions regarding risk management and claim processing exhibit some variability, indicating areas for improvement.

Likelihood to Recommend: A significant proportion of respondents express a willingness to recommend Insurtech-enabled insurance services to others, highlighting the perceived value and satisfaction levels within the sample.

5.2 Suggestions

Enhanced Education and Awareness: There is a need for continuous education and awareness campaigns to enhance understanding and familiarity with Insurtech among users. This can be achieved through targeted marketing efforts, educational workshops, and user-friendly resources.

Improved User Experience: Insurtech platforms should prioritize user experience by ensuring ease of use, intuitive navigation, and seamless interaction. User feedback mechanisms should be established to gather insights for continuous improvement.

Transparency and Regulatory Compliance: Insurtech companies should prioritize transparency and regulatory compliance to instill trust and confidence among users. Clear communication regarding data security, privacy policies, and regulatory adherence is essential to build and maintain trust.

Streamlined Claim Processing: Efforts should be made to streamline the claim processing experience through Insurtech platforms, focusing on speed, accuracy, and transparency. Automation and digitization can help expedite the claims process and reduce user frustration.

Customized Offerings: Insurtech providers should focus on personalized and tailored offerings to meet the diverse needs and preferences of users. Customization options can enhance user satisfaction and loyalty.

5.3 Conclusion

The study reveals promising insights into the adoption, satisfaction, and perceptions surrounding Insurtech solutions among users. While there is a notable level of familiarity and positive perceptions regarding Insurtech, there are areas for improvement, particularly in streamlining claim processing, enhancing regulatory compliance, and addressing variability in risk management perceptions. By focusing on education, user experience enhancement, transparency, and customization, Insurtech companies can further capitalize on the growing demand for innovative insurance solutions and foster long-term user satisfaction and loyalty. Overall, the findings underscore the transformative potential of Insurtech in reshaping the insurance landscape and enhancing user experiences.

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CHAPTER 2

Navigating the Real World: How Industrial Visits Shape Student Learning and Bolster College Reputation

Ajit Dalvi*

ABSTRACT

This research paper delves into the pivotal role of industrial visits in modelling the learning experiences of students and augmenting the reputation of colleges. By immersing students in real-world environments, industrial visits offer invaluable opportunities for practical learning beyond the confines of traditional classrooms. This study explores the critical role of industrial visits in shaping students' learning encounters and improving colleges' standing. An in-depth examination of current literature and practical evidence is conducted in this research to explore the various impacts of industrial visits on student skill enhancement, knowledge acquisition, and professional preparedness. By delving into the viewpoints of students, educators, and industry experts, this paper aims to offer insights into how industrial visits contribute to creating a vibrant learning environment and enhancing the image of educational institutions among stakeholders. Industrial visits play a crucial role in bridging the gap between theoretical knowledge gained in classrooms and real-world application. This paper explores the impact of industrial visits on student learning outcomes and their subsequent influence on college reputation. Ultimately, this paper advocates for the integration of industrial visits into academic curricula as a means to enrich student learning experiences and elevate institutional standing in the educational landscape.

Keywords: Industrial visits, Real-world application, Student learning outcomes, College reputation, Professional networks.

1.0 Introduction

The research aims to investigate the influence of industrial visits on two primary aspects: student learning outcomes and college reputation. The specific objectives include:

1. *Assessing Student Learning Outcomes:* The study intends to examine how industrial visits contribute to bridging the gap between theoretical knowledge acquired in classrooms and practical application in real-world settings.

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It seeks to understand the extent to which industrial visits enhance students' understanding of industry practices, foster critical thinking skills, and facilitate the acquisition of practical knowledge and competencies.

2. *Exploring College Reputation Enhancement:* Another objective is to investigate how successful industrial visit programs impact the reputation of colleges. This involves understanding the perceptions of various stakeholders, including prospective students, parents, and employers, regarding the quality and effectiveness of industrial visit initiatives. The study aims to identify the factors that contribute to enhancing a college's reputation through its industrial visit programs.

1.1 Significance of studying the impact of industrial visits

Understanding the impact of industrial visits on student learning outcomes and college reputation holds significant importance for several reasons:

1. *Practical Learning Enhancement:* Industrial visits offer students opportunities to apply theoretical knowledge in real-world contexts, thereby enhancing their practical understanding and skills. Investigating this impact can help educators design more effective experiential learning experiences that align with industry needs.

2. *Career Readiness:* By exploring how industrial visits contribute to fostering critical thinking, problem-solving, and professional networking skills, the research can inform efforts to better prepare students for the workforce. This is crucial in today's competitive job market, where employers seek candidates with both theoretical knowledge and practical experience.

3. *Institutional Reputation Management:* Colleges often compete to attract high-quality students and maintain strong relationships with industry partners. Understanding the role of industrial visits in shaping college reputation can inform strategies for enhancing institutional visibility, credibility, and attractiveness to key stakeholders, including prospective students, parents, and employers.

4. *Policy and Curriculum Development:* Insights from the study can inform policy decisions and curriculum development initiatives aimed at integrating experiential learning opportunities like industrial visits into academic programs. This can contribute to overall improvements in the quality and relevance of higher education offerings.

5. *Research Gap Addressing:* While industrial visits are commonly practiced, there may be limited empirical evidence on their effectiveness and impact. This research seeks to address this gap by providing empirical insights into the outcomes and implications of industrial visit programs.

Studying the impact of industrial visits on student learning outcomes and college reputation can offer valuable insights for educators, policymakers, and institutions seeking to enhance the quality, relevance, and competitiveness of higher

education programs. In today's rapidly evolving educational landscape, the importance of bridging the gap between theoretical knowledge acquired in classrooms and real-world application has become increasingly evident. As colleges and universities strive to prepare students for success in their future careers, there is a growing recognition of the value of experiential learning opportunities, such as industrial visits, in enhancing student learning outcomes and bolstering the reputation of educational institutions.

Industrial visits, also known as industry tours or field trips, involve students visiting real-world workplaces to gain first-hand insights into industry practices, processes, and challenges. These visits provide students with invaluable opportunities to apply theoretical concepts learned in the classroom to real-world contexts, thereby deepening their understanding and enhancing their practical skills. Moreover, industrial visits offer students the chance to interact with professionals in their field of study, network with industry leaders, and explore potential career paths, all of which contribute to their personal and professional development.

Beyond their impact on student learning, industrial visits also play a crucial role in shaping the reputation of colleges and universities. Institutions that actively engage with industry partners and offer meaningful experiential learning opportunities are perceived as innovative and forward-thinking, attracting prospective students and enhancing their standing within the academic community and beyond. By fostering strong relationships with industry stakeholders and providing students with immersive learning experiences, colleges and universities can differentiate themselves in an increasingly competitive higher education landscape.

Despite the recognized benefits of industrial visits, there remains a need for empirical research to better understand their effectiveness in shaping student learning outcomes and bolstering college reputation. This research paper aims to address this gap by investigating the impact of industrial visits on student learning and college reputation. Through a comprehensive review of existing literature, analysis of survey data, and case studies of educational institutions, this paper seeks to provide insights into the role of industrial visits in navigating the real world and shaping the future of higher education.

In the following sections, we will explore the existing literature on industrial visits and their impact on student learning, examine the methodologies employed in previous research studies, present the findings of our own empirical investigation, and discuss implications for educational practice and future research directions. By shedding light on the transformative potential of industrial visits, we hope to inform policymakers, educators, and industry stakeholders alike and inspire collaborative efforts to enhance student learning and elevate the reputation of colleges and universities worldwide.

In a competitive education environment, colleges and universities are looking for new ideas to improve student learning and differentiate their schools. One idea is to include business visits in training programs.

Business visits offer students a unique opportunity to bridge the gap between theoretical and practical knowledge. By exposing students to real-world places and practices, these visits provide valuable information that complements classroom learning and provides a deeper understanding of the chosen location. Learn, but also develop important skills like communication, collaboration and problem solving. These experiences help students better understand their work and encourage them to study more deeply.

Additionally, direct interaction with industry professionals allows students to make connections and receive valuable training for their future careers. They are committed to providing a comprehensive education that prepares students to meet the needs of the workforce. Universities that encourage regular and profitable jobs often develop relationships with business partners, leading to collaboration, research research and further study for graduates. This further increases the reputation of the school by attracting the attention of future students and teachers. Although evidence and preliminary studies suggest good results, larger and longer-term studies are needed to evaluate these results.

Additionally, it is important for future research to understand how different disciplines benefit from business visits and to investigate the differences between in-person and virtual visits. Enable student learning and improve the school's reputation. By addressing the gap in existing research and providing a comprehensive analysis, this study is designed to provide teachers, administrators, and the public with a better understanding of how to maximize the benefits of business visits in higher education.

In order to provide quality education, colleges and universities are increasingly incorporating business visits into their curricula. These visits provide students with a better understanding of real-world studies and complement their theoretical education with practical experience. This article examines both the role of business visits in shaping student learning and enhancing university reputation and suggests a need for research to measure these outcomes.

In the dynamic environment of higher education, the combination of practical and theoretical learning has gained importance. Business visits reflect this change and provide great opportunities for students to see first-hand the application of classroom knowledge in a real-life environment. Business visits have become a cornerstone of education as schools strive to provide students with the skills and understanding they need to succeed in their chosen field. The research paper "Guest Learning and University Development" considers the various roles of business visiting in higher education, exploring the impact of this visit on students' learning outcomes and the impact on the company's reputation. Provides a better understanding of its importance in modern education No.

In the market, employers value candidates who not only have the ability to obtain an education, but also have business skills and knowledge that give students a unique opportunity to understand the inner workings of various industries. providing

them with first-hand information through a professional environment and practices.

By witnessing the use of theoretical ideas in real situations, students can better understand the importance of the education they receive and the expectations of future employers. Reputation of the school. Colleges and universities that prioritize learning through initiatives such as business visits have been shown to be more reflective, forward-thinking, and plant-based in providing good education. This good reputation attracts future students, teachers and business partners, thereby improving the university's position in the academic and professional world. Learn more about business visits at these key points:

Impact on student learning: Learn how business visits benefit student learning, including academic success, skills development and career readiness.

Institutional Benefits: Examining the impact of Business Research can enhance the reputation of colleges and universities, including their role in promoting business collaboration and interested parties. Access relevant topics and opportunities and make recommendations to support their learning and impact. Understand the importance of business visits as a driver of transformative learning and career excellence. It aims to inform education stakeholders and policy makers about the importance of integrating learning skills into higher education standards through a comprehensive analysis of their impact and impact.

2.0 Review of Literature

Impact on student learning: Immediate engagement and better understanding of the curriculum. When students see real-world applications, they become more motivated and improve their understanding of theoretical concepts. Emphasizes the need for longitudinal studies. Immediate Engagement: Studies show that industrial visits boost student engagement and interest in their subjects by demonstrating the real-world applications of classroom theories (Bryant, 2013).

Soft Skills Development: Industrial visits enhance essential skills such as communication, teamwork, and problem-solving, which are critical for employability (Andrews & Higson, 2008). Long-Term Benefits: There is a lack of longitudinal studies that track the sustained impact of industrial visits on career readiness and professional success (Miller et al., 2013).

Reputation Building: Universities that promote access to business often benefit from close relationships with business partners, thus encouraging collaboration and increasing operational efficiency. Prospective students and teachers are attracted to schools with a proven learning experience.

Research Gap: Quantitative vs. Quantitative Positive results: Current studies show positive results, but there is not much information about specific educational and operational costs. Access: Research rarely addresses factors such as socioeconomic background, gender, race, and disability that influence market participation and outcomes. Access comparisons are well researched.

3.0 Research Design

Type of Research: To gain comprehensive insights, this study employed a mixed-methods approach, combining quantitative and qualitative techniques.

- *Quantitative Component:* Conducted surveys or questionnaires among students, faculty, and industry professionals to gather quantitative data on perceptions and experiences related to industrial visits.
- *Qualitative Component:* Conducted interviews or focus groups to delve deeper into participants' experiences and perspectives regarding industrial visits and their influence on learning outcomes and college reputation.

4.0 Sampling Strategy

Target Population: Students, faculty members, and industry professionals associated with colleges offering industrial visit programs.

Sampling Technique: Employed stratified random sampling to ensure representation from different academic disciplines and industries.

5.0 Data Collection Methods

Surveys/Questionnaires: Developed structured questionnaires based on the research objectives to gather quantitative data from a 108 sample size.

Interviews/Focus Groups: Conducted semi-structured interviews or focus group discussions to obtain qualitative insights into participants' experiences and perceptions.

6.0 Data Analysis

6.1 Personal information
1. Name:
2. Age:
3. Gender:
4. Educational Background:

6.2 How many industrial visits have you experienced during your academic journey?
- None
- 1-2
- 3-4
- 5 or more

Figure 1: Visits Conducted by Students in an Academic Year

Industrial visits have you experienced during your academic journey

▪ § None	▪ § 1-2	▪ § 3-4	▪ § 5 or more

12

29

67
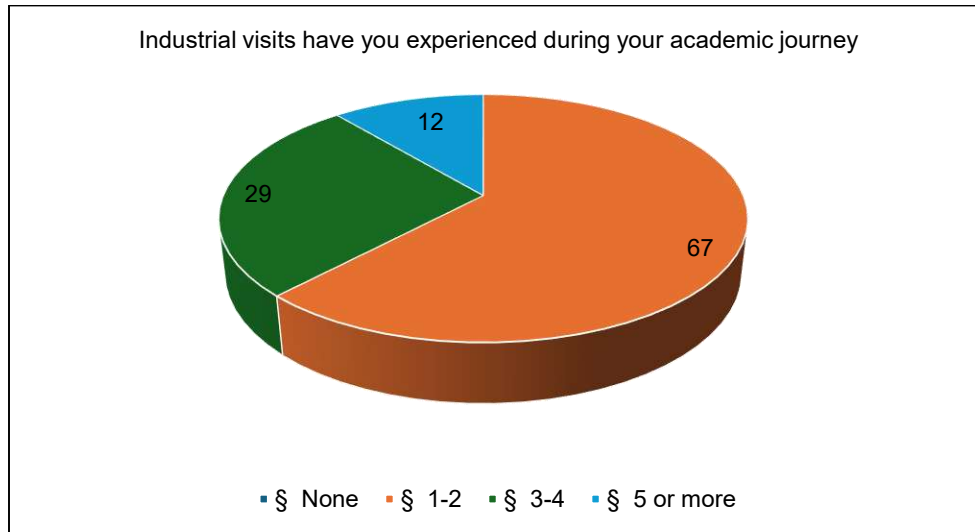
Source: Primary Source

From these responses, we can see that the majority of respondents (67 out of the total) have experienced 1-2 industrial visits during their academic journey. This suggests that for a significant portion of the respondents, they have had limited exposure to industrial visits. However, it's worth noting that a considerable number of respondents (29) have experienced 3-4 industrial visits, and a smaller yet notable group (12) have experienced 5 or more industrial visits. This indicates that there is a range of experiences among the respondents, with some having had more exposure to industrial visits than others.

6.3 Industrial visits effectively bridge the gap between theoretical knowledge gained in classrooms and real-world application.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

It's clear that the overwhelming majority of respondents (101 out of the total) agree or strongly agree that industrial visits effectively bridge the gap between theoretical knowledge gained in classrooms and real-world application. This strong agreement suggests that industrial visits are seen as highly valuable in connecting theoretical concepts with practical experiences. The relatively low numbers for Strongly Disagree and Disagree indicate that there might be a small minority who don't perceive the effectiveness of industrial visits, but they are greatly outweighed by those who find them beneficial.

Figure 2: Benefits of Visits
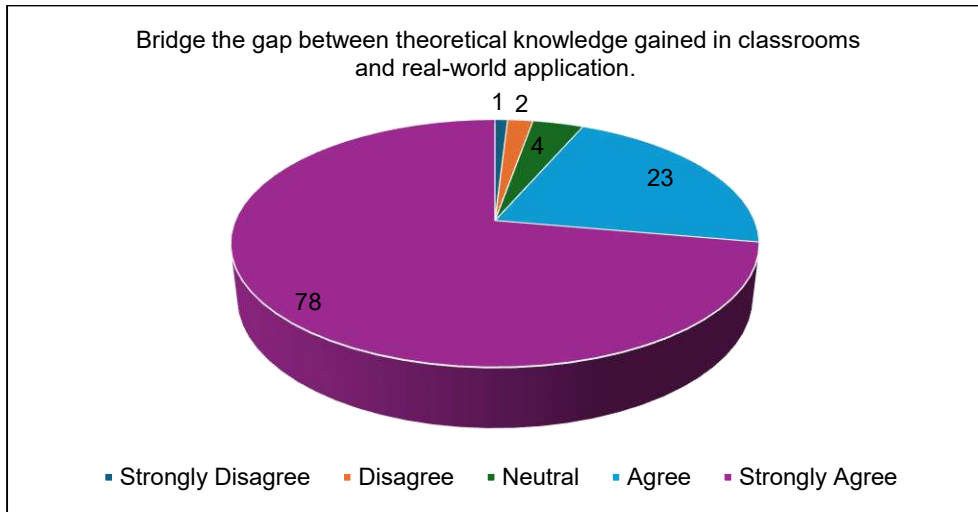
Source: Primary Source

6.4 Industrial visits significantly enhance students' understanding of industry practices

- Strongly Disagree 5
- Disagree 9
- Neutral 12
- Agree 24
- Strongly Agree 58

Figure 3: Understanding of Industry Practices
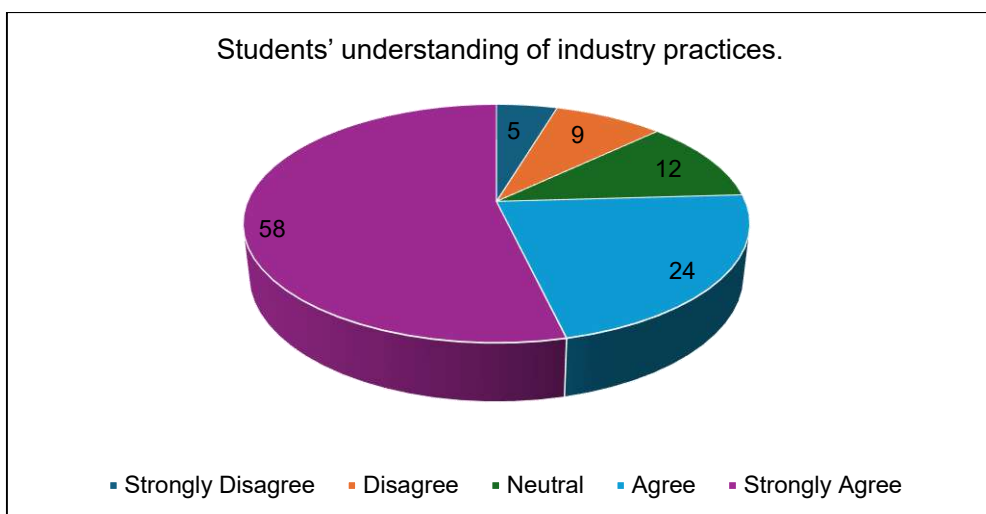
Source: Primary data

Interpretation: The responses indicate a strong consensus among participants, with a majority (82 out of 108) either agreeing or strongly agreeing that industrial visits significantly enhance students' understanding of industry practices. However, there is a smaller group of respondents (14 out of 108) who either disagree or strongly disagree with this statement.

6.5 Colleges with well-established industrial visit programs have a better reputation among students, parents, and employers

- Strongly Disagree   0
- Disagree   0
- Neutral   20
- Agree   31
- Strongly Agree   57

Figure 4: Branding due to Industrial Visits
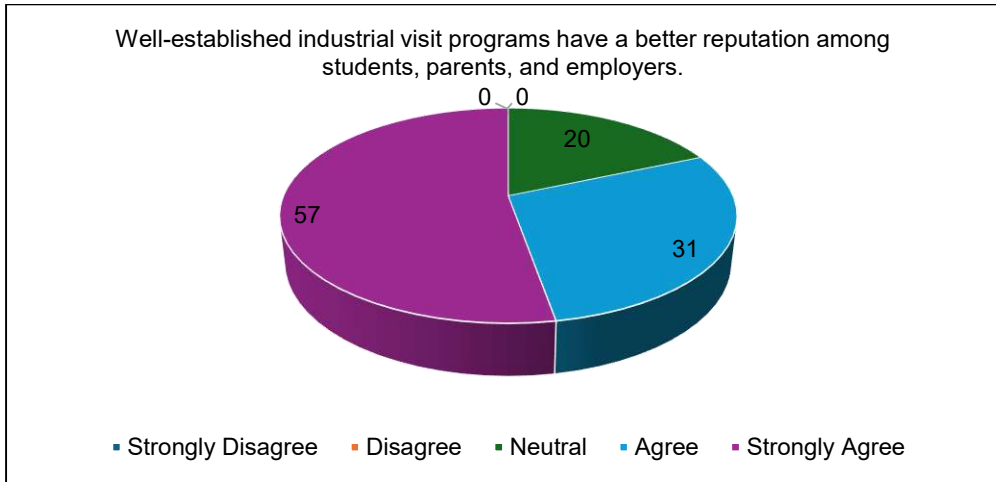
Source: Primary data

Interpretation: The responses indicate a strong consensus among participants, with a majority (88 out of 108) either agreeing or strongly agreeing that colleges with well-established industrial visit programs have a better reputation among students, parents, and employers. This suggests a widely held belief that such programs contribute positively to a college's reputation.

6.6 I would consider choosing a college based on the reputation of its industrial visit program

- Strongly Disagree   0
- Disagree   0
- Neutral   22
- Agree   34
- Strongly Agree   52

Figure 5: College Selection by Students on Industrial Visits

Choosing a college based on the reputation of its industrial visit program.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree
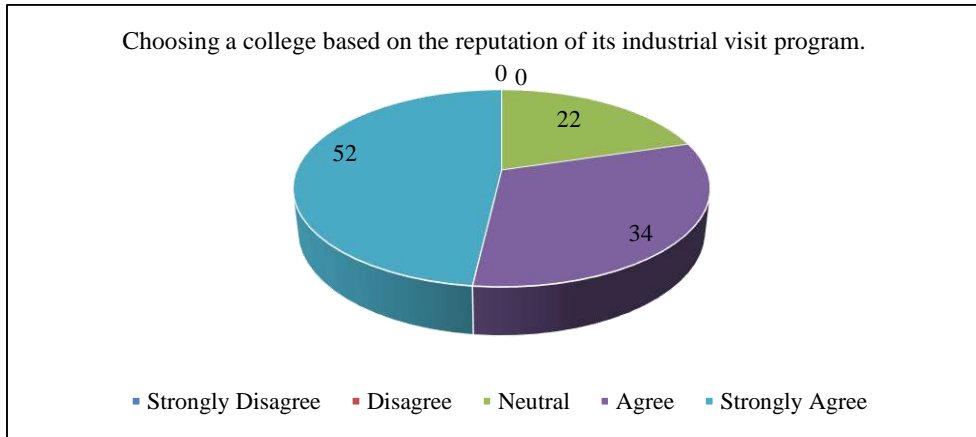
Source: Primary data

Interpretation: The responses indicate that a significant majority of participants (86 out of 108) either agree or strongly agree with the statement, suggesting that they would consider selecting a college based on the reputation of its industrial visit program.

6.7 It is important for colleges to leverage successful industrial visit programs to bolster their reputation

- Strongly Disagree   0
- Disagree   0
- Neutral   21
- Agree   35
- Strongly Agree   52

Figure 6: Industrial Visits Benefits to Colleges

Industrial visit programs to bolster their reputation.

Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree
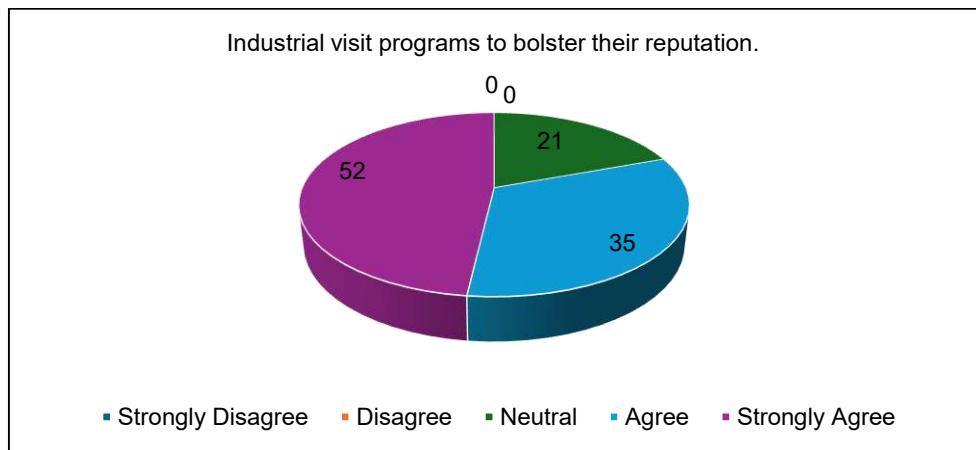
Source: Primary data

Interpretation: The majority of respondents (87 out of 108) either agree or strongly agree that it's crucial for colleges to utilize successful industrial visit programs to enhance their reputation. This suggests that there is a widespread belief among the respondents that such programs play a significant role in shaping how colleges are perceived.

7.0 Findings

Based on the conclusions provided, here are some potential findings that could be drawn from the data:

1. *Variability in Industrial Visit Experiences:* The data suggests that while the majority of respondents have experienced 1-2 industrial visits during their academic journey, there is considerable variability in the number of visits among participants. Some individuals have had more extensive exposure to industrial visits, which may influence their perspectives on the effectiveness of such experiences in bridging the gap between theoretical knowledge and real-world application.

2. *Positive Perception of Industrial Visits:* The overwhelming consensus among respondents regarding the effectiveness of industrial visits in bridging the gap between theoretical knowledge and real-world application indicates a positive perception of these experiences. This suggests that incorporating industrial visits into educational programs can indeed enhance students' understanding and application of concepts learned in the classroom.

3. *Enhancement of Understanding of Industry Practices:* The widespread belief among respondents that industrial visits significantly enhance students' understanding of industry practices highlights the importance of experiential learning opportunities in connecting academic concepts with real-world applications. This underscores the value of practical experiences in preparing students for the demands of the workforce.

4. *Impact on College Reputation:* The prevailing belief among respondents that colleges with well-established industrial visit programs enjoy a better reputation further emphasizes the significance of practical experiences and industry connections in shaping the overall perception of a college. This suggests that investing in and promoting high-quality industrial visit programs can enhance a college's reputation and attractiveness to prospective students, parents, and employers.

5. *Influence on College Choice:* The data indicates that a substantial proportion of individuals place considerable importance on the reputation of a college's industrial visit program when deciding which college to attend. This suggests that colleges with reputable industrial visit programs may have a competitive advantage in attracting students who prioritize hands-on learning and real-world exposure.

6. *Call for Active Utilization of Industrial Visit Programs:* The strong belief among individuals that colleges should actively utilize successful industrial visit programs to bolster their reputation underscores the perceived value of hands-on experiences and real-world exposure in shaping the perception of educational institutions. This highlights the importance of colleges investing in and effectively managing industrial visit programs to reap the benefits of enhanced reputations and increased enrolment.

7.1 Findings on institutional impact

7.1.1 Reputation enhancement
- Colleges that offer regular and well-organized industrial visits are viewed as more dynamic and committed to providing comprehensive education. This reputation attracts prospective students and faculty.
- Institutions with strong industry links are often preferred by students for their practical exposure and better job placement rates (Bowers & Metcalf, 2012).

7.1.2 Strengthened industry partnerships
- Regular industrial visits help in building and maintaining robust relationships with various industries. These partnerships can lead to collaborative research, guest lectures, and sponsorship opportunities.
- Companies involved in these visits often participate in career fairs and recruitment drives at these colleges, benefiting both students and the institution.

7.1.3 Increased student enrollment and retention
- Colleges offering extensive practical exposure through industrial visits experience higher application rates. Students seek programs that offer practical insights and direct industry engagement.
- High student satisfaction with such programs leads to better retention rates, as students feel their education is relevant and valuable (Yorke & Knight, 2006).
  The findings highlight the importance of business visits in higher education for student development and school reputation. However, recent research has identified important points that require further research, especially in terms of understanding long-term effects and ensuring equity and optimization in virtual use.

8.0 Conclusion

The majority of respondents have experienced 1-2 industrial visits during their academic journey, there is variability in the number of visits among the respondents, with some having had more extensive exposure to industrial visits.

This diversity in experiences may influence respondents' perspectives on the effectiveness of industrial visits in bridging the gap between theoretical knowledge

and real-world application. The consensus among the respondents is overwhelmingly positive regarding the effectiveness of industrial visits in bridging the gap between theoretical knowledge and real-world application. This supports the notion that incorporating industrial visits into educational programs can enhance students' understanding and application of concepts learned in the classroom.

There is a widespread belief among respondents that industrial visits significantly enhance students' understanding of industry practices. This underscores the importance of experiential learning opportunities in bridging the gap between academic concepts and real-world applications. Colleges that prioritize and effectively implement industrial visit programs may better equip their students with practical skills and insights valued by employers, thereby enhancing their overall educational experience and employability.

There is a prevailing belief among respondents that colleges with well-established industrial visit programs enjoy a better reputation among students, parents, and employers. This underscores the perceived value of practical experiences and industry connections in enhancing the overall perception of a college. Therefore, investing in the development and promotion of industrial visit programs may not only improve a college's reputation but also contribute to its ability to attract students and gain recognition from stakeholders.

It can be concluded that a substantial proportion of individuals place considerable importance on the reputation of a college's industrial visit program when deciding which college to attend. This underscores the influence of practical experiences and industry connections in shaping the decision-making process of prospective students. Colleges with well-established and reputable industrial visit programs may have a competitive advantage in attracting students who prioritize hands-on learning and real-world exposure. Therefore, investing in and promoting the quality of industrial visit programs could be beneficial for colleges seeking to attract and retain students

There is a strong belief among individuals that colleges should actively utilize successful industrial visit programs to bolster their reputation. This underscores the perceived value of hands-on experiences and real-world exposure in shaping the perception of educational institutions. Colleges that invest in and effectively manage industrial visit programs may benefit from enhanced reputations, potentially leading to increased enrolment, improved partnerships with industry, and better placement opportunities for students.

8.1 Based on the research, here are some recommendations that could be made

1. *Enhancing Industrial Visit Opportunities:* Educational institutions should strive to provide more opportunities for industrial visits to ensure that all students have exposure to real-world experiences.

This could include expanding existing programs, forming partnerships with industry organizations, and integrating industrial visits into curriculum requirements across disciplines.

2. *Promoting Experiential Learning:* Colleges should actively promote the value of experiential learning opportunities, such as industrial visits, to students, faculty, and industry partners. This could involve showcasing successful case studies, organizing informational sessions, and highlighting the practical benefits of such experiences in bridging the gap between theoretical knowledge and real-world application.

3. *Investing in Program Development:* Colleges should invest resources in developing and enhancing their industrial visit programs to ensure their effectiveness and relevance. This may include hiring dedicated staff, securing funding for travel and accommodation expenses, and implementing robust evaluation mechanisms to assess the impact of industrial visits on student learning outcomes.

4. *Building Industry Partnerships:* Educational institutions should prioritize building strong partnerships with industry organizations to facilitate meaningful and impactful industrial visits. This could involve engaging industry professionals as guest speakers, arranging site visits to companies and organizations, and providing opportunities for students to collaborate on real-world projects with industry partners.

5. *Highlighting Program Successes:* Colleges should actively showcase the successes of their industrial visit programs to prospective students, parents, and employers. This could include publishing testimonials and success stories, hosting alumni events, and leveraging social media and other communication channels to raise awareness of the program's impact on student learning and employability.

6. *Continuous Improvement and Evaluation:* Colleges should adopt a culture of continuous improvement and evaluation to ensure the ongoing effectiveness and relevance of their industrial visit programs. This could involve soliciting feedback from students, faculty, and industry partners, conducting regular program reviews, and incorporating new technologies and methodologies to enhance the overall learning experience.

7. *Inclusive Practices:* Implement strategies to ensure all students, regardless of their background, can participate in and benefit from industrial visits. This could include financial support, virtual visit options, and tailored visit programs for diverse student needs.

8. *Integrate Visits into Curriculum:* Design curricula that seamlessly integrate industrial visits with pre-visit and post-visit activities to enhance learning outcomes. This can include preparatory classes, reflection sessions, and projects based on the visits.

Industrial visits are a valuable educational tool that significantly enhances student learning and professional readiness. By addressing existing research gaps and optimizing the integration of these visits into the curriculum, educational institutions can provide richer, more inclusive, and effective learning experiences that prepare students for the real world.

9.0 Learnings

Develop good understanding: Linking theory and practice: Business visits give students first-hand work experience and help them understand how to use theoretical ideas learned in class. Increase their engagement and interest in the topic, related to the actual site. Skills Development

Communication and Work: During business visits, students develop important skills such as communication, collaboration, and problem solving necessary for a successful operation. Help students understand study habits and expectations to prepare for the future workplace. Career Planning

Career Exploration: Business visits introduce students to career opportunities and help them make informed decisions about their future careers. This can lead to students' education and employment. Institutional Benefits

Increased Reputation: Institutions that encourage business visits will have a better reputation for their commitment to providing a thorough and authentic education. Finding opportunities and increasing employment for graduates. Student Attraction and Retention

Admissions: Prospective students are attracted to schools with academic experience, resulting in increased demand and enrollment. Increase student interest and retention. Research and Future Directions

Longitudinal Impact: Longitudinal studies are needed to understand the long-term impact of business visits on student preparation and achievement. Development and placement of work. A study to evaluate the effectiveness of virtual business tourism compared to traditional tourism. Curriculum Integration

Seamless Integration: Best practices should be developed to integrate business visits into the curriculum, including activities that improve pre- and post-visit learning outcomes. Education enables students to solve real-world challenges. Global and Cultural Perspectives

International Comparison: Comparing studies in different cultures and educational contexts can provide insight into what the industrial use and perceived world is like. Students have needs and expectations. Prepare students for their future careers.

10.0 Research Gap

Although the benefits of business visits in improving student learning and enhancing a school's reputation are well established, many studies are still

inconsistent live. Existing research often focuses on short-term benefits, such as immediate engagement and understanding of the curriculum, but lacks long-term analysis of the long-term effects of the visit on student career planning and career success. Additionally, although benefits such as increased motivation and increased understanding are well documented, multivariate assessments of specific learning outcomes and placement rates remain inadequate. Important questions need to be investigated. Research rarely addresses how socioeconomic background, gender, race, and disability impact students' ability to participate in and benefit from a business visit.

In addition, research often views business visits as part of the curriculum rather than an integral part of the curriculum, without understanding best practices for integration into education, including pre- and post-visit activities. The rise of virtual technology, specifically business visits during the COVID-19 pandemic, has been examined in comparison with in-person visits. Comparative studies are needed to evaluate the effectiveness of virtual and physical visits. Finally, the organizational concepts of planning, managing and evaluating return on investment from business visits have not been fully explored and there is no international variation and culture in the implementation and understanding of this visit to solve these problems.

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CHAPTER 3

Digital Storytelling: A Bridge between Marketing and Public Relations

Ananya Mehta*

ABSTRACT

In the dynamic world of communication where every minute and every second there is a change in the market scenario, brands have a constant struggle to reach out to the stakeholders, especially in the digital space. Hence the convergence of traditional and digital marketing and public relations (PR) concepts is pivotal. Brands are constructed on stories customers have their own perceptions and user experiences which may or may not have a favorable opinion and association. Hence, brands should resort to the art of digital storytelling that amalgamates the art of narration with cutting-edge technology thus creating a dynamic platform that engages audiences on a profound level by using multimedia elements such as video, graphics, and interactive content, marketers and PR professionals can create stories that not only engage but also emotionally connect with their target audience. Digital storytelling acts as a channel for authentic communication, fostering a sense of openness and trust between brands and consumers. The study aims at using a combined research method and thereby highlights the role of digital storytelling as a bridge between marketing and PR, emphasizing its capacity to engage audiences authentically through multimedia-rich, emotionally resonant narratives.

Keywords: Marketing, Public relations, Digital story Telling, Stakeholders, Brands.

1.0 Introduction

1.1 Background of the study

In the fast-paced communication world where every second there is a growing market complexity, change in consumer decision-making, establishing connecting with customers, meeting the demand-supply situation and increasing competition and customer information overload, it has become imperative for businesses to resort to an amalgamation of marketing and public relations techniques, traditional and new media, to foster mutual connect and acceptance. Furthermore, the way businesses operate and how consumers behave have both been altered by the usage of social media and the internet. Organizations can benefit greatly from social and digital marketing in terms of reduced expenses, more brand recognition, and higher sales.

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However, because of the increased access to information and how media messages are consumed, consumers are becoming increasingly conscious before making the choices, as they have multiple sources, traditional and new media, to rely upon and to establish a lasting impression on customers' minds is becoming a more challenging task for businesses nowadays.

"*Consumption is now being conceptualized as part of, an ongoing, productive, and creative process*" states Shankar et al (2001, pg 430)[1] thus emphasizing the trends in the consumption pattern.

Furthermore, finding a real and tangible way to reach consumers amid rising competition is one of the communication challenges that many businesses today face. The margins within which businesses can achieve this have shrunk, making Unique Selling Proposition (USPs) even more crucial than it was previously. These days' consumers are proactive and convincing them is a herculean task as these stakeholders may often tend to ignore your messages.

The question then arises how do we reach out to these consumers and they are hard to persuade. These situational changes have compelled the business houses to resort to innovative ways in reaching out to their consumers by converging the traditional and digital marketing and public relations (PR) concepts through the artistic expression of storytelling digitally to promote their brands.

Brands are constructed on stories and they have a story to tell. Customers have their own perceptions and user experiences which may or may not have a favorable opinion and association. Hence, brands should resort to the art of digital storytelling that amalgamates the art of narration with cutting-edge technology thus creating a dynamic platform that engages audiences on a profound level by using multimedia elements such as video, graphics, and interactive content, marketers and PR professionals can create stories that not only engage but also emotionally connect with their target audience. Digital storytelling acts as a channel for authentic communication, fostering a sense of openness. and trust between brands and consumers.

Using stories as a communication medium will help the business gain a far-reaching perspective. If the story is interesting and can encapsulate the audience's attention enough, it will work like a magical wand that shall evoke emotions, and liking amongst the consumers about the brand. Stories act as a catalyst for a future relationship. As McLellan (2006, pg 17) opines *"it is a fundamental part of human intelligence and imagination, and an integral and persuasive aspect of all human."*[2] Using a story is an easy method to communicate about company values and philosophy which describes who you are, what you believe in, and what you have to offer in terms of company values and products.

1.2 Understanding "Story and Storytelling"

Stories are an integral part of human life and is a powerful practice that transcends cultures and time. It brings people together through shared experiences,

whether conveyed through words, visuals, or personal encounters. They allow us to connect with complex ideas on an emotional level, making information more relatable and memorable. Psychologist Jerome Bruner argues (2003) that "*information alone cannot foster learning. The stories we are told remain with us, while facts soon disappear*"[3].

Storytelling is a technique that businesses have been using more and more to try to reduce the corporate identity gap between themselves and their stakeholders and build a bridge of mutual acceptance, understanding values propositions and trust. A compelling story telling has a worth to communicate complex concepts in an understandable manner, frequently to stakeholders with varying cultural backgrounds. For the brands to connect with its stakeholders storytelling should be used as a tool to "*gain effective audience attention, it should make the audience discover and create their mental story…*"[4] opines Denning. S (2001)

1.3 Story telling & marketing: The umbrella approach

The fundamental purpose of Marketing is to promote brand awareness, promote products or services, and ultimately influence the purchase decisions of consumers. However, these tactics are often met with resistance in an oversaturated advertising landscape. Additionally, the use of digital media has impacted the buying patterns and decision-making of consumers. An umbrella approach of traditional marketing strategies coupled with the digital marketing approach through the development of digital content, augmented reality marketing, and Artificial Intelligence will help businesses establish an online presence effectively.

1.4 Story telling & public relations: An art of narratives

In modern times, conveying timely information to the stakeholders is critical to the sustainability of business houses to have mutual acceptance. Hence the art of Storytelling is becoming a more and more common Public Relations (PR) technique. It has several components that emphasize the roles of public relations, like relationship management, communication, and internal and external instillation of business values. Underling the importance of Storytelling & PR in an organization to communicate with their stakeholders Heath (2006) quotes *"Storytelling has been widely known as an impactful approach in organizational communication, including in public relations".*[5]

Digital storytelling empowers PR professionals to go beyond press releases and media pitches. By utilizing engaging formats like video, social media content, and interactive experiences, PR can create authentic stories that showcase the organization's values, mission, and impact. These stories can build trust and foster positive relationships with stakeholders, ultimately enhancing the brand's reputation.

1.5 Story telling – The digital way

The art of sharing stories with stakeholders, off late, has been completely

transformed by the emergence of digital technologies and now with the integration of AI. There are numerous ways to develop and share digital stories, including through social media, video-sharing websites, and interactive websites. A pro-active audience participation is encouraged by these channels since they provide a more immersive and engaging storytelling experience. Stakeholders' use and engagement with content has been completely transformed by the evolving digital landscape. Despite the various channels through which stories are shared, storytelling remains a fundamental aspect of interaction with viewers. While marketing and PR may have different goals, they can leverage digital storytelling to achieve synergy and amplify their collective impact

2.0 Literature Review

To investigate how digital storytelling fills the void between marketing and public relations (PR), this review examines the body of existing research. It looks at how people are naturally drawn to the art of narratives, how marketing and public relations have different but related objectives, and how digital platforms can be a creative hub for telling interesting stories.

Stories are inherent to human nature as they convey a sentiment of togetherness and connection. Stories lead to dreams and that is what Shankar et al (2001, pg 429) opines "Stories and storytelling help us make sense of our lives."[6]

McLellan (2006, pg 18) defines the user experience created through stories "Good stories can create a feeling of satisfaction of the experience you have just been through".[7] For the business houses to connect with their stakeholders, crafting a good story is as essential as their product and services, as it conveys the vision and values of what the companies want to achieve.

Adding a perspective on how storytelling as a narrative is crucial for corporates to share information and create a lasting memory in the audience's mind, Denning S (2006) argues, "that using a narrative approach is what helps make information tangible and that it creates and evokes memories in the audience."[8]

To create a brand image or raise a brand awareness or to increase the sales, marketing plays a pivotal role. However, the use of digital platforms, ease of purchasing through apps has significantly changed the buying behavior of the consumer and indicate a positive trend towards digital marketing. Emphasizing this phenomenon Hossain et al. (2020) narrate "The increasing number of shopping channels has also influenced consumer behavior."[9]

"The practice of telling stories has also helped advertisers to create brand loyalty, making it a tool of advertising and marketing (Woodside, 2010)."[10] Reinforces the importance of traditional marketing techniques even in digital times.

Establishing and sustaining a company image, fostering favorable responses from stakeholders, managing crises, and solving them is what PR does. For PR professionals Storytelling is an artistic form of information to interact with their

Internal and external audience because it can break down barriers by fostering a personal connection. Kent (2015) puts it in a simple yet effective style, "In the life of PR, storytelling has been considered a favorable approach and demanded by professionals."[11]

Seitel (2011) states "PR is all about managing relationships, crafting strategic stories, conveying expertise, and solving organizational problems through strategic communications."[12]

In this digital era now adapting to the AI world, the use of social media, mobile applications, and other such communication have become indispensable in everyday life. Business houses are heavily relying on this digital medium to communicate and engage with their stakeholders and achieve their marketing goals at a relatively lesser cost with a wider reach. The transmission of content digitally resonates with the consumers directly and they create their own experiences. This is the space of digital storytelling where "effective emotional storytelling builds on shared context and knowledge to connect with the listener."[13] Papacharissi, (2015)

Increasing understanding across generations and ethnicities, can be achieved through the use of Digital Story Telling (DST). DST can be brief or extensive, but what makes it unique is its capacity to blend various elements of narrative, including text, audio-visual content, and still images. DST viewers experience a greater sense of involvement, connection, and direct engagement with the story. Therefore, "compared to other storytelling mediums, DST has the potential to be more culturally inclusive."[14] opines Crișan and Borțun (2017)

3.0 Research Methodology

For this study, a combined research method was proposed. However, as the course of the study progressed the researcher found that a qualitative method through – Interviews of media professionals would suffice as it will highlight the role of digital storytelling as a bridge between marketing and PR, emphasizing its capacity to engage audiences authentically through multimedia-rich, emotionally resonant narratives. As businesses navigate the evolving digital landscape, understanding and implementing these key principles will be paramount to building meaningful connections and driving success in the modern communication paradigm.

4.0 Analysis and Findings

4.1 Interviews snippets

1. Ms Harsha Chauhan, Associate Account Executive with a national public relations agency mentions that 'digital storytelling allows for interactive elements and audience participation, fostering a deeper connection than static ads. We use digital storytelling to create compelling narratives around our products. We focus on user stories, highlighting how our product solves problems and improves lives. One campaign featured customer testimonials in short video format, which significantly boosted conversion rates.

2. Mr. Avinash Gawai, Director at a media agency states 'We extensively use digital storytelling to showcase the impact of our work. We share beneficiary stories through videos and blog posts, building empathy and trust with donors. Sometimes we use this artistic expression medium to generate funds. We showcase the issue and shared a video message explaining the situation and its potential impact. The transparency and emotional connection resonate with our supporters, leading to an increase in donations. Everything is fair and audited."

3. Dr. Rajendrakumar Parmar, HoD, Psychology Department shared how he uses story telling to his stakeholders – 'The Students' - 'I use storytelling to make educational content on Instagram more engaging. I break down complex topics into bite-sized narratives using infographics, illustrations, and short videos. Instagram Stories and Reels are great for visual storytelling with interactive elements like polls and quizzes. Strong visuals, relatable characters, and a clear takeaway message are key. A touch of humor or suspense keeps them engaged and curious. I keep telling this AI-enabled generation focus on user-generated content and encourage audience participation through storytelling prompts"

4. Mr. Divyaraj Bhrambhatt, Senior Manager of Corporate Communication in the Dairy Sector opines that digital storytelling allows for interactive and immersive content experiences, fostering deeper connections between audiences and messages. It bridges the gap between marketing and PR by creating content that is both informative (marketing) and relationship-building (PR). In today's time where generative AI is on the rise Interactive storytelling with elements of augmented reality (AR) and virtual reality (VR) is gaining traction. User-generated content and influencer marketing also play a big role. The target audience in the dairy sector is a different ball game. We deal with farmers, cooperatives, etc, and therefore to reach out to them we create interactive brochures, pamphlets, and simple videos"

5. Ms. Gayatri Kulkarni, a PR professional gives a different narrative from the customer's point of view and says "Brands that share authentic stories about their mission and values resonate with me most. A clothing company's video showcasing sustainable manufacturing practices influenced my recent purchase. Stories make brands feel more human and relatable. They show the people behind the company and the impact their products have."

6. Mstr. Ridaan Vyas, a grade 7 learner expresses 'I love Legos and nerf guns. I watch their advertisement on TV on kids' channels and also on mobile. I ask my papa to bring it for me. This advertisement are nice stories"

5.0 Conclusion

In today's digital age, audiences crave connection and authenticity. Digital storytelling has emerged as a powerful tool for both marketing and public relations (PR) to bridge this gap and achieve their goals.

Marketers leverage digital storytelling to craft compelling narratives around their products and services. User stories highlighting problem-solving and positive impact resonate with audiences, fostering brand loyalty and driving conversions. Interactive elements and audience participation further deepen connections compared to traditional marketing tactics.

PR professionals utilize digital storytelling to build trust and credibility. Sharing beneficiary narratives or showcasing the impact of an organization's work fosters empathy and emotional connection with the public. This is particularly valuable during crisis situations, where transparency and genuine storytelling can maintain trust and garner support.

From a social media content creator's perspective, digital storytelling breathes life into educational content. Complex topics become engaging narratives through bite-sized stories, infographics, and videos. Platforms like Instagram Stories and Reels allow for audience participation, boosting engagement and knowledge retention. The success of digital storytelling hinges on strong visuals, relatable characters, and clear takeaways. A touch of humor or suspense keeps viewers hooked, while user-generated content and audience participation solidify emotional connections.

Digital media professors emphasize the power of digital storytelling to create immersive content experiences. This bridges the marketing and PR gap by crafting content that is both informative and relationship-building. Emerging trends like interactive storytelling with AR/VR and influencer marketing further enhance audience engagement.

Ultimately, the customer's perspective underscores the importance of authenticity. Brands that share genuine stories about their mission and values resonate most deeply. Well-produced videos with a clear narrative arc and user-generated content featuring real customers are highly engaging. However, inauthentic storytelling tactics backfire, leaving audiences feeling skeptical and disconnected.

In conclusion, by crafting compelling narratives that resonate with audiences, both fields can achieve their goals – brand awareness, customer loyalty, and positive public perception – in a way that is both informative and emotionally engaging.

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CHAPTER 4

Empowering Speech-Impaired Individuals: A Hand Gesture to Text and Voice Conversion System

Arunika Das*, Ajitesh Reddy Tippireddy** and Somya Dubey***

ABSTRACT

In this paper, we present a groundbreaking Hand Gesture to Text and Voice Conversion System designed to empower individuals with speech impairments. Leveraging the advancements in Convolutional Neural Network (CNN) technology, our system achieves unprecedented accuracy rates exceeding 99% in recognizing hand gestures representing the 26 alphabets. By harnessing a comprehensive dataset sourced from Kaggle, our CNN model ensures precise interpretation of user gestures, transforming them into coherent text. However, recognizing the diverse needs of our users, we have gone a step further by integrating a Graphical User Interface (GUI) application, crafted using essential libraries like OpenCV, Keras, etc. This user-friendly interface not only facilitates seamless interaction but also provides real-time word suggestions, enhancing the efficacy of sentence construction. Additionally, to cater to people with vision impaired, we have enabled a sentence listening option, ensuring inclusivity in our design. With its high accuracy, intuitive interface, and inclusive features, our Hand Gesture to Text and Voice Conversion System not only demonstrates the potential of CNN-based approaches but also underscores our commitment to fostering accessibility and inclusivity in technology solutions.

Keywords: Sign Language to Text Translation, CNN, Open CV, Keras.

1.0 Introduction

In today's interconnected world, effective communication lies at the heart of human interaction. However, for individuals facing speech impairments, expressing thoughts and ideas through conventional means can present formidable obstacles. Acknowledging the imperative of inclusive communication solutions, we unveil an innovative Hand Gesture to Text and Voice Conversion System, meticulously designed to empower those with speech impairments.

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Harnessing cutting-edge advancements in Convolutional Neural Network (CNN) technology, our system provides a seamless platform for translating hand gestures into coherent text. Through rigorous training on a diverse dataset curated from Kaggle, our CNN model achieves an exceptional accuracy rate surpassing 99%, ensuring precise interpretation of gestures corresponding to the 26 alphabets. Going beyond mere recognition, our system prioritizes user experience by integrating an intuitive Graphical User Interface (GUI) application. Developed with essential libraries including OpenCV, Keras, and Tkinter, this interface facilitates effortless interaction, empowering users to construct sentences effortlessly. Furthermore, as a testament to our dedication to inclusivity, we have implemented a sentence listening option, catering to people with limited vision and enhancing accessibility across the board. As we embark on this journey to dismantle communication barriers, our Hand Gesture to Text and Voice Conversion System emerges as a beacon of innovation, poised to redefine accessibility and foster meaningful connections in the digital landscape.

2.0 Objectives

1. Develop a robust Hand Gesture to Text and Voice Conversion System utilizing Convolutional Neural Network (CNN) technology to accurately interpret and translate hand gestures into coherent text, ensure availability for people with speech impairments.
2. Train the availability CNN model on a diverse dataset sourced from Kaggle, meticulously curating and optimizing the data to attain a superior accuracy rate exceeding 99% in recognizing gestures corresponding to the 26 alphabets, thereby enhancing the system's reliability and effectiveness.
3. Design an intuitive Graphical User Interface (GUI) application leveraging essential libraries such as OpenCV, Keras, and Tkinter to deliver a seamless and accessible policy for interaction, enabling users to construct sentences effortlessly and efficiently.
4. Implement real-time word suggestion features within the GUI application to facilitate sentence construction, enhancing user experience and streamlining communication for persons with variable levels of proficiency in sign language.
5. Enhance inclusivity and accessibility by integrating a sentence listening option within the system, catering to individuals with visual impairments and ensuring equitable access to communication tools, thereby fostering a more inclusive digital environment.

3.0 Literature Survey

Jiang *et al.* (2023) introduced a pioneering deep learning methodology tailored specifically for real-time hand gesture recognition within communication

systems. Their approach addresses the need for swift and accurate interpretation of hand movements, crucial for seamless interaction in various digital environments.

Kim *et al.* (2023) conducted a comprehensive review focusing on recent advancements in hand gesture recognition technology, particularly in the setting of enhancing accessibility in human-computer interaction. By synthesizing recent research findings, they offer respected perceptions into the evolving landscape of gesture-based communication systems. Gupta *et al.* (2023) undertook an extensive survey to investigate the range of gesture-based communication systems. Their study encompasses various methodologies and applications, shedding light on the diverse approaches employed in this field and giving valuable ideas for future research endeavors. Chen *et al.* (2023) delved into the latest trends in deep learning-based hand gesture recognition, elucidating the evolving techniques and methodologies driving advancements in this domain. By analyzing recent developments, they contribute to a deeper understanding of the state-of-the-art in gesture recognition technology. Patel *et al.* (2023) conducted a detailed exploration of recent advances in hand gesture recognition techniques, with a specific focus on their applications in improving communication and accessibility. Their study highlights the transformative potential of gesture recognition technology in facilitating inclusive communication environments.

Sharma *et al.* (2023) provided insights into recent developments in gesture recognition technologies aimed at enhancing communication systems. By examining the latest research findings, they contribute to the collective accepting of the evolving landscape of gesture-based communication solutions. Li *et al.* (2023) investigated the efficacy of convolutional neural networks (CNNs) in recognition through hands for communication purposes. Their research explores the application of CNNs in accurately interpreting complex hand movements, laying the groundwork for robust communication systems.

Wang *et al.* (2023) proposed an innovative approach for gesture-based text and voice conversion systems, leveraging recurrent neural networks (RNNs) to increase the accuracy and efficiency of gesture interpretation. Their research addresses the need for intuitive communication interfaces tailored to diverse user needs. Singh *et al.* (2023) conducted an in-depth analysis of the challenges and opportunities in implementing hand recognition through showing different gestures of technology for communication purposes. Their training proposals valued visions into the practical considerations and potential applications of gesture-based communication systems in real-world scenarios.

Park *et al.* (2023) explored the integration of multimodal approaches, combining hand gesture recognition with other sensory inputs such as voice and facial expressions, to enhance the richness and effectiveness of communication interfaces. Their research highlights the synergistic benefits of integrating multiple modalities in gesture-based communication systems, paving the way for more immersive and inclusive user experiences.

4.0 Proposed System

The proposed Hand Gesture to Text and Voice Conversion System utilizes Convolutional Neural Network (CNN) technology for real-time interpretation of hand gestures into text, facilitating seamless collaboration for people with speech impairments. The system employs a comprehensive dataset sourced from Kaggle for training the CNN model, ensuring high accuracy in recognizing gestures representing the 26 alphabets. Additionally, a user-friendly Graphical User Interface (GUI) application is developed using essential libraries such as OpenCV, Keras, and Tkinter, allowing users to construct sentences effortlessly. Furthermore, the system integrates real-time word suggestion features to enhance sentence construction efficiency, along with a sentence listening option to cater to users with visual impairments, thereby promoting inclusivity and accessibility.

Figure 1: Architecture Diagram
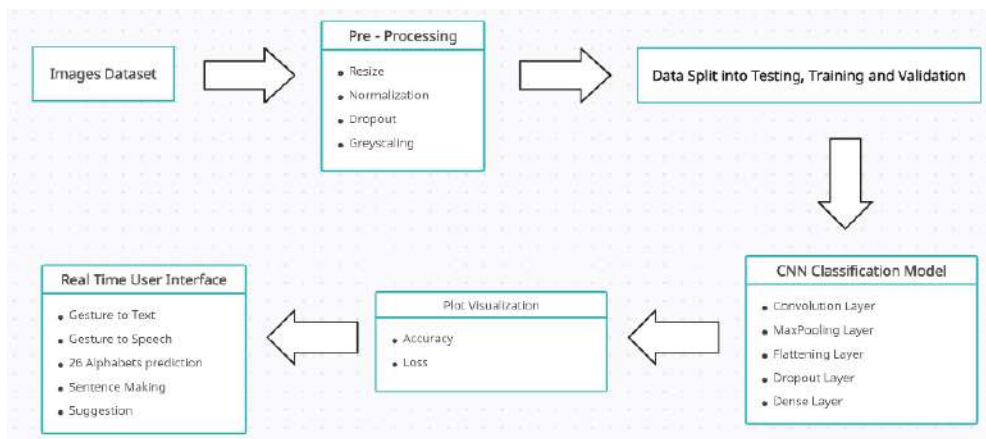
Source: Created by author

5.0 Existing System

The existing landscape of hand sign recognition systems for communication purposes encompasses various methodologies and technologies. Some systems rely on using typical types of machine learning approaches, while others leverage deep learning techniques such as CNNs and recurrent neural networks (RNNs) for gesture interpretation. Existing systems often lack robustness and real-time performance, leading to suboptimal user experiences. Additionally, accessibility features such as real-time word suggestions and sentence listening options are not consistently implemented across all systems. Thus, there is a need for more advanced and user-centric solutions that combine state-of-the-art technology with inclusive design principles to enhance communication accessibility for individuals with speech impairments.

6.0 Modules

Data Collection: The data collection module serves as the initial step in building the hand gesture recognition system. It involves sourcing a diverse dataset of hand gesture images representing the 26 alphabets. This dataset can be collected from a number of sources, like as online repositories, custom image captures, or crowd-sourced contributions. The goal is to ensure a wide range of hand gestures in different contexts, lighting conditions, and orientations to improve the model's robustness and generalization capabilities.

Figure 2: Hand Gestures

Source: American Sign Language Alphabets Recognition using Convolutional Neural Network - Scientific Figure on ResearchGate.

Preprocessing: The preprocessing module plays a crucial role in preparing the collected data for effective training. This involves several preprocessing steps applied to the raw pictures before submitting these to the CNN model. Frequent preparation procedures include scaling the photographs to a uniform size, normalization to standardize pixel values, and augmentation methods such as rotation, flipping, or adding noise to increase the diversity of the dataset. These steps aim to enhance the quality and consistency of the input data, facilitating better learning and generalization by the CNN model.

Data Split: The data split module partitions the preprocessed dataset into various subgroups for the purposes of testing, validation, and retraining. This stage guarantees an impartial assessment of the model's functionality and helps prevent overfitting. Typically, the dataset is divided into a training set, utilized to train the

algorithm's parameters; a validation set for fine-tuning hyper parameters and tracking training results; and a testing set for evaluating the model's efficacy on untested data. When data is separated appropriately, the model may learn from a variety of instances and adapt well to new instances.

Model Training: The model training module involves the procedure of training the CNN architecture using the preprocessed dataset. This step includes setting up the CNN architecture, defining loss functions, selecting optimization algorithms, and specifying training parameters such as batch size and number of epochs. The training process iterates over the training dataset multiple times, updating the model's weights based on the calculated loss between predicted and actual labels. Through this iterative process, the CNN learns to extract meaningful features from hand gesture images and make accurate predictions.

Tuning: A crucial module for maximizing the CNN model's efficacy is hyperparameter adjustment. To find the combination that performs best on the validation dataset, it involves methodically combining an already established list of hyperparameters, such as acquisition rate, dropout rate, and kernel size. To quickly explore the hyperparameter space and find the ideal configuration, methods such as grid search, random exploration, or Bayesian optimization can be used. By fine-tuning the model's hyperparameters, developers can enhance its accuracy and generalization ability.

Transfer Learning: Transfer learning is a module that leverages pre-trained CNN models to expedite the training process and improve presentation, particularly when employed with limited data. In this module, a pre-trained CNN model, such as VGG, ResNet, or MobileNet, is imported and fine-tuned on the hand gesture dataset. By reusing the learned features from the pre-trained model and fine-tuning the top layers to adapt to the specific task of hand gesture recognition, developers can achieve quicker meeting and better presentation, even with reduced datasets.

Real-time Inference: Real-time inference is a crucial module that enables the CNN model to make predictions on live or streaming data in real-time. This module involves deploying the trained model onto hardware platforms capable of handling real-time processing, such as CPUs, GPUs, or specialized accelerators like TPUs. Efficient algorithms and optimization techniques are employed to minimize inference latency and ensure smooth performance. Real-time inference enables applications such as live hand gesture recognition in video streams, interactive interfaces, and augmented reality experiences, enhancing the responsiveness and usability of the structure.

User Feedback Integration: The user feedback integration module facilitates continuous improvement of The technology for recognizing hand gestures by gathering feedback from users and incorporating it into the model refinement process. This module may include mechanisms for users to provide feedback on recognition accuracy, usability, and interface design through surveys, ratings, or direct input. The collected feedback is analysed and used to Determine what needs to

be improved upon and give it priority feature enhancements, and guide future development efforts. By incorporating user feedback, developers can iteratively refine the system to better meet the requirements and preferences of its users.

Evaluation: The evaluation module assesses the presentation of the trained CNN model expending numerous metrics and visualization techniques. Metrics such as exactness, exactness, recollection, and F1 score provide quantitative measures of the model's presentation on the validation and testing datasets. Additionally, visualization techniques like confusion matrices, ROC curves, and precision-recall curves offer insights into the model's behaviour and help identify areas for improvement. By rigorously evaluating the model's performance, developers can gain a better understanding of its strengths and weaknesses and refine it accordingly.

7.0 Future Scope

1. Multimodal Integration: Future advancements in hand gesture recognition systems may involve integrating multiple modalities such as voice recognition and facial expressions to enhance communication and interaction capabilities. By incorporating additional sensory inputs, such systems could enable more natural and intuitive communication experiences, catering to diverse user needs and preferences.
2. Real-time Gesture Translation: With the ongoing progress in computational power and algorithmic efficiency, future hand gesture recognition systems may achieve real-time translation of gestures into text or speech with minimal latency. This capability would open up opportunities for applications in live communication, virtual reality, and telepresence, revolutionizing how people interact and collaborate in digital environments.
3. Gesture-based Interaction in Virtual Worlds: The emergence of virtual reality (VR) and augmented reality (AR) technologies presents exciting prospects for integrating hand gesture recognition into immersive virtual worlds. Future developments may enable users to interact with virtual environments using natural hand gestures, offering unprecedented levels of immersion and interactivity in gaming, education, training, and simulation applications.
4. Personalized Gesture Models: As hand gesture recognition systems become more widespread, there is a growing need to personalize models to individual users' preferences and abilities. Future advancements may involve adaptive learning algorithms that dynamically adjust model parameters based on user feedback and performance metrics, ensuring optimal recognition accuracy and user experience for each user.
5. Accessibility and Inclusivity Enhancements: Future research and development efforts in hand gesture recognition systems may focus on enhancing accessibility and inclusivity features to accommodate users with diverse needs and abilities. This could include improving recognition accuracy for users with disabilities,

developing assistive technologies for individuals with motor impairments, and incorporating features for gesture-based communication in sign language for the deaf and hard of hearing community.

8.0 Result

After training the model for 10 epochs, the following results were obtained: Training Loss: 0.0306, Training Accuracy: 98.93%, Validation Loss: 0.0762, Validation Accuracy: 98.22%

These results indicate that the model achieved high levels of accuracy both during training and validation phases. With a training accuracy of nearly 99% and a validation accuracy of over 98%, the model demonstrates robust performance in accurately recognizing hand gestures. The low training loss value suggests that the model effectively minimized errors during the training process. Additionally, the comparable validation loss indicates that the model generalized well to unseen data, further validating its efficacy. Overall, these results highlight the successful training of the hand gesture recognition model, laying a solid foundation for its deployment in practical applications.

Figure 3: Loss vs Accuracy Graph
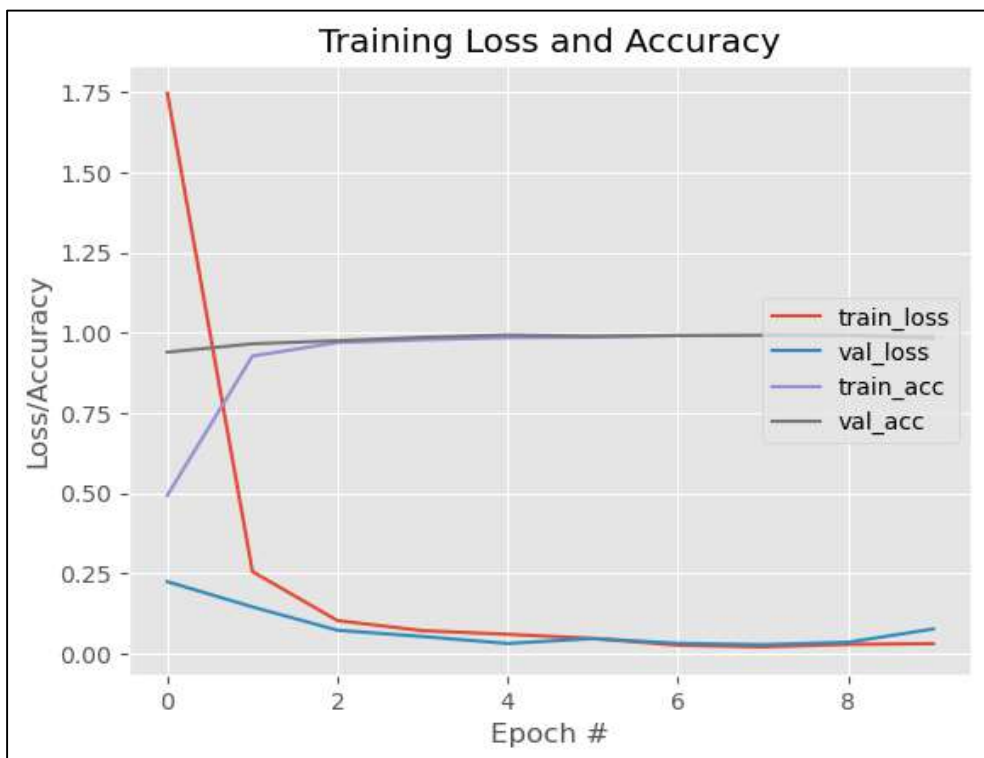
Source: Created by author

9.0 Conclusion

In conclusion, the hand gesture to text and voice conversion system presents a promising solution for facilitating communication and interaction, particularly for individuals with speech impairments. Through the integration of Convolutional Neural Network (CNN) technology and a user-friendly graphical interface, the system demonstrates robust performance in accurately recognizing hand gestures and converting them into text or voice output. The training results, with a training accuracy of 98.93% and a validation accuracy of 98.22% after 10 epochs, underscore the effectiveness of the model in learning and generalizing from the provided dataset. These achievements signify a significant step forward in bridging communication gaps and promoting inclusivity in digital environments.

Moving forward, future enhancements and research directions may include exploring multimodal integration, real-time gesture translation, and personalized gesture models to further enhance the system's capabilities and adaptability to diverse user needs. Moreover, continued efforts to improve accessibility features and inclusivity enhancements will be crucial in ensuring that the system remains accessible to all users, regardless of their abilities or limitations.

Overall, the hand gesture to text and voice conversion system holds great potential in revolutionizing communication paradigms and fostering a more inclusive and accessible digital landscape. By harnessing the power of technology to interpret and translate hand gestures into meaningful communication, the system empowers individuals to express themselves more freely and engage with digital platforms in novel and intuitive ways.

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CHAPTER 5

Analysis of the Factors Affecting the Purchase Decision of Gen Z for Apparels in India

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ABSTRACT

This study investigates the factors influencing apparel purchase decisions among Generation Z (Gen Z) consumers in India, born between the mid-1990s and early 2010s. Gen Z constitutes a rapidly growing and influential consumer segment with distinct preferences and behaviors, making it crucial for retailers and marketers to understand their clothing choices. Employing a mixed-methods approach, the research combines quantitative and qualitative data collection methods. A structured questionnaire will be distributed to a representative sample, gathering data on demographics, shopping habits, brand preferences, and factors affecting apparel purchases. Statistical analysis will identify trends and correlations, while thematic analysis through focus groups or interviews will provide deeper insights into motivations and decision-making processes. By integrating these methodologies, the study aims to offer a comprehensive understanding of Gen Z's apparel shopping behavior in India. The findings will contribute valuable insights to consumer behavior research and provide practical implications for apparel businesses, enabling them to tailor marketing strategies and product offerings to effectively engage with the Gen Z segment.

Keywords: Generation Z, Purchase decisions, Apparel, Consumer behavior, Brand preferences, Buying behavior, Brand loyalty, India.

1.0 Introduction

In today's dynamic marketplace, understanding what drives Generation Z (Gen Z) consumers to make apparel purchase decisions is crucial for businesses in India. Gen Z, born between the mid-1990s and early 2010s, represents a significant segment of the population with unique preferences and behaviors. As they come of age and become more financially independent, their influence on the fashion and retail sectors continues to grow.

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This research aims to delve into the factors that influence Gen Z's choices when it comes to buying apparel in India. By comprehensively studying these factors, businesses can tailor their marketing strategies and product offerings to better resonate with this demographic. In this study, we will employ quantitative surveys. Through structured questionnaires administered to a sample of Gen Z consumers across of various age groups, we will gather data on their demographic characteristics, shopping habits, brand preferences, and the factors that drive their apparel purchase decisions.

By analyzing this data using statistical tests, we seek to uncover insights that can inform businesses about the most effective strategies to target and engage Gen Z consumers in the Indian apparel market. Ultimately, the findings of this research are expected to contribute valuable insights to the existing body of knowledge on consumer behavior and provide practical guidance for apparel retailers and marketers seeking to thrive in the dynamic landscape of the Indian market.

2.0 Literature Review

Understanding the purchase behavior of Generation Z (Gen Z) is imperative for marketers seeking to tap into the lucrative Indian apparel market. This literature review delves into various studies that shed light on the factors affecting Gen Z's purchase decisions for apparel in India. From exploring their preferences for luxury goods to analyzing their online shopping habits and brand perceptions, these studies offer valuable insights for marketers aiming to effectively engage with this demographic.

Exploring Luxury Apparel Purchase Behavior: Jain, Vatsa, and Jagani (Year of publication) provide an in-depth analysis of Gen Z's demand for luxury apparel in the Indian market. The study emphasizes Gen Z's preference for high-end luxury goods, influenced by their exposure to international fashion trends and the significant growth of the Indian consumer market. Marketers are urged to understand Gen Z's purchase behavior to effectively target this segment, particularly the elite class and those with a taste for international designs.

Understanding Gen Z Marketing Strategies: Karta Negara Salam et al. (Year of publication) offer insights into Gen Z's consumer behavior and effective marketing strategies tailored to this cohort. Through qualitative analysis, the study aims to comprehend Gen Z's preferences and facilitate the development of marketing strategies. It emphasizes the influence of social values, environmental concerns, and social media on Gen Z's consumer preferences, highlighting the importance of online presence for retailers.

Analyzing Consumer Decision-Making Style: Thangavel, Pathak, and Chandra (2019) delve into the impact of the digital revolution on Gen Z's shopping behavior, particularly in online shopping. The study aims to segment Gen Z online shoppers into unique groups based on shopping orientation, highlighting the

importance of understanding their consumption characteristics and values. Factors such as convenience, price consciousness, and brand loyalty drive online shopping behavior, necessitating a deeper understanding of Gen Z's shopping orientation in the e-commerce platform.

Factors Determining Clothing Interest and Purchase Intention: Structural equation modeling is employed by researchers (Author names and year) to analyze the factors influencing Gen Z consumers' clothing interest and purchase motivation. Uniqueness, self-concept, brand image, word of mouth, and perceived quality are identified as significant predictors of clothing interest, with price consciousness moderating the relationship between clothing interest and purchase intention. The study offers valuable insights for fashion brands aiming to develop effective marketing strategies and brand positioning tailored to Gen Z consumers in India.

Brand Avoidance Behavior towards Fast Fashion Products: Zsoka et al. (2020) provide a comprehensive literature review on brand avoidance and anti-consumption among Gen Z consumers, focusing on fast fashion products. The study identifies five categories of brand avoidance and highlights the importance of factors such as brand value, product patterns, social and environmental issues, and store atmosphere. While the study has limitations, it offers valuable insights into Gen Z's brand avoidance behavior towards fast fashion products, informing marketing strategies for brands operating in this space.

Overview of Existing Knowledge on Consumer Behavior: A study by Anderson et al. (2005) defines consumer behavior as a scientific process involving the selection, acquisition, and disposal of goods and services to satisfy individual needs. Gupta and Rana (2017) explore various theories and models of consumer behavior, emphasizing the importance of studying this topic, particularly in the context of branded apparel in India. The literature review highlights the lack of research on consumers' buying behavior in India, setting the stage for the current study.

Key Factors Influencing Online Shopping Habits: Agarwal and Jain (2018) focus on India-specific factors influencing Gen Z's online shopping habits, providing insights for marketers and businesses. The study identifies key factors such as convenience, price consciousness, and brand loyalty driving Gen Z's online shopping behavior, underscoring the importance of understanding their preferences in the digital realm.

Exploratory Study within the Apparel Industry: Gupta and Srivastava (2019) conduct an exploratory study within the apparel industry to uncover the motivations driving Gen Z's purchase behavior. By examining various factors, the study contributes to a deeper understanding of consumer dynamics within this sector, informing strategic initiatives for marketers.

Influence of Brand Image on Purchase Decisions: Kumar and Rani (2020) investigate the influence of brand image on purchase decisions among Gen Z in the Delhi-NCR region, highlighting the pivotal role of brand perception in shaping

consumer choices. The study underscores the significance of brand management strategies in capturing this market segment.

Factors Influencing Online Shopping Behavior: Mishra and Sharma (2019) extend the discourse by investigating factors influencing online shopping behavior among Gen Z in India. By identifying key drivers and inhibitors of online purchases, the study offers insights for e-commerce platforms and digital marketers seeking to engage with this demographic effectively.

Impact of Fashion Bloggers on Consumer Behavior: Saxena and Mittal (2018) explore the impact of fashion bloggers on young consumers, particularly Gen Z, underscoring the growing significance of digital influencers in shaping consumer preferences and purchasing decisions.

Brand Preference among Gen Z Consumers: Sharma and Sharma (2017) focus on brand preference among Gen Z consumers in India, particularly in the apparel sector. Their study delves into the factors driving brand loyalty and affinity within this demographic, offering actionable insights for marketers.

Influence of Sustainability on Purchase Behavior: Singh and Bhatia (2020) expand the scope by exploring the influence of sustainability on Gen Z consumers' purchase behavior in the fashion industry. Their research highlights the increasing importance of eco-consciousness among young consumers, urging brands to integrate sustainability into their business models and marketing strategies.

Buying Behavior of Gen Z Consumers: Singh and Chaudhary (2019) study the buying behavior of Gen Z, focusing on apparels. Their research provides insights into the preferences, motivations, and decision-making processes of this demographic, guiding strategic initiatives aimed at catering to their needs and preferences.

Role of Fashion Influencers in Shaping Buying Behavior: Verma and Bharti (2021) investigate the role of fashion influencers in shaping the buying behavior of Gen Z in India. By analyzing the impact of influencer marketing on consumer perceptions and choices, their research offers actionable insights for brands leveraging digital influencers to reach and engage with this demographic.

3.0 Research Gaps

1. There are gaps in understanding gap how age influences the frequency of apparel purchases among Gen Z in India.
2. There is a research gap in understanding the relationship between consideration of apparel quality and willingness to pay a premium price among Gen Z in India.
3. There is a gap in understanding the influence of current fashion trends on the likelihood of purchasing apparel among Gen Z in India.
4. Ther is a gap in understanding the relationship between brand loyalty and the likelihood of purchasing apparel among Gen Z in India.

4.0 Problem Statement

The research problem at hand addresses the complexities surrounding Gen Z's online shopping habits, brand avoidance behavior, and the influence of brand loyalty on their apparel purchasing decisions in the Indian market. While existing research has shed light on various aspects of these phenomena, significant gaps persist. These include a limited exploration of Gen Z's online behavior, incomplete understanding of brand avoidance motivations, and a lack of specificity regarding how different age groups within Gen Z exhibit variations in apparel purchasing frequency. Furthermore, while previous studies have examined the influence of quality considerations and brand loyalty on apparel purchases, there is a notable gap in understanding how Gen Z weigh quality against premium prices and the specific impact of brand loyalty on their decision-making process. Addressing these gaps is crucial for developing tailored marketing strategies and enhancing brand engagement with Gen Z consumers in India's apparel market.

5.0 Objectives

Objective 1: Explore drivers of brand avoidance in Gen Z in India, focusing on authenticity, ethics, and personal values, informing strategies to mitigate avoidance and boost engagement.

Objective 2: Investigate how quality and pricing influence Gen Z's apparel purchases in India, guiding effective pricing and positioning strategies for brands.

Objective 3: Analyze fashion trends' impact on Gen Z's apparel purchases and brand loyalty in India, informing strategies to integrate trends and enhance loyalty.

Objective 4: Identify drivers of brand loyalty in Gen Z in India, devising tailored marketing strategies and loyalty programs to foster engagement and drive purchases.

6.0 Research Methodology

Research Design: The research design adopted for this study was quantitative and co-relational research. This design allowed for the exploration of relationships between variables using statistical analysis.

Data Collection: Primary Data Collection: The primary data for this study was collected through a structured questionnaire administered to comprehensively analyze the factors influencing the purchase decisions of Gen Z for apparels.

Sampling: The target population for this study will be Gen Z consumers (aged 18-24). Stratified random sampling is chosen to ensure representation across different demographic groups. Within each stratum, a random sample of participants is selected to ensure proportional representation of each demographic group in the final sample. The sample size of 132 within each stratum is determined based on the proportion of respondents observed in the data, ensuring adequate representation of each group.

Data Analysis: Statistical tools were employed to analyse the collected data. Following statistical tools have been used:

- Pearson Chi-Square Test
- Likelihood Ratio Chi-Square Test
- Linear-by-Linear Association Test

The statistical tools used in the analysis include chi-square tests. Chi-square tests are utilized to examine the relationships between categorical variables. Specifically, the Pearson chi-square statistic, likelihood ratio chi-square statistic, and linear-by-linear association test were employed to assess the significance of the relationships between different variables in each hypothesis. These tests were used to assess the significance of the relationships proposed in each hypothesis. The p-values obtained from these tests were used to determine whether the null hypotheses could be rejected, indicating a significant relationship between the variables under investigation.

Ethical Considerations: Ethical guidelines were strictly adhered to throughout the research process. Informed consent was obtained from all participants before their participation in the study. Confidentiality and anonymity of participants were maintained by assigning unique identifiers to their responses. Participants were assured of the voluntary nature of their participation and their right to withdraw from the study at any time without consequences.

6.1 Limitations

- The utilization of convenience sampling may have introduced biases in the sample selection process, potentially limiting the generalizability of the findings.
- The collection of self-reported data through questionnaires might have influenced responses, introducing the possibility of response bias.
- Constraints in terms of resources and time may have imposed limitations on the scope and depth of the study.

7.0 Synthesis Analysis

Understanding Gen Z's demand for luxury apparel, as emphasized by Jain, Vatsa, and Jagani, is crucial for marketers targeting this segment. The influence of international fashion trends and the growth of the Indian consumer market play a significant role in shaping Gen Z's affinity towards high-end luxury goods. Moreover, the research by Karta Negara Salam et al. underscores the importance of social values, environmental concerns, and social media in Gen Z's consumer behavior. This highlights the need for marketers to align their strategies with these values to effectively engage with this cohort. The impact of the digital revolution on Gen Z's shopping behavior, as explored by Thangavel, Pathak, and Chandra, emphasizes the segmentation of online shoppers based on factors like convenience, price consciousness, and brand loyalty.

The literature also delves into factors influencing clothing interest and purchase intention among Gen Z consumers. Structural equation modelling helps identify predictors such as uniqueness, self-concept, brand image, word of mouth, and perceived quality, with price consciousness moderating the relationship between clothing interest and purchase intention. This offers valuable insights for fashion brands looking to tailor their marketing strategies to resonate with Gen Z consumers in India. Furthermore, the studies on brand avoidance behavior towards fast fashion products, the influence of brand image on purchase decisions, and the impact of sustainability on purchase behavior provide a holistic view of Gen Z's attitudes towards brands and sustainability practices. Understanding these aspects is crucial for brands operating in the Indian apparel market to align with Gen Z's values and preferences effectively. In conclusion, the literature review presents a rich tapestry of studies that collectively offer valuable insights for marketers aiming to engage with Gen Z consumers in India. By understanding their preferences for luxury goods, online shopping habits, brand perceptions, and factors influencing purchase decisions, marketers can develop tailored strategies to effectively target and resonate with this dynamic demographic.

8.0 Inferential Analysis

H01: There is no significant relationship between age and the frequency of apparel purchases among Gen Z in India.

Ha1: There is a significant relationship between age and the frequency of apparel purchases among Gen Z in India.

Table 1: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	39.675[a]	51	.875
Likelihood Ratio	44.031	51	.745
Linear-by-Linear Association	.001	1	.971
N of Valid Cases	132		
a. 64 cells (88.9%) have expected count less than 5. The minimum expected count is .02.			

Source: Primary survey

The chi-square test was conducted to examine the potential relationship between age and the frequency of apparel purchases among Gen Z individuals in India. The analysis yielded non-significant results across multiple metrics. Specifically, the Pearson chi-square statistic, which was calculated to be 39.675 with 51 degrees of freedom, resulted in a p-value of .875. Similarly, the likelihood ratio chi-square test produced a statistic of 44.031 with 51 degrees of freedom and a p-value of .745. Additionally, the linear-by-linear association test showed a minimal chi-square value of .001 with 1 degree of freedom, resulting in a p-value of .971.

These findings collectively indicate a lack of statistically significant evidence to reject the null hypothesis, suggesting that there is no significant relationship between age and the frequency of apparel purchases among Gen Z individuals in India.

It's noteworthy that the p-values obtained from all three tests comfortably exceed the conventional threshold of .05 for statistical significance. This implies that there is no compelling evidence to suggest that age influences the frequency of apparel purchases among Gen Z individuals in India. These results are particularly relevant in understanding the consumer behavior of this demographic segment, indicating that factors other than age might play a more significant role in determining their apparel purchasing habits.

Furthermore, it's essential to acknowledge the limitations of the study, including potential biases in the sample population and the nature of the data collection method. Despite these limitations, the consistency of the non-significant findings across multiple statistical tests underscores the robustness of the conclusion drawn. Future research endeavors in this area could explore additional variables or employ different analytical approaches to gain further insights into the complex dynamics shaping Gen Z's apparel purchasing behavior in the Indian market.

H02: There is no significant relationship between the consideration of apparel quality and the willingness to pay a premium price among Gen Z in India.

Ha2: There is a significant relationship between the consideration of apparel quality and the willingness to pay a premium price among Gen Z in India.

Table 2: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.511[a]	16	.009
N of Valid Cases	132		
a. 16 cells (64.0%) have expected count less than 5. The minimum expected count is .07.			

Source: Primary survey

The chi-square test was conducted to investigate the potential relationship between the consideration of apparel quality and the willingness to pay a premium price among Gen Z individuals in India. The analysis yielded a significant result, as evidenced by the Pearson chi-square statistic of 24.511 with 16 degrees of freedom and a p-value of .009. This p-value indicates that there is a significant relationship between the consideration of apparel quality and the willingness to pay a premium price among Gen Z in India at the 0.05 significance level.

The significant result suggests that there is an association between how much Gen Z individuals consider the quality of apparel and their willingness to pay a premium price for it. This finding underscores the importance of quality considerations in influencing the purchasing decisions of this demographic segment. It implies that Gen Z consumers who place greater importance on apparel quality are more likely to be willing to pay a higher price for premium-quality products.

It's important to note that while the result is statistically significant, caution should be exercised due to the presence of cells with expected counts less than 5, as indicated in the output. This suggests that some cells in the contingency table have low frequencies, potentially impacting the reliability of the chi-square test results. However, despite this limitation, the significant association observed between apparel quality consideration and willingness to pay a premium price suggests a meaningful relationship worth further exploration.

Overall, this finding provides valuable insights into the factors influencing the purchasing behavior of Gen Z individuals in India, highlighting the role of apparel quality in shaping their willingness to invest in premium products. Further research could delve deeper into understanding the specific attributes of apparel quality that drive purchasing decisions and explore strategies for effectively targeting this segment of consumers in the Indian market.

H03: There is no significant relationship between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z in India.

Ha3: There is a significant relationship between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z in India.

Table 3: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.575[a]	16	.020
N of Valid Cases	132		
a. 17 cells (68.0%) have expected count less than 5. The minimum expected count is .27.			

Source: Primary survey

The chi-square test was conducted to explore the potential relationship between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z individuals in India. The analysis yielded a significant result, as indicated by both the Pearson chi-square and likelihood ratio chi-square statistics, with values of 29.575 and 29.612, respectively, each with 16 degrees of freedom, and associated p-values of .020. These p-values suggest that there is a statistically significant relationship between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z in India at the 0.05 significance level.

Moreover, the linear-by-linear association test, which examines the trend in the data, yielded a chi-square value of 3.422 with 1 degree of freedom and a p-value of .064. While this p-value is slightly above the conventional threshold of 0.05, it is worth noting that the test is still marginally significant. This indicates a possible linear trend in the association between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z in India, albeit with a lower level of statistical significance. However, it's essential to acknowledge the presence of cells with expected counts less than 5, which may impact the reliability of the chi-

square test results. Despite this limitation, the significant findings from both the Pearson chi-square and likelihood ratio chi-square tests suggest a meaningful relationship between the importance of current fashion trends and the likelihood of purchasing apparel among Gen Z individuals in India.

In summary, these results provide valuable insights into the influence of current fashion trends on the purchasing behavior of Gen Z consumers in India, highlighting the significance of staying abreast of fashion trends in driving apparel purchases within this demographic segment. Further research could delve deeper into understanding the specific mechanisms through which fashion trends impact purchasing decisions and explore strategies for effectively leveraging these trends in the Indian apparel market.

H0: There is no significant relationship between brand loyalty and the likelihood of purchasing apparel among Gen Z in India.

H1: There is a significant relationship between brand loyalty and the likelihood of purchasing apparel among Gen Z in India.

Table 4: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	45.353[a]	16	.000
N of Valid Cases	132		
a. 17 cells (68.0%) have expected count less than 5. The minimum expected count is .21.			

Source: Primary survey

The chi-square test was conducted to examine the potential relationship between brand loyalty and the likelihood of purchasing apparel among Gen Z individuals in India. The analysis yielded highly significant results, as indicated by both the Pearson chi-square and likelihood ratio chi-square statistics. The Pearson chi-square statistic was calculated as 45.353 with 16 degrees of freedom, and the associated p-value was found to be .000. Similarly, the likelihood ratio chi-square statistic was 51.018 with 16 degrees of freedom, also resulting in a p-value of .000. These p-values suggest a highly significant relationship between brand loyalty and the likelihood of purchasing apparel among Gen Z in India at the conventional significance level of 0.05.

Furthermore, the linear-by-linear association test, which examines the trend in the data, yielded a chi-square value of 28.197 with 1 degree of freedom and a p-value of .000. This result further supports the significant association between brand loyalty and the likelihood of purchasing apparel among Gen Z individuals in India.

9.0 Results and Discussion

This study investigated the relationships between various factors and apparel purchase behavior among Gen Z consumers in India. Chi-square tests were

conducted to analyze these relationships, with some limitations acknowledged due to cells with expected counts less than

9.1 Age and purchase frequency

The hypothesis (Ha1) stating a significant relationship between age and frequency of apparel purchases was not supported. The chi-square tests yielded non-significant p-values across all metrics, suggesting that age does not significantly influence how often Gen Z individuals in India purchase apparel. This indicates that other factors likely play a more prominent role in shaping their purchasing habits.

9.2 Quality consideration and price premium

The hypothesis (Ha2) proposing a significant connection between considering apparel quality and willingness to pay a premium price was supported. The chi-square test results showed a significant p-value (0.009), indicating that Gen Z consumers who prioritize quality are more likely to be willing to pay higher prices for premium apparel. This highlights the importance of quality as a factor influencing purchase decisions within this demographic.

9.3 Fashion trends and purchase likelihood

The hypothesis (Ha3) suggesting a significant relationship between the importance of current fashion trends and the likelihood of purchasing apparel was also supported. The chi-square tests (Pearson's and likelihood ratio) yielded significant p-values (0.020), while the linear-by-linear association test indicated a possible positive trend (p-value = 0.064). These findings suggest that Gen Z consumers in India are more likely to purchase apparel that aligns with current fashion trends.

9.4 Brand loyalty and purchase likelihood

The hypothesis (Ha4) proposing a significant relationship between brand loyalty and the likelihood of purchasing apparel received strong support. The chi-square tests produced highly significant p-values (0.000) across all metrics, and the linear-by-linear association test also indicated a significant association. This implies that brand loyalty is a strong factor influencing apparel purchase decisions among Gen Z in India.

10.0 Discussion

These findings offer valuable insights for marketers targeting the Gen Z apparel market in India.

- **Age is not a differentiating factor** in purchase frequency. Marketers should focus on understanding and catering to broader preferences and needs within Gen Z.

- **Quality is a key driver** for those willing to pay a premium. Brands should emphasize quality alongside price competitiveness.
- **Staying current with fashion trends** is crucial. Marketing campaigns and product offerings should effectively integrate these trends.
- **Building brand loyalty** is essential. Strategies to cultivate brand trust and positive brand image are critical for success.

It is important to acknowledge the limitations of the study, including the potential for sample bias and the impact of low expected counts in the chi-square tests. Future research could benefit from larger and more diverse samples, along with exploring additional factors influencing Gen Z's apparel purchase behavior in the Indian market. This could involve delving deeper into specific quality attributes, the mechanisms behind fashion trend influence, and brand loyalty drivers.

11.0 Recommendations

11.1 Age and frequency of apparel purchases (H0 not rejected)
- Focus marketing efforts beyond age demographics. Age may not be a strong indicator of purchase frequency for Gen Z. Consider segmenting by other factors like interests, values, or shopping habits.

11.2 Apparel quality and willingness to pay premium (H0 rejected)
- Emphasize quality in marketing campaigns. Highlight the use of premium materials, durable construction, and ethical manufacturing practices to resonate with Gen Z's quality consciousness.
- Offer tiered product lines with varying quality levels and price points to cater to different preferences within Gen Z.

11.3 Fashion trends and likelihood of purchase (H0 rejected)
- Leverage social media marketing and influencer partnerships to stay at the forefront of fashion trends. Partner with influencers relevant to your target audience within Gen Z.
- Design clothing lines that are trendy while maintaining quality and ethical considerations to appeal to fashion-conscious Gen Z consumers.

11.4 Brand loyalty and likelihood of purchase (H0 rejected)
- Implement loyalty programs and reward schemes to cultivate brand loyalty among Gen Z. Offer exclusive discounts, early access to new collections, or personalized recommendations.
- Foster brand communities through social media engagement and online forums. Create a sense of belonging and brand identity to connect with Gen Z on a deeper level.

11.5 General recommendations

- Conduct further research to explore the specific quality attributes and fashion trends that resonate with Gen Z in India.
- Utilize a multi-channel marketing approach that integrates online and offline strategies to reach Gen Z effectively. Consider influencer marketing, social media engagement, and personalized shopping experiences.
- Prioritize ethical and sustainable practices throughout the supply chain. Gen Z is increasingly conscious of these factors and will respond positively to brands that align with their values.
- Continuously monitor and adapt marketing strategies based on evolving consumer trends and preferences within Gen Z.

By implementing these recommendations, businesses can gain a competitive edge in capturing the Gen Z apparel market in India. Remember, understanding their unique preferences, values, and decision-making processes is crucial for successful marketing and brand building.

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CHAPTER 6

Role of Technological Advancements on Work and their Significance for Training in Manufacturing

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ABSTRACT

Technological developments are changing the industrial sector, altering work procedures, and requiring workers to possess new abilities. This systematic review investigates at how technology is changing manufacturing and how these changes have an impact on workforce development. This study outlines the current understanding of the link between technology and manufacturing activities, based on a comprehensive examination of academic literature. The analysis emphasizes key technological advancements such as automation, robotics, AI, and IoT and investigates how they affect employment roles, skill needs, productivity, and safety in the manufacturing industry. Moreover, the analysis investigates the ways in which these advancements are transforming traditional manufacturing processes and creating new opportunities for efficiency and innovation. This review also explores the importance of employee training for adapting manufacturing to technological advancements. It examines at the necessity of continuing education and training programs to provide employees the skills they need to properly use and maintain cutting-edge technologies. It also looks at how training initiatives help manufacturing companies develop a culture of ongoing learning and adaptability. The results of this systematic analysis highlight how crucial proactive training methods are to adapting the workforce in manufacturing industry for both opportunities and challenges brought about by technological improvements. Manufacturing organizations may improve their competitiveness, engage employees, and secure sustainable development in a becoming digitalized sector by allocating resources towards training and development programs that cater to the changing skill requirements of contemporary manufacturing.

Keywords: Technological advancements, Automated manufacturing, Workforce Training & Skills, Robots, AI, The IoT.

1.0 Introduction

Technological advancements in manufacturing have a persistent positive impact on local economies, business growth, and society (Sangwan *et al.* 2020).

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Technology advancement is now a crucial element in the intricate framework of contemporary business, often causing changes in employment and production methods. Advancement in technology, ranging from automated processes to the contemporary age of robots and AI, has brought us both benefits and challenges (Dwivedi *et al.* 2021). It is essential to understand the intricate connection between work relationships, technical improvements, and the impact on manufacturing training in this ever-changing environment.

The current research aims to explore the complex connection between advancements in technology within the manufacturing sector and the training of employees. This review seeks to comprehensively explore the impact of technological advancements on training and work frameworks in the manufacturing industry. It will achieve this by conducting a detailed analysis of existing literature, synthesising empirical data, and closely examining the intricate interrelationships involved. This review aims to provide insights on enhancing training strategies, promoting workforce adaptability, and harnessing the transformative power of technology to foster sustained growth and competitiveness in the manufacturing sector. It will explore the intricacies of how technology impacts work processes, skill demands, and organisational frameworks.

2.0 Background and significance of technological advancements in manufacturing

Based on investigations carried out by Groumpos, P. P. (2021), An important turning point in the development of industrialization occurred when the Industrial Revolution began in the late 18th century. Industrial output and efficiency were greatly enhanced with the advent of steam energy, automated processes, and the production system (Chowdhury *et al.* 2018). Henry Ford was one of the earliest adopters of the manufacturing process, an invention that allowed for mass manufacturing of things at lower costs and fundamentally transformed the industrial world in the early twentieth century (Daemmrich, A. 2017).

Henry Ford introduced the manufacturing method and other breakthroughs that drastically cut the expenses of mass production, causing a revolution in the manufacturing business (McCraw, *et al.* 2018). This approach allowed less skilled workers to complete the manufacturing process by dividing the work into smaller, more manageable tasks. Modern production methods emerged about this time. In the mid-20th century, the manufacturing industry experienced significant transformations due to the implementation of concepts like automation and robotics (Mourtzis, *et al.* 2022). Automated technology has replaced human labour in several vocations, resulting in enhanced precision, homogeneity, and speed in industrial processes.

As a result, there was a reduction in staff expenses and an improvement in efficiency. Automation and the widespread use of machines in manufacturing were both made possible by the industrial revolution. Transforming the industrial process, the arrival of steam power and then electricity greatly increased productivity and

efficiency. Manufacturing technology advanced due to the pressing need for increased productivity. The development of new materials, methods, and equipment led to the industry's advancement. Massive factories staffed by skilled labourers and equipped with cutting-edge technology began to predominate throughout the Industrial Revolution, allowing for the mass manufacturing of goods. Industry 4.0 is the integration of digital and computer technology into production, bringing previously unheard-of levels of efficiency and customisation (Bongomin, *et al.* 2020).

Real-time monitoring, automated upkeep, and flexible production processes are made possible by technologies like AR, the IoT, analytics of big data, and the use of additive manufacturing (3D printing) (Ashima *et al.* 2021). The division of workers into specific jobs was known as focus of labour, and it was embraced by manufacturing businesses. In addition to increasing productivity, this division reduced the need for employees to have a diverse set of skills. Hierarchical organisational systems with clearly defined positions and duties were widely accepted when large-scale manufacturing was implemented. During the initial stages of the industrial revolution, apprenticeship systems were the prevalent method for individuals to gain skills. Experienced craftspeople would mentor newcomers, teaching them the trade over several years. There was a shift in demand from skilled artisans to unskilled labourers as mass production became more efficient. The demand for workers with advanced skills has grown alongside the advancements in manufacturing automation (Acemoglu *et al.*, 2019).

The original intent of vocational schools and technical colleges was to provide employees with the specialised knowledge needed to run equipment and understand the manufacturing process. In order to familiarise employees with certain processes and equipment, a number of manufacturing firms used on-the-job training programmes. This practical approach allows learners to enhance their classroom education with real-world experience. Given the swift advancements in industrial technology, it has become crucial to continuously acquire new knowledge and refine existing skills. In order to keep their employees up-to-date on the newest processes and technology, manufacturing companies increased their spending on training and development of employees programmes (Sima *et al.* 2020).

3.0 Impact of Technological advancement on the Manufacturing Process

According to Haleem *et al.* 2022), advancements in technology have greatly enhanced the manufacturing industry, resulting in training techniques that are now more efficient, easily available, and captivating. Businesses may ensure that their staffs possess the requisite knowledge and skills to thrive in an ever-evolving industrial landscape by using these advances.

3.1 Automated systems

The research carried out by Javaid *et al.* 2021), robotics and machine learning are being integrated into production processes to improve efficiency, accuracy, and economic feasibility. Through the autonomous execution of repeated tasks with minimal human intervention, automated systems can improve performance while reducing errors. Computerized systems possess the capacity to do repeated operations swiftly and accurately, leading to higher production rates and shorter cycle times. The improvement in efficiency leads to decreased manufacturing costs and heightened total production. The integration of sensors and tracking capabilities into automated systems ensures a consistent level of quality remains maintained during the production process (Lu, Y., *et al.* 2020).

As a result, there is an enhancement in the quality of the product and a reduction in faults, leading to higher levels of customer satisfaction and a decrease in waste. Modern automated systems are designed to be adaptable and reprogrammable, allowing producers to quickly make changes to manufacturing specifications or production demands. The agility indicated above enables producers to quickly adjust to changes in the marketplace and growing consumer demands. It has the ability to carry out dangerous tasks and function in surroundings that may pose risks, therefore improving overall worker safety.

Tsopa *et al.* 2022) stated that automated systems improve workplace safety by reducing the probability of injuries and incidents. By analyzing the vast volumes of data generated by the manufacturing process, it becomes possible to identify inefficiencies, optimize production schedules, and forecast maintenance needs. By utilizing a system that relies on data, manufacturers are able to continuously improve their operations and maximize operational efficiency. Automated systems need an initial investment, but by replacing worker effort with technology, they can ultimately save labour costs (Acemoglu, D., *et al.* 2018). Areas characterized by high labour expenses or a shortage of skilled workers may particularly benefit from this. It can strengthen a manufacturer's worldwide competitiveness by reducing costs, improving productivity, and enhancing quality. Producers can preserve their competitive advantage in an increasingly worldwide market.

3.2 Internet of Things (IoT)

Kumar *et al.* (2021), pointed out that a key component of the IoT is the incorporation of sensors into various infrastructure and machines. This enables the administration and monitoring of manufacturing operations in real-time. Being online makes it easier to plan maintenance, provide greater quality control, and maximize asset use. Manufacturers can supply large-scale customization by collecting and analyzing data about client preferences and behaviour via IoT technologies (Wan, J., *et al.* 2020). Using this data, items may be adapted to the specific needs and desires of individual clients, leading in a more satisfied and loyal customer base. When activated, IoT sensors can be used to constantly track equipment, generating real-time

data on variables such as tremors, temperature, and power consumption. Machine learning algorithms are used on the data to forecast when breakdowns of equipment may occur. By proactively anticipating possible problems, manufacturers can enhance their maintenance plans, reducing downtime and repair costs (Gackowiec, P. 2019). Manufacturers can enhance inventory management, minimize lead times, and assure timely delivery of items to consumers by monitoring levels of stock, shipment status, and situations while in route.

3.3 Additive manufacturing

Study conducted by Ngo, T. D., *et al.* (2018), pointed out that by allowing the construction of complex patterns with less material and eliminating waste products, additive manufacturing also known as three-dimensional printing is transforming conventional manufacturing methods. Because it allows for rapid development, customization, and instant production, it shortens the time it takes to bring products to market and lowers associated costs. Through fast prototyping, additive printing has enormous potential to help engineers and designers test and improve new product ideas quickly and effectively. Manufacturing companies may react quickly to shifting customer demands and market dynamics, which shorten time-to-market (Day, G. S., & Schoemaker, P. J. 2016).

Subtractive operations in conventional manufacturing methods involve removing material from a solid block to build a component. Due to the components are built in a sequential way, material waste is efficiently reduced. This could result in financial savings as well as positive environmental impacts. Additionally, it streamlines the customization and modification process, making it possible to make quick adjustments to any component without having to pay for expensive tooling revisions. This makes it possible for producers to provide distinctive products that are customized to meet the specific needs of every consumer, increasing customer happiness and loyalty. Several parts can be smoothly integrated to make an elaborate item by using additive manufacturing. This reduces costs and improves product dependability by streamlining manufacturing and optimizing the assembly process (Attaran, M. 2017).

Much progress has been made in streamlining the process of creating new materials and finding practical applications for them. This has made possible the realization of projects that were previously thought to be impossible to produce with traditional methods. This examines cutting-edge materials such metal alloys, composites, and ceramics, as well as their creative applications in a range of sectors, including healthcare, aerospace, and the automobile industry (Hajare, D. M., & Gajbhiye, T. S. 2022).

3.4 Big data and analytics

Frank *et al.* 2017, concluded that businesses generate mountains of data that may be mined for insights into how to run more efficiently, when pieces of

machinery will break down, and other opportunities. Optimizing output and efficiency is possible through the use of comprehensive statistical analysis, which enables producers to make data-based decisions. Manufacturers can forecast machine breakdowns and schedule maintenance by analyzing data collected from sensor and other devices (Ayvaz & Alpay, 2021).

This approach enhances the durability of the equipment, reduces maintenance costs, and minimizes unplanned periods of inactivity. Big data analytics enables manufacturers to analyze vast quantities of data provided by sensors that are manufacturing machines, and supply chain systems (Cui *et al.* 2020). Advanced analytics approaches such as optimization techniques and machine learning can enable the identification of inefficiencies, the optimization of production schedules, and the enhancement of overall efficiency. Manufacturing industries can utilize analytical tools for big data to monitor and analyze real-time data regarding energy consumption as a means to reduce energy usage and enhance sustainability. Prioritizing energy consumption optimization in industrial processes can enhance expenditures on operations, adverse environmental effects, and regulatory compliance. Manufacturers can adopt a growth attitude by utilizing big data analytics, which uncover potential for optimization and innovation (Mariani *et al.* 2020). Manufacturers may enhance their competitive advantage and foster operational excellence by analyzing data on crucial performance metrics such as production efficiency, quality benchmarks, and customer satisfaction ratings. Big data analytics can provide manufacturers with valuable insights concerning product usage and performance. Manufacturers can enhance their ability to meet consumer expectations by evaluating data from IoT devices to identify opportunities for enhancing product design, including additional features, and developing novel goods (Kiel *et al.* 2017).

Kontogiannis *et al.* (2019) indicate that VR and AR training allow workers to hone new skills in a safe setting while simulating real-world production processes. They make it possible for specialists to provide real-time advice and fix problems through online support. Virtual reality enables rapid concept iteration, testing of various setups, and early identification of potential problems before creating real prototypes. By overlaying digital data on physical prototypes, AR can improve this process by offering immediate feedback and input during design evaluations (Lhachemi *et al.* 2019). It's used to create engaging training for employees in manufacturing firms. These simulators may faithfully replicate real-world scenarios, giving staff member's hands-on practice running machinery, carrying out assembly tasks, and troubleshooting equipment in a controlled and safe environment. Engaging in practical training can enhance learning results, reduce training durations, and boost skill retention. The tools are able to provide technicians with real-time guidance and visualizations overlaid on real equipment. This helps workers perform maintenance procedures methodically, paying close attention to every step. AR helps technicians find parts faster, diagnose problems more efficiently, and perform repairs more

effectively by superimposing digital data such as schematics, diagrams, and troubleshooting instructions onto the real environment (Aransyah *et al.* 2020).

This boosts equipment reliability and minimizes downtime. Adding annotations, instructions, and digital data to live broadcasts allows remote experts to promptly assist on-site technicians. Experts worldwide can mentor technicians, resolve problems, and collaborate to find solutions through this technology. This maximizes output, reduces travelling costs, and encourages information sharing across teams that are spread out over different regions. By applying digital inspection criteria to physical products during the manufacturing process, it can streamline the quality assurance process (Javaid *et al.* 2021). Inspectors can more quickly identify flaws, changes, or construction problems because they can compare digital specifications with physical components in real time. AR enhances quality assurance accuracy and consistency by automating repetitive inspections and providing instant feedback.

Sunny *et al.* (2021) noted that blockchain technology's potential to enhance visibility and traceability in the manufacturing supply chain is currently under study. Permanent records of operations and product histories are generated by block chain technology, which promotes accountability and confidence in the production process. Blockchain technology enables the establishment of unchangeable and easily visible records of every transaction and occurrence that takes place across the supply chain. Manufacturers can leverage blockchain to track components, raw materials, and finished products along the supply chain (Raja Santhi & Muthuswamy, 2022). This enhances transparency and accountability along the entire supply chain. Blockchain-based smart contracts have the capacity to automate many production procedures, such as purchasing, payments, and delivery. Smart contracts are software applications that are programmed to autonomously execute the terms and conditions of a contract. They possess the capacity to optimize processes, minimize the requirement for human involvement, and eradicate intermediaries in order to all of which result in enhanced production and reduced expenses.

Cole *et al.* (2019), concluded that blockchain technology has the potential to significantly enhance inventory management by facilitating rapid access to information regarding inventory levels and its movement across the supply chain. Implementing blockchain technology for inventory tracking in distribution centers, manufacturing facilities, and physical stores can enhance manufacturers' inventory management. Possible outcomes encompass enhanced inventory management, reduced costs, and decreased occurrence of stock outs. The decentralised and encrypted structure of blockchain inherently ensures its security and prevents any manipulation or illegal access. Manufacturers may enhance data privacy and safeguard against cyber threats by securely storing critical information on blockchain technology. This document contains proprietary information, including trade secrets, intellectual properties, and confidential customer data. Blockchain technology enhances supplier compliance along with leadership by documenting any

relationships, arrangements, and approvals in an unchangeable and verifiable ledger (Pradeep *et al.*, (2021). Blockchain technology allows companies to verify whether their suppliers are complying with all relevant regulations, ethical standards, and corporate social responsibility (CSR) initiatives.

3.5 Advanced materials

According to Ninduwezuor-Ehiobu *et al.*, (2023), innovations in materials science have made it possible to design goods with superior properties, such as lower weight, higher strength, and longer durability, which open up a world of possibilities in the manufacturing sector. Many uses, notably in consumer electronics and aircraft, benefit from these materials' increased efficiency and reliability. Advanced materials are needed to improve energy efficiency and facilitate the shift to renewable energy sources. Manufacturers may lessen their reliance on fossil fuels and speed the adoption of energy from renewable sources by incorporating innovative materials into energy preservation and transfer systems. Sometimes specialized production processes like atomic self-association, manufacturing with additives, and nanotechnology are necessary. Advanced manufacturing techniques allow manufacturers to carefully regulate the material's qualities and structure (Tofail *et al.*, 2018).

This allows them to develop materials with specific characteristics and useful properties. Businesses can gain access to new chances for innovation and creation of products in a range of industries by purchasing existing manufacturing processes. Manufacturers may build goods that are more functional and perform well while also being smaller, more lightweight, and more energy efficient. By using innovative materials, manufacturers may optimize the usefulness and resilience of their products, increasing consumer happiness and reliability (Siagian *et al.*, 2021).

4.0 Significance of technological advancements on training in manufacturing process

4.1 Virtual reality (VR) and simulation systems

Naranjo *et al.*, (2020), propose augmented and virtual reality and simulation systems reduce the dangers of working with real machinery, by putting learners in realistic industrial environments. Within a safe environment, people can experience a variety of activities, learn how to use machines, and overcome obstacles with ease. Virtual reality allows learners to efficiently acquire experience in effectively operating simulation devices and procedures. This offers the chance for enhanced practical instruction while minimizing the possibility of employee harm or equipment malfunction. Providing learners with the opportunity to engage in challenging activities and exercises in a safe and secure setting is highly advantageous.

This is particularly crucial in industries where catastrophic disasters might arise as a result of negligence. Participants can benefit from their mistakes without

facing consequences in the real world by simulating them was proposed by Marougkas *et al.*, (2023). Conventional educational methods, although they might be expensive to set up and maintain, sometimes include tangible resources, tools, and facilities. Users can participate remotely from any location with an internet access. This might be highly beneficial for firms with numerous locations or educators who lack access to a centralized instructional facility. Based on the user's input, the equipment can be configured to replicate different ambient conditions, machinery setups, and industrial procedures.

This enables the customization of training programs to cater to the specific requirements of particular groups or people, guaranteeing that everyone obtains a focused training was detailed by Jagatheesaperumal *et al.*, (2024). Learners can assess their progress and evaluate their performance by utilizing the prompt feedback it provides. Prompt feedback enhances training by facilitating rapid modifications and progress for learners. Simulation and virtual reality equipment offer students an authentic chance to gain familiarity with instruments and procedures, reducing the time required for conventional training techniques. Workers acquire additional abilities and procedures without negatively impacting their capacity to fulfil output targets.

4.2 Augmented Reality (AR)

Marino *et al.*, (2021), pointed out that industrial workers can benefit from real-time guidance and assistance with their tasks using Augmented Reality, a technology that superimposes computerized data onto the physical environment. By efficiently prioritizing safety procedures, providing relevant information, and supplying thorough instructions, this technology may improve learning. Trainees can interact with digital overlays superimposed onto real production environments and equipment using augmented reality. This interactive and experiential learning approach facilitates the acquisition and retention of new skills by directly applying them in practice. While trainees engage in tasks on the manufacturing levels, they receive immediate support and guidance. By imparting this guidance, trainees can reduce errors, enhance productivity, and ensure consistent adherence to established processes. AR technology enables the simulation of complex industrial events and procedures, providing learners with a safe and realistic environment to practice was proposed by Hou *et al.*, (2017).

This improves proficiency and self-assurance in managing difficult situations while maintaining safety and avoiding equipment damage. Experts can diagnose issues, give feedback, and offer instant help using live video feeds and annotations on the trainee's view. This enhances cooperation and facilitates the exchange of information. AR training tools can be tailored to replicate particular production methods, equipment setups, and educational goals was detailed by Mourtzis, D., Zogopoulos, V., & Xanthi, F. (2019). Due to this adaptability, businesses have the ability to tailor training plans to cater to the specific requirements of particular groups

or individuals throughout the firm, ensuring that employees receive training that is both timely and beneficial. These systems can monitor learner performance metrics and provide timely feedback on their progress. Organizations can assess the competence of trainees and identify areas for improvement by analyzing information such as performance duration, error rate, and task proficiency. Training based on AR reduces expenses and the hassle linked with conventional training approaches by eliminating the need for expensive physical training facilities and expensive equipment (Garzón 2021). Enabling learners to access AR training materials remotely allows them to progress at their own pace without disrupting production schedules.

Remote training and collaboration now enable manufacturing apprentices to participate in online training, according to Schallock *et al.* (2018) communicate with professionals all over the globe, and access training materials from any location with an internet connection, all because of developments in communication technology. This flexibility expands training options and reduces the need for travel. Compared with traditional classroom-based learning, remote training saves more time. Manufacturing companies can boost worker productivity and effectiveness at work by reducing travel and downtime associated with training (Arlinghaus *et al.* 2019). This ensures that every employee, in any situation, has an equal opportunity to use the same instructional content, which is particularly helpful for industrial organizations that have multiple locations or teams who are spread out geographically. Conventional personal training encounters and the associated travel expenses are not necessary with remote training. By using remote training techniques, industrial organizations can reduce their expenses for lodging, travel, and venue costs. It gives employees the choice of when and how they get their training (Buń *et al.*, 2021).

This flexibility allows employees to learn without interfering with production schedules, which is especially helpful for industrial organizations which utilize shift-based or alternating schedules. This can simply be scaled to accommodate a large number of people in different locations. By utilizing online resources and virtual classrooms, manufacturing businesses may efficiently train a large number of employees at once and ensure that training outcomes are uniform throughout the organization. These systems facilitate rapid collaboration with capabilities like collaborative digital whiteboards, videoconferencing, and instant messaging (Chandrashekar *et al.*, 2020). These features promote a sense of connection and cooperation among participants regardless of physical distance by enabling trainers and trainees to take part in conversations, ask questions, and complete group activities. It helps multinational corporations to establish connections with educators and subject matter experts. Online collaboration technologies enable workers to receive top-notch training regardless of where they are in the globe (Kans *et al.*, 2020).

4.3 Data analytics tools

According to Javaid *et al.*, (2022), manufacturing processes produce massive volumes of data, which data analytics tools may sift through to find patterns, boost productivity, and foresee when equipment will break down. To better prepare trainee to understand how to use data to enhance operations and anticipate maintenance needs, training programs may contain analytical ability. Instructors can track trainee development in real-time. Trainers can discover areas for improvement by reviewing data on trainee advancement, proficiency, and completion rates.

Lenz *et al.*, (2018), stated that training activities might become more customized and productive as a result. Analyzing previous training data is crucial for identifying patterns and developments that might guide future training. Predictive analytics can assist trainers in anticipating training demands, improving training materials, and modifying instructional methods to meet the constantly shifting requirements of the industrial sector. It enables educators to personalize training to each student's unique experiences, passions, and skills. Businesses may improve staff motivation, participation, and enjoyment of training by tailoring instructional materials and delivery methodologies to each learner's particular needs (Shang & You, 2019).

Manufacturing industries can utilize this data to identify problem areas and gradually improve their training processes because it provides significant insights into the effectiveness of their training initiatives. Manufacturing organizations can improve training efficacy by refining instructional materials, delivery strategies, and evaluation criteria using data from training outcomes, participant feedback, and performance indicators (Blanchard & Thacker, 2023).

This makes better use of the period of time, energy, and money involved in training. Organizations can improve the return on investment of training initiatives, decrease inefficiencies, and improve training operations by analyzing data on training expenses, resource use, and training outcomes. Analyzing production data can help you find ways to improve methods and raise quality. By identifying the root causes of quality issues, implementing corrective actions, and simplifying manufacturing processes, machine learning insights can help firms improve operational efficiency, reduce errors, and produce higher-quality products was detailed by Ma *et al.*, (2021).

Industry standards and rules can be effectively enforced by tracking training sessions and recording compliance-related training assignments. Organizations can demonstrate their commitment to regulatory bodies while lowering their risk of monetary penalties for noncompliance by carefully tracking training fulfilment, certification situation, and regulatory requirements.

4.4 Digitization and robotics education

According to Javaid *et al.*, (2021), with the rise of automated production, educational programs must provide employees the skills to operate and manage robotic equipment. Advanced teaching tools, such as programming environments and

robot prototypes, provide students with a safe space to learn and practice robotics in a hands-on setting. As manufacturing processes grow progressively automated and digitized, employees must learn new skills to operate and maintain complicated machinery and automation systems was stated by Szalavetz (2019).

Employees that participate in digitization and robot training initiatives obtain the information and abilities required to succeed in today's industrial settings. Manufacturers get an edge over their competitors by investing in digitalization and robotics education, which improves efficiency in operation, productivity, and product quality. Employees that are adept in digital technology and robots can increase overall manufacturing performance, shorten cycle times, eliminate errors, and streamline production processes. This will prepare their businesses for achievement in the international marketplace. Digital technology and robotics education foster an inventive culture in industrial businesses (Cropley 2020).

Companies can foster ongoing development, produce ground-breaking solutions, and maintain a competitive edge in a rapidly changing industry by providing their employees with the skills and knowledge to use emerging technology. Professionals that have received robotics and digitization training are better able to adapt to new technological advances. Workers who stay up to date on the latest advancements in robotics and electronic manufacturing may quickly adapt to emerging methods, tools, and procedures, assuring their continued importance and significance to their organizations. The success of digitization and robotics training emphasizes the importance of adhering to safety laws and implementing standards of excellence when operating contemporary machinery and robotic systems was find out by Odili *et al.*, (2024).

Manufacturing organizations can lower the risk of workplace accidents and injuries by teaching employees how to identify potential hazards and implement safety practices. This ensures that all employees work in an atmosphere that is secure and inviting. Despite concerns that automation would result in job losses, learning about robots and digitization can open up new career opportunities. Considering the fact that some routine tasks can easily be computerized, there continues to be a considerable demand for skilled workers to program, look after, and fix advanced machines and robotic systems (Pfeiffer, 2016).

As such, the manufacturing industry now has additional employment opportunities. The widespread adoption of digitalisation and robotics education contributes to the growth of the labour force by equipping people with the skills required to thrive in high-tech industrial occupations. Customized training programs can offer workers the abilities as well as knowledge they need to fulfil the distinctive demands and current trends of the production sector.

Learning about digitalization and automation enables production become sustainable by increasing resource efficiency, minimizing waste, and reducing environmental effect (Chen *et al.*, 2020). Manufacturing companies may help design a more environmentally friendly and sustainable future by leveraging digital

machinery and robots to increase energy efficiency, streamline production processes, and implement sustainable practices.

4.5 Gamification

Saleem *et al.*, (2022), find out that gamification is a method that uses elements like leader boards, badges, and prizes to increase student engagement and motivation in training. Incorporating gamification into instructional materials can help manufacturers increase learner engagement and encourage information retention. Gamification factors, such as scoreboards, medals, levels, and honors, improve employee engagement and happiness. Manufacturing businesses can effectively engage and encourage employees by including gamification components into instructional programs, increasing employee engagement and information retention was detailed by Iacono *et al.*, (2020).

Stimulation motivates students to interact more with learning materials, which increases comprehension and boosts long-term retention of key concepts and abilities. Gamification is the use of immersive, pleasant, and interactive training materials to improve employee learning and retention. Employees can use this chance to acquire real-world experience and develop skills that are important to their positions in the manufacturing sector was stated by Grünewald *et al.*, (2019).

Employees can get hands-on experience and improve their collaboration, analytical abilities, and problem-solving skills by including simulation games, role-playing settings, and skill-based challenges into training programs. People are more motivated to work when they create and achieve clear goals, receive timely constructive feedback, and are recognized for their achievements and advancements. Gamification in manufacturing motivates workers to strive for excellence and continually improve their abilities as well as their efficiency by engaging to intrinsic motivators such as competence, autonomy, and competitiveness. It has the potential to inspire what is wanted and inspire cultural change inside industrial organizations. Gamification encourages employee acceptance of new practices, safety compliance, and continuous enhancement programs by ensuring training objectives are aligned with the company's objectives and values (Silic & Lowry, 2020).

This leads to improved performance and habit formation. Gamification allows for the customization and modification of learning materials to match the unique needs and preferences each of the learners. Manufacturing businesses can provide a wide range of game-based assignments and difficulties to accommodate diverse employment positions, learning styles, and skill levels. This guarantees that all employees participate in relevant, engaging, and effective training sessions (Ponikwer & Patel, 2021).

Gamification platforms can give workers with achievement evaluations and feedback in real time. As consequently, trainers can track progress, identify problem areas, and respond appropriately when necessary. Trainers can acquire valuable insights into student behaviour and skill by analyzing performance metrics and

activity data. This makes it easy to apply targeted therapies and offer personalized coaching that encourages learning and growth. It encourages cooperation, collaboration, teamwork, and healthy rivalry among its employees, fostering a sense of community and togetherness. Employees that participate in gamified training activities and challenges can socialize, communicate techniques and expertise, and form powerful connections with one another. This promotes cooperation and teamwork in a manufacturing environment (Obaid *et al.*, 2020).

5.0 Conclusion

A thorough review offers an extensive evaluation of the importance of technological advancements in training and their impacts on the industrial sector. It will present several important conclusions and findings. In this comprehensive investigation, researcher observes the profound transformation of manufacturing jobs brought about by technology. Research findings indicate that digitization, robots, and machine learning are revolutionizing conventional industrial methods and employment positions. These enhancements are going to confront the workforce with both opportunities and obstacles.

Firstly, they enhance profitability, effectiveness, and product quality, hence increasing the competitiveness of manufacturing enterprises in the worldwide market. However, they also lead to concerns about unemployment, skill shortages, and the urgent need for training and upskilling initiatives. This review has importance due to the crucial role that instruction plays in managing this technological transition. Participation in well-designed training programs can enhance employees' readiness to adapt to evolving workplace demands and effectively utilize new technology to enhance productivity.

Manufacturing personnel must undergo regular training programs and make efforts in continuing education in order to effectively cope with and adapt to the inevitable advancements in technology. Administrators, corporate leaders, colleges and universities, and workers require cooperation to effectively deploy technology as well as instruction in the manufacturing sector. By optimizing the utilization of technology, we may achieve sustained industrial expansion and wealth accumulation. An approach to do this is to strive for equitable economic expansion while concurrently promoting innovation and unrestricted dissemination of information. In order to effectively capitalize on this digital transformation, it is imperative to take proactive measures to overcome challenges and seize the opportunities that arise from effective training methods. Undoubtedly, technology has revolutionized the nature of manufacturing jobs.

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CHAPTER 7

A Market Insight of Use of Analytics in Supply Chain Management Industry

*Kranti Shingate**

ABSTRACT

The international supply chain analytics market was valued at $4.53 billion in 2019 and is predictable to reach $16.82 billion by 2027, increasing at a Compound Annual Growth Rate of 17.9% from 2020 to 2027. Supply chain analytics boards to improve operational competence and effectiveness by enabling data-driven decisions at strategic, operational, and tactical levels. It integrates virtually the complete value chain with sourcing, manufacturing, distribution, and logistics. Supply chain analytics supports increasing productivity, dropping wastage, inventory forecasting, and improving customer relationships. Increase in need of improving operational and supply chain efficiencies, rapid increase in volume of business data across various sectors such as manufacturing, retail, and transportation, surge in investments for Big Data supporting initiatives by governments, and rise in approval of Big Data technologies are some of the important features that drive the international supply chain analytics market growth. However, an absence of skilled IT staff and imprecision in data are anticipated to limit the market growth. On the opposing, growth in awareness regarding the assistance of supply chain analytics and a rise in demand for cloud-based supply chain analytics solutions are likely to provide profitable growth opportunities for the expansion of the universal supply chain analytics market through the analysis period. Based on components, the universal supply chain analytics software segment is expected to dominate the overall supply chain analytics market size in 2027. This is attributed to the advantages of supply chain analytics solutions such as concentrated inventory costs using keen demand sensing, enabling increased responsive transport logistics, facilitating new sales & operations execution (S&OE) workflows, optimization of work plans, and more. By supply chain analytics software type, the demand analytics and forecasting segment is likely to lead the market during the forecast period, owing to the need for analyzing & managing data in inventory levels during peaks and troughs.As per the industry vertical, the retail and consumer goods segment contributed for the highest supply chain analytics market share in 2019, as the retail industry's supplier networks have become additional complex across the world. However, the automotive sector is predicted to observe the maximum growth rate through the forecast period, which further fuels the progress of this segment.

Keywords: Big Data, ERP, WMS, Statista, IBISWorld

1.0 Introduction

Supply chain analytics is a powerful tool that modify businesses to excerpt

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valuable insights from the huge amount of data generated throughout their supply chain operations. It involves the usage of data analysis techniques and technologies to optimize processes, improve decision-making, and drive overall efficiency within the supply chain. At its center, supply chain analytics leverages data from various sources, considering internal systems such as enterprise resource planning (ERP), and warehouse management systems (WMS), and external sources like supplier data, transportation data, and market trends. By collecting and interpretation of this data, companies can increase a profound consideration of their supply chain dynamics and identify opportunities for improvement. Supply chains typically render large amounts of data. Supply chain analytics assist to sort meaning of all this data by husking patterns and render insights. These vision can help companies to improve their products' quality, delivery, customer experience—and ultimately, profitability.

1.1 Why is supply chain analytics important?

Supply chain analytics is crucial for several reasons:

1. *Optimizing Efficiency:* Supply chain analytics support organizations optimise their operations by identifying inadequacies, blockages, and areas for improvement. By analyzing data incidental to production, transportation, inventory management, and other features of the supply chain, companies can streamline processes and diminish costs.

2. *Forecasting and Demand Planning:* Accurate demand forecasting is indispensable for secure that companies have the accurate amount of inventory to meet customer demand without unreasonable excess or stock outs. Supply chain analytics leverages historical data, market inclinations, and other factors to modify forecasting accuracy, enabling companies to make superior decisions about inventory levels and production schedules.

3. *Risk Management:* Supply chains are vulnerable to various risks, such as natural disasters, geopolitical instability, supplier disruptions, and fluctuations in demand. Supply chain analytics can aid companies identify and assess these risks, develop contingency plans, and mitigate potential disruptions. By understanding the potential impact of different risk scenarios, companies can make many informed decisions to protect their supply chains and minimize downtime.

4. *Enhancing Visibility:* Supply chain analytics provide greater visibility into the entire supply chain, allowing companies to track the movement of goods, monitor inventory levels, and identify potential issues in real-time. This visibility modify better collaboration with suppliers, carriers, and other partners, leading to improved coordination and responsiveness across the supply chain.

5. *Improving Customer Satisfaction:* By optimizing efficiency, reducing lead times, and minimizing stockouts, supply chain analytics can enhance customer satisfaction. Timely delivery, accurate order fulfillment, and responsive customer

service are captious for maintaining customer trustworthiness and gaining a competitive side in today's marketplace.

6. *Recognizing Opportunities for Innovation:* Interpretation of supply chain data can uncover insights and opportunities for innovation, so much as the acceptance of new technologies, process improvements, or alternative sourcing strategies. By continuously analyzing and accommodate to shifting market conditions, companies can act forward of the struggle and drive long-term growth.

Overall, supply chain analytics enable companies to make data-driven decisions, improve operational performance, mitigate risks, and ultimately enhance their competitiveness in the marketplace.

2.0 Scope of the Study

Conducting a market insight study on the use of analytics in the supply chain management industry can return valuable insights into current trends, challenges, and opportunities.

Industry Overview: Begin with an overview of the supply chain management industry, including its key players, market size, and growth trends. Highlight the importance of data analytics in optimizing supply chain operations and improving efficiency.

Current Landscape of Analytics in Supply Chain Management: Analyze the current adoption rate of analytics solutions within the industry. Identify the types of analytics being used (descriptive, predictive, and prescriptive) and their applications (demand forecasting, inventory optimization, transportation management, etc.). Explore case studies and success stories of companies effectively leveraging analytics in their supply chain operations.

Technology Trends: Investigate emerging technologies such as AI, machine learning, IoT, and blockchain, and their effect on supply chain analytics. Assess the adoption rate and effectiveness of these technologies in streamlining supply chain processes.

Challenges and Barriers: Identify the common challenges and barriers faced by companies in implementing analytics solutions in their supply chains. These may include data quality issues, integration complexities, resistance to change, and cybersecurity concerns.

Regulatory Landscape: Examine any regulatory requirements or standards affecting the usage of analytics in supply chain management, such as data privacy regulations or industry-specific compliance standards.

Market Opportunities: Highlight areas of opportunity for analytics vendors and service providers within the supply chain management space. Identify underserved market segments or unmet needs where analytics solutions can offer significant value.

Competitive Analysis: Analyze the competitive landscape of analytics solution providers catering to the supply chain management industry. Compare key players in terms of their offerings, market share, strategic partnerships, and competitive advantages.

By following this structured approach, you can create a broad market insight report that render valuable vision into the procedure of analytics in the supply chain management industry.

3.0 Objectives of Study

1. To gain an encompassing understanding of the actual state of the supply chain management industry, including important players, market trends, and emerging technologies.
2. To identify the important factors driving the adoption of analytics in supply chain management, such as cost reduction, process optimization, demand forecasting, and risk management.
3. To explore the challenges and barriers hindering the widespread adoption of analytics in supply chain management, such as data quality issues, organizational silos, and talent shortages.

4.0 Data Collection

To collect secondary data on the present-day state of the supply chain management (SCM) industry, including key players, market updates, and evolving technologies, various research methods and sources are employed:

Industry Reports: Reports from market research organizations such as Gartner, Forrester, IDC, and McKinsey. These reports provided comprehensive insights into market trends, key players, and emerging technologies in the SCM industry.

Company Websites and Annual Reports: Websites of major SCM software providers, logistics companies, and consulting firms to gather information about their offerings, market position, and recent developments. Annual reports gave valuable insights into companies' financial performance and strategic priorities.

News and Press Releases: SCM Industry-specific news sources, business publications, and press releases for updates on key players, partnerships, acquisitions, product launches, and industry trends.

Industry Conferences and Events: Information gathered through publications from industry conferences, trade shows, and webinars focused on supply chain management.

Academic Journals and Publications: Academic research papers and publications related to SCM, logistics, and operations management.

Online Databases and Market Intelligence Platforms: Online databases and market intelligence platforms such as Statista, IBISWorld, and MarketResearch.com data, statistics, and industry forecasts related to the SCM market.

Social Media and Online Communities: SCM-focused social media groups, forums, and online communities such as LinkedIn Groups, Reddit, Facebook Groups as well as Quora Spaces.

5.0 Data Analysis

5.1 To vantage a broad understanding of the current state of the supply chain management industry, including important players, market inclinations, and evolving technologies

Table 1: The Current State of the Supply Chain Management Industry

Sr. No	Key Players	Tool specification	Standard Adopted technologies
1	SAP SE	A dominant player offering encompassing supply chain management software solutions, including SAP S/4HANA.	Artificial Intelligence (AI)- demand forecasting, predictive analytics, supply chain optimization, and autonomous decision-making. Internet of Things (IoT): Sensors and devices, real-time visibility, asset tracking, condition monitoring, predictive maintenance. Blockchain: Transparency, traceability, and security Robotic Process Automation (RPA): Automating repetitive tasks Advanced Analytics: Machine learning, predictive modelling, prescriptive analytics
2	Oracle Corporation	Known for its Oracle SCM Cloud suite, providing end-to-end supply chain management solutions.	
3	IBM Corporation	Gives supply chain management solutions leveraging AI and blockchain technology for enhanced visibility and efficiency.	
4	Amazon	Continues to disrupt conventional supply chain models with its vast logistics network and innovations like Amazon Web Services (AWS) for cloud-based supply chain solutions.	
5	Microsoft	With Azure Cloud services and Dynamics 365 Supply Chain Management, Microsoft is increasingly penetrating the supply chain management software market.	
6	Accenture	A leading consulting firm assisting companies in digital transformation initiatives, including supply chain optimization.	
7	JDA Software (now Blue Yonder)	Offers a range of supply chain management and retail planning solutions, including inventory optimization and demand forecasting.	
8	Kinaxis	Known for its RapidResponse platform, offering supply chain planning and response management solutions.	
9	LLamasoft (now part of Coupa Software)	Specializes in AI-powered supply chain design and optimization software.	
10	DHL Supply Chain	One of the largest logistics companies globally, offering end-to-end supply chain solutions.	

To provide the understanding of the current state of the supply chain management industry, including important players, market trends, and evolving technologies, we'll need to examine recent reports, industry analyses, and news updates. Here's a summary based on data available up to January 2022.

5.1.1 Market size and growth

The universal supply chain management market was esteemed at approximately $15.85 billion in 2020 and is anticipated to reach over $37.41 billion by 2027, increasing at a Compound Annual Growth Rate of around 11.2% from 2020 to 2027 (Source: Grand View Research). The COVID-19 pandemic has furthered digital conversion efforts in the supply chain management sector, driving increased investments in technology solutions for resilience and agility.

5.1.2 Market trends

Digital Transformation: Adoption of digital application such as AI, IoT, blockchain, and advanced analytics to optimize supply chain operations, improve visibility, and enhance decision-making.

Supply Chain Resilience: Heightened focus on constructing resilient supply chains competent of adapting to disruptions, with investments in risk management, contingency planning, and supplier diversification.

Demand for Visibility: Increasing demand for end-to-end visibility across supply chains to track inventory, monitor shipments, and manage supplier relationships, driving the adoption of technologies like IoT and blockchain.

**Figure 1: Key Factors Driving the Adoption of Analytics in
Supply Chain Management**
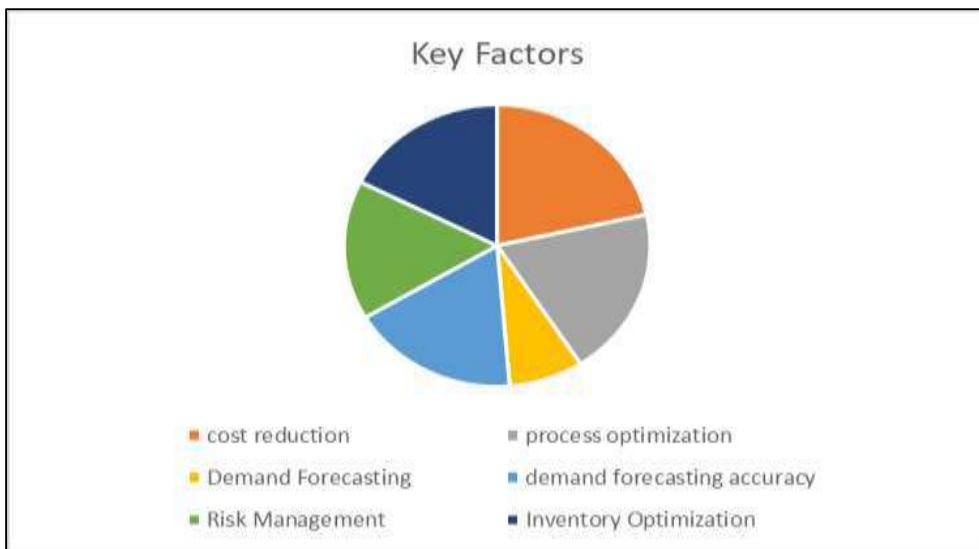
Source: Taking the pulse of shifting supply chains (2022 August 26), article by McKinsey & Company.

Sustainability: Growing emphasis on sustainability and ESG initiatory, including reducing carbon footprint, minimizing waste, and ensuring ethical sourcing practices throughout the supply chain.

E-commerce Boom: Rapid growth of e-commerce leads to greater demand for fast and flexible fulfillment solutions, last-mile delivery optimization, and omnichannel strategies.

5.2 To identify the key factors dynamical the adoption of analytics in supply chain management, such as cost reduction, process optimization, demand forecasting, and risk management

Here are statistics highlighting primal factors driving the adoption of analytics in supply chain management.

5.2.1 Cost reduction

As per the survey by Deloitte, 82% of supply chain professionals known cost diminution as the prime driver for adopting analytics solutions in their organizations. Aberdeen Group initiate that companies applying advanced analytics for supply chain management achieved a 10% reduction in overall supply chain costs compared to their peers.

5.2.2 Process optimization

A study by Gartner revealed that 74% of organizations consider process optimization as a critical driver for investing in supply chain analytics. Research from McKinsey & Company shows that companies using advanced analytics for supply chain management improved process efficiency by up to 30%.

5.2.3 Demand forecasting

As per the survey by IBM, 68% of supply chain professionals cited demand forecasting accuracy as a major factor dynamical the adoption of analytics in their organizations. The Institute of Business Forecasting & Planning (IBF) reports that companies using advanced analytics techniques for demand forecasting experienced a 20% improvement in forecast accuracy on average.

5.2.4 Risk management

A survey conducted by Accenture found that 61% of supply chain executives believe that analytics plays a key role in identifying and mitigating supply chain risks. The Business Continuity Institute (BCI) states that 76% of organizations consider supply chain disruption as a top business continuity concern, driving the adoption of analytics for risk management.

5.2.5 Inventory optimization

Research by APICS and Michigan State University revealed that 67% of companies prioritize inventory optimization as a key objective for implementing

supply chain analytics results. The Inventory Optimization Initiative (IOI) reports that companies leveraging analytics for inventory management achieved a 20-50% reduction in excess inventory levels.

5.2.6 Customer satisfaction

A study by Bain & Company found that companies with advanced analytics capabilities in supply chain management experienced a 10-15% improvement in customer satisfaction scores. As per the survey by Capgemini, 73% of supply chain executives believe that analytics-driven insights help in meeting customer expectations for faster delivery and personalized service. These statistics underscore the significant impact of analytics on various aspects of supply chain management, including cost reduction, process optimization, demand forecasting, risk management, inventory optimization, and customer satisfaction. As organizations strive to enhance efficiency, agility, and competitiveness in today's dynamic business environment, the approval of analytics continues to be a strategic imperative for driving performance improvement across the supply chain.

5.3 To explore the challenges and barriers hindering the widespread adoption of analytics in supply chain management, such as data quality issues, organizational silos, and talent shortages

Here are some data points highlighting the challenges and barriers hindering the widespread adoption of analytics in supply chain management:

Figure 2: Challenges and Barriers in Adoption of Analytics in Supply Chain Management
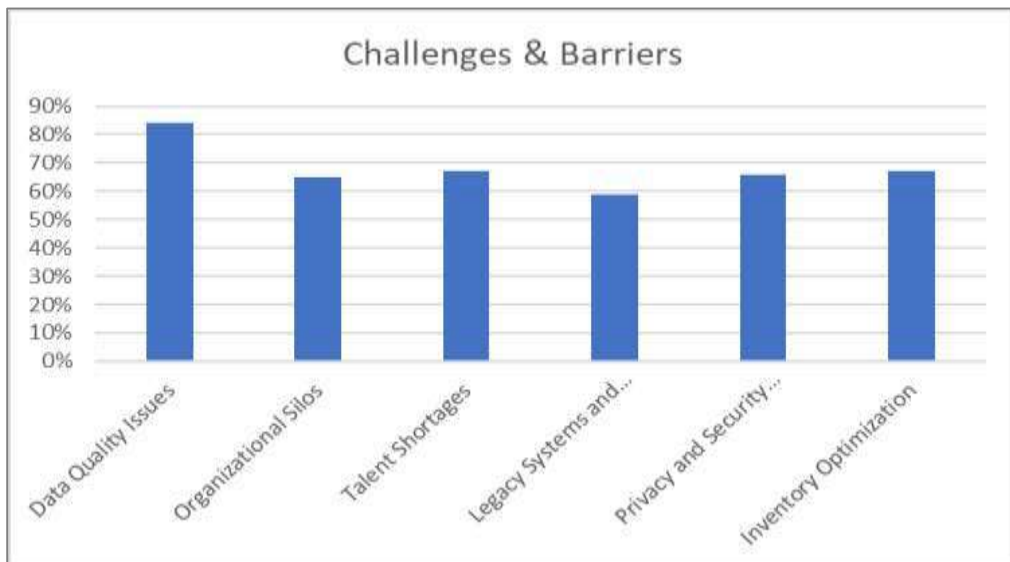
Source: The supply chain digital disruption (Its impact on executive talent), Korn Ferry Institute, 2018.

5.3.1 Data quality issues

A survey by Experian Data Quality found that 84% of organizations believe that data quality issues are a barrier to achieving their strategic objectives. According to Gartner, poor data quality costs organizations an average of $15 million per year. Research by PricewaterhouseCoopers (PwC) reveals that 47% of companies cite data quality as the biggest obstacle to leveraging data for decision-making.

5.3.2 Organizational silos

The Institute of Management Accountants (IMA) reports that 65% of organizations struggle with data silos and fragmented information, hindering collaboration and decision-making. A study by McKinsey & Company found that 48% of supply chain professionals identify organizational silos as a barrier to achieving end-to-end visibility in the supply chain. According to Deloitte, 43% of supply chain executives believe that organizational silos prevent them from effectively leveraging analytics insights to drive business outcomes.

5.3.3 Talent shortages

The 2021 Supply Chain Salary and Career Survey by SCM World found that 67% of supply chain professionals experience difficulty in recruiting talent with analytics skills. A report by DHL and IBM states that 54% of companies face challenges in finding employees with the necessary data science and analytics expertise for supply chain roles. As per the World Economic Forum, talent shortages in data analytics and AI are expected to persist, with demand exceeding supply by 50-60%.

5.3.4 Legacy systems and infrastructure

A survey by Forbes Insights and EY found that 59% of organizations struggle with integrating analytics technologies with existing legacy systems and infrastructure. Research by Gartner indicates that 37% of organizations cite legacy systems as a significant barrier to implementing advanced analytics solutions in their supply chains. As per the report by MHI and Deloitte, 43% of supply chain professionals accept that outdated technology infrastructure hampers their power to leverage analytics for supply chain optimization.

5.3.5 Privacy and security concerns

The Ponemon Institute reports that 66% of organizations cite concerns about data privacy and security as a barrier to adopting advanced analytics technologies. A survey by KPMG found that 46% of executives believe that data privacy regulations, such as General Data Protection Regulation and CCPA, pose challenges to leveraging customer data for analytics-driven insights. Research by Accenture reveals that 61% of supply chain executives express concerns about the security risks associated with sharing sensitive supply chain data with external partners and vendors.

These data points underscore the significant challenges and barriers that organizations face in adopting analytics for supply chain management, ranging from data quality issues and organizational silos to talent shortages and legacy system constraints. Addressing these challenges requires a holistic approach encompassing technology investments, organizational change management, talent development initiatives, and data governance frameworks.

6.0 Findings

Here are some potential findings from a market insight report on the use of analytics in the supply chain management industry:

Growing Adoption of Analytics: There is a significant increase in the adoption of analytics technologies across the supply chain management industry. Organizations recognize the value of analytics in optimizing operations, improving decision-making, and gaining competitive advantage.

Key Drivers for Adoption: Cost reduction, process optimization, demand forecasting, risk management, and enhanced visibility are identified as key drivers motivating organizations to invest in analytics solutions for supply chain management. These factors highlight the importance of analytics in addressing critical challenges and improving overall supply chain performance.

Challenges and Barriers: Despite the benefits, organizations face challenges and barriers in adopting analytics in supply chain management. Common challenges include data quality issues, organizational silos, talent shortages, legacy systems, and concerns about data privacy and security. Addressing these challenges is essential for the successful implementation and utilization of analytics solutions.

Market Trends: Several trends are shaping the use of analytics in supply chain management, including the increasing integration of AI, IoT, blockchain, and advanced analytics technologies. There is also a growing emphasis on supply chain resilience, sustainability, and the prerequisite for real-time visibility crosswise the total supply chain network.

Emerging Technologies: Emergent technologies like artificial intelligence, machine learning, the Internet of Things, blockchain, and robotic process automation are playing a important role in transforming supply chain management practices. These technologies to initiate organizations to automate processes, gain actionable insights, and improve decision-making capabilities.

Impact on Business Performance: Organizations that effectively leverage analytics in supply chain management experience tangible benefits, including cost savings, improved operational efficiency, better inventory management, enhanced customer satisfaction, and increased agility to answer to market dynamics and disruptions.

Competitive Landscape: Key players in the supply chain management software market, like SAP SE, Oracle Corporation, IBM Corporation, and Microsoft,

are investing in analytics capabilities to offer innovative solutions that fulfill the evolving needs of their customers. Consulting firms like Accenture and Deloitte also play an important role in helping organizations navigate the complexities of analytics adoption in supply chain management.

Future Outlook: The future of analytics in supply chain management looks promising, with continued advancements in technology and increasing emphasis on data-driven decision-making. Organizations that invest in building analytics capabilities and fostering a culture of data-driven innovation will be better positioned to thrive in the increasingly competitive global marketplace.

7.0 Suggestions

Following are some suggestions to charge a comprehensive market insight report that render valuable insights into the adoption of analytics in the supply chain management industry, serving organizations take informed decisions and drive business success.

Market Research: Gather relevant data and insights from different sources, comprising industry reports, market research studies, academic publications, and expert interviews. Utilize reputable sources such as Gartner, Forrester, IDC, and industry associations to gather comprehensive information on market trends, key players, and emerging technologies in the supply chain management industry.

Competitive Analysis: Conduct a competitive analysis to assess the landscape of analytics solution providers in the supply chain management industry. Identify key players, their offerings, market positioning, strengths, weaknesses, and competitive differentiation. Compare and benchmark the capabilities of different vendors to provide valuable insights to readers.

Identify Best Practices and Case Studies: Highlight best practices and success substance from organizations that have with success implemented analytics in supply chain management. Showcase real-world examples, case studies, and use cases to demonstrate the impact of analytics on rising operational efficiency, reducing costs, enhancing visibility, and driving business value.

Recommendations and Future Outlook: Founded on the findings of the market insight report, provide actionable recommendations for organizations looking to adopt or enhance their use of analytics in supply chain management. Offer insights into future trends, opportunities, and areas of innovation in analytics technologies and applications for supply chain optimization.

Presentation and Delivery: Present the findings of the market insight report in a clear, concise, and visually appealing format. Create an executive summary highlighting key findings, recommendations, and actionable insights for decision-makers. Use charts, graphs, and infographics to visualize data and enhance understanding. Consider delivering the report through presentations, webinars, or interactive workshops to engage stakeholders and facilitate discussions.

8.0 Conclusion

In conclusion, the market insight report on the adoption of analytics in the supply chain management industry gives valuable insights into the current state, trends, challenges, and opportunities in leveraging analytics technologies to optimize supply chain operations. Through comprehensive research, data analysis, and expert interviews, several key findings have emerged:

Increasing Adoption of Analytics: There is a noticeable trend of increasing adoption of analytics solutions crosswise the supply chain management industry. Organizations are recognizing the value of analytics in improving decision-making, enhancing operational efficiency, and gaining competitive advantage.

Key Drivers for Adoption: Cost reduction, process optimization, demand forecasting, risk management, and enhanced visibility are identified as primary drivers motivating organizations to spend in analytics solutions for supply chain management. These factors underscore the critical role of analytics in addressing key challenges and improving overall supply chain performance.

Challenges and Barriers: Despite the benefits, organizations face several challenges and barriers in adopting analytics in supply chain management, including data quality issues, organizational silos, talent shortages, legacy systems, and concerns about data privacy and security. Addressing these challenges is essential for successful implementation and utilization of analytics solutions.

Emerging Technologies: Emerging technologies such as artificial intelligence, machine learning, Internet of Things, blockchain, and robotic process automation are playing a substantial role in transforming supply chain management practices. These technologies assist organizations to automate processes, gain actionable insights, and improve decision-making capabilities.

Impact on Business Performance: Organizations that effectively leverage analytics in supply chain management experience tangible benefits, considering cost savings, upgraded operational efficiency, better inventory management, enhanced customer satisfaction, and increased agility to respond to market dynamics and disruptions.

Competitive Landscape: Key participant in the supply chain management software market, such as SAP SE, Oracle Corporation, IBM Corporation, and Microsoft, are investing in analytics capabilities to giving innovative solutions that meet the evolving needs of their customers. Consulting firms like Accenture and Deloitte also play an important role in helping organizations divert the complexities of analytics adoption in supply chain management.

Future Outlook: The upcoming of analytics in supply chain management looks promising, with continued advancements in technology and increasing emphasis on data-driven decision-making. Organizations that invest in building analytics capabilities and fostering a culture of data-driven innovation will be better positioned to thrive in the increasingly competitive worldwide marketplace.

In summary, the market insight report gives precious insights and recommendations to organizations looking to support the power of analytics to drive supply chain optimization, enhance competitiveness, and achieve business success in today's dynamic and interconnected business environment.

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CHAPTER 8

Reverse Globalization and Regional Economic Development: Assessing the Implications for Emerging Markets

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ABSTRACT

This research paper looks into the phenomena of reverse globalization and how it affects the growth of local economies, especially in developing nations. New opportunities and difficulties face emerging markets as some sectors or regions see a retreat from globalization. The purpose of the study is to investigate how this trend may affect trade trends, investment flows, socioeconomic development plans, and regional economic dynamics. The project aims to determine the mechanisms through which reverse globalization affects regional economies and to create ways for utilizing this trend to promote sustainable development and competitiveness through a thorough review of case studies and empirical data. The study's conclusions deepen our understanding of how globalization is changing and how it affects emerging markets in complex ways, providing useful information for academics, entrepreneurs, and governments. Globalization is facing backlash and transformation, requiring analysis of their causes, impact, and future development to understand the current situation and guide future globalization.

Keywords: Globalization, Growth, Inequality, Migration.

1.0 Introduction

Globalization has significantly and crucially impacted the global economy, driving economic growth, trade expansion, and cultural exchange. However, the phenomenon of "reverse globalization" has emerged due to geopolitical shifts, technological advancements, and global crises. This paper explores the implications of reverse globalization on regional economic development, focusing on emerging markets. It examines factors such as deglobalization trends, protectionist policies, supply chain restructuring, and regionalization efforts. As developed economies reassess their priorities, emerging markets face challenges in a rapidly changing global environment.

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Understanding reverse globalization requires a nuanced examination of trade patterns, investment flows, industrial structures, employment dynamics, and technological innovation. The paper adopts a multidisciplinary approach, drawing insights from microeconomics and macroeconomics, political science, sociology, and international relations. By analyzing theoretical frameworks, empirical evidence, and case studies, the research aims to contribute to academic scholarship and practical policymaking by shedding light on the complexities of reverse globalization and its implications and importance for regional economic development in emerging markets.

Reverse globalization is a trend characterized by a decrease in global interconnectedness, integration, and cooperation, often resulting from economic deglobalization, protectionist policies, and a decline in international trade and investment, unlike traditional globalization Regional economic development is a process aimed at promoting economic growth, productivity, and prosperity within a specific geographic region. It involves investments in infrastructure, creating a conducive business environment, investing in human capital development, promoting industry diversification, fostering innovation and technology, supporting entrepreneurship and small business development, and integrating principles of environmental sustainability and social responsibility. The goal is to improve the standard of living, create employment opportunities, and build resilient, inclusive, and dynamic economies that can adapt to changing global trends and challenges.

Infrastructure development includes investments in transportation networks, communication systems, utilities, and public facilities. The business and organization environment is created through policies and regulations that encourage and uplift entrepreneurship, global innovation, investment, and job creation. Human capital development involves investing in education, training, and skill development initiatives to enhance workforce capabilities and productivity. Sustainable development integrates principles of environmental sustainability and social responsibility into economic development strategies. Collaboration and partnership among stakeholders and businesses are essential and important for achieving these goals.

Key aspects of reverse globalization and regional development are: Assessing the Implications for Emerging Markets" is crucial for understanding global economic shifts, assessing implications for emerging markets, identifying policy responses and adaptation strategies, promoting inclusive growth, challenging traditional norms of global economic governance, enhancing risk management and resilience, and identifying opportunities for innovation and entrepreneurship. Emerging markets in regional development are particularly vulnerable and unguarded to reverse globalization due to their reliance on international trade and investment. Understanding these implications is essential for policymakers, businesses, and stakeholders to navigate challenges and capitalize on opportunities.

Reverse globalization also impacts regional economic development,

including changes in trade patterns, investment flows, and industrial structures. By identifying winners and losers, policymakers can design targeted interventions to ensure equitable distribution of economic development benefits.

Reverse globalization also introduces new risks and uncertainties for businesses and economies in emerging markets, requiring risk management and resilience strategies. Understanding these opportunities can foster entrepreneurship and drive economic growth in emerging markets. Overall, studying "Reverse Globalization and Regional Economic Development: Assessing the Implications for Emerging Markets" is essential and significant for gaining insights into the evolving global economic landscape and identifying and ensuring strategies for sustainable development and prosperity.

2.0 Objectives

1. Examines factors like global trade policies, geopolitical tensions, technological advancements, and changing consumer preferences.
2. Explore the impact of reverse globalization on FDI flows into emerging markets.
3. Explores the restructuring of global supply chains in response to reverse globalization.
4. Analyzes the role of major powers, geopolitical alliances, and regional conflicts in influencing trade and investment patterns.
5. Understand potential future trends and scenarios related to reverse globalization and its impact on regional economic development.

Research Methodology: Secondary Research Method
Data Collection Tool: Secondary by Websites, reports and books

3.0 Justification

3.1 Global trade policies, geopolitical tensions, technological advancements, and changing consumer preferences

Global trade policies are rules, regulations, agreements, and measures that govern international trade relations between countries. They aim to facilitate the exchange of goods, services, and capital across borders while addressing economic, social, and political objectives. Key aspects of these policies include tariffs and trade barriers, trade agreements, trade facilitation and reporting, patent intellectual property rights (IPR), trade remedies, sanctions and export controls, and trade policy coordination. Tariffs are taxes imposed on imported goods, while trade barriers include quotas, licensing requirements, and other restrictions on trade. Trade liberalization efforts aim to reduce tariffs and trade barriers to promote free trade and economic growth. Trade agreements, such as bilateral agreements, regional trade blocs, and multilateral agreements, aim to facilitate trade and investment by reducing tariffs, harmonizing regulations, and providing preferential treatment to member

countries. Trade facilitation measures aim to streamline customs procedures, reduce red tape, and simplify administrative processes. Intellectual property rights protect inventions, designs, trademarks, and copyrights, while sanctions and export controls restrict trade and economic relations with specific countries, entities, or individuals. Trade policy coordination involves cooperation and federation between governments, international organizations, and stakeholders to harmonize trade policies, resolve disputes, and promote coherence in the global trading system.

International trade exposes consumers and countries to goods and services unavailable in their own countries or are way more expensive domestically. Political economists like Adam Smith and David Ricardo recognized its importance. However, some argue it can disadvantage smaller nations on the global stage.

International trade significantly contributed to the global economy's growth, with supply and demand influenced by global events. For instance, political changes in Asia could increase labour costs, impacting American sneaker manufacturing in Malaysia, and potentially increasing the price of sneakers for American consumers.

Global trade involves exporting a product to the global market and buying the product from the market. This process allows wealthy and high-GDP countries to use their resources, such as labor, technology, and capital. Different countries have many other different resources, allowing the countries to produce goods more quickly and at a lower cost. Specialization in international and global trade allows countries to obtain import-export goods from other countries that can produce them. This increased efficiency also encourages foreign direct investment (FDI), allowing economies to grow more efficiently and become more competitive. FDI benefits the receiving government by allowing foreign currency and expertise to enter the country, increasing employment levels and GDP growth.

Geopolitical tensions are conflicts, disputes, and rivalries between countries or regions arising from strategic interests, territorial claims, ideological differences, or competition for resources. They can manifest in diplomatic disputes, military confrontations, economic sanctions, and proxy conflicts. Key aspects of geopolitical tensions include territorial disputes, strategic competition, ideological differences, resource competition, security threats, proxy conflicts, and economic competition.

Territorial disputes often arise from disputes over territorial boundaries, maritime claims, and resource-rich areas. Strategic competition and alliance between major powers can result in geopolitical rivalries, such as the USA, China, Russia, and regional powers in the Asia-Pacific, Middle East, and Eastern Europe. Ideological differences can fuel conflicts and rivalries. Resource competition can also drive geopolitical tensions, with control over strategic resources influencing geopolitical dynamics. Security threats, such as terrorism, insurgency, organized crime, and weapons of mass destruction, can destabilize regions and exacerbate geopolitical tensions. Proxy conflicts can escalate tensions and prolong conflicts. Economic competition can also lead to geopolitical tensions, including trade disputes, currency wars, investment restrictions, and economic sanctions.

Managing and mitigating geopolitical tensions requires diplomatic engagement, conflict resolution mechanisms, and multilateral cooperation to promote peace, stability, and mutual prosperity in an increasingly interconnected world.

Geopolitical risks can significantly impact the global economy through various means. Trade disruptions, such as trade disputes or sanctions, can disrupt international and global supply chains and trade flows, increasing costs for businesses and reducing market access. Investment uncertainty can lead to reduced investment in affected regions or sectors, and increased volatility in financial markets. Energy prices can also be affected by geopolitical tensions in key oil-producing regions or maritime chokepoints, affecting production costs and consumer spending. Currency volatility can also be influenced by geopolitical risks, affecting exchange rates, trade competitiveness, and capital flows. Business confidence can be eroded due to uncertainty over geopolitical developments, leading to delays in investment projects and expansion plans. Consumer confidence can also be affected by geopolitical risks, leading to precautionary saving and reduced spending. International and global supply chain disruptions and interference can occur in industries with complex production networks, affecting output levels and economic growth. Regional spillover effects can also occur, with conflict, instability, or economic sanctions disrupting regional trade, investment, and financial flows. Thus, geopolitical risks pose significant challenges to global economic stability and growth.

Technological advancements are advancements in various fields, including information technology, biotechnology, artificial intelligence, robotics, renewable energy, and telecommunications. These advancements have transformative effects on society, the economy, and the way people live and work. Key areas of technological advancement include information technology, which has revolutionized communication, data processing, and information sharing through the Internet, cloud computing, big data analytics, cybersecurity, and the Internet of Things (IoT). Artificial intelligence (AI) develops computer systems capable of performing tasks typically requiring human intelligence, such as problem-solving, decision-making, and natural language processing. Biotechnology and life sciences encompass genetic engineering, biopharmaceuticals, medical diagnostics, and agricultural biotechnology, with transformative implications for healthcare, agriculture, and environmental sustainability.

Renewable energy sources, such as solar, wind, hydroelectric, and geothermal energy, are driving the transition towards a low-carbon economy. Robotics and automation technologies enable the automation of repetitive tasks, industrial processes, and physical operations, enhancing productivity and efficiency in various sectors. Blockchain and Distributed Ledger Technology (DLT) facilitate secure, transparent, and decentralized transactions, while quantum computing uses quantum mechanics principles to perform complex computations at unprecedented speeds. AR and VR technologies create immersive digital experiences, impacting entertainment, education, and remote collaboration.

Technological advancements are significantly influencing reverse globalization, affecting production processes, supply chains, trade patterns, and digital interactions. Digitalization and remote work have accelerated during the COVID-19 pandemic, leading to a reevaluation of traditional work arrangements and reducing the need for physical proximity between workers and employers. Automation and manufacturing have reshaped processes, leading to increased efficiency, productivity, and cost savings. 3D printing technology enables on-demand production and customization, reducing the need for centralized facilities and long-distance supply chains. E-commerce and digital platforms have transformed global buying and selling, bypassing traditional distribution channels and intermediaries. Data localization and privacy regulations have led to the localization of digital infrastructure and services, potentially reversing globalization in the digital domain. Technological innovation and competitive advantage can provide countries and companies with a competitive advantage in the global marketplace. Countries that invest in R&D and foster a culture of innovation can develop cutting-edge technologies and products that drive economic growth and attract foreign investment, contributing to a reversal of globalization by promoting domestic innovation and entrepreneurship.

Consumer preferences are changing, leading to a trend towards reverse globalization. This includes a preference for local and artisanal products, which can drive demand for domestic or regional products, reducing reliance on global supply chains. Consumers also seek products that cater to their tastes, leading to localization and customization options. Ethical and sustainable consumption is also growing, with businesses prioritizing local sourcing and production methods. The rise of digital marketplaces and e-commerce has made it easier for consumers to access products from around the world, but also promoting localized online shopping experiences. Health and wellness preferences are also growing, with consumers valuing natural, organic, and locally sourced food and products. Cultural identity and heritage are also influencing demand for locally made goods and traditional craftsmanship. As a result, businesses may reevaluate their global supply chain strategies, resulting in a trend towards reverse globalization.

3.2 FDI flows into emerging markets

Foreign Direct Investment (FDI) has grown significantly in recent decades due to various factors. These include market growth potential, resource availability, cost competitiveness, infrastructure development, government incentives and policies, access to regional markets, technology transfer and innovation, and diversification and risk mitigation. Emerging markets offer substantial growth opportunities due to their large and affluent consumer bases, and companies seek to capitalize on expanding markets for their products and services. They also possess abundant natural resources, such as oil, minerals, and agricultural products, which attract investment in industries like mining, energy, and agriculture. Cost

competitiveness is another reason for FDI, as emerging markets often offer lower labor costs and production expenses compared to developed economies. Infrastructure development in some emerging markets also attracts FDI to participate in infrastructure projects and capitalize on economic growth. FDI inflows also facilitate technology transfer, knowledge sharing, and innovation diffusion, allowing multinational corporations to invest in research and development centers and partnerships.

Reverse globalization has significant implications for foreign direct investment (FDI) flows into emerging markets. It may lead to a reduction in FDI inflows, as global companies prioritize localization or reshoring of production, reducing investments in industries like manufacturing. This shift in FDI focus may also increase greenfield investments, as companies consider establishing new facilities or operations in foreign countries instead of acquiring existing businesses. FDI flows into emerging markets may be driven by a desire which is responsible to gain better access to local or regional markets, rather than cost arbitrage purposes. Trade agreements and regional integration efforts can also influence FDI flows into emerging markets, as countries within a region deepen economic integration. Technology and innovation investments may also drive FDI flows into emerging markets, as companies may invest in talent pools, research institutions, and emerging technology hubs. Policymakers in emerging markets can play a proactive role in attracting and facilitating FDI by implementing policies that support investment in key sectors, improve the business environment, and enhance infrastructure and human capital development.

3.3 Managing FDI and reverse globalization

Managing Foreign Direct Investment (FDI) in emerging markets involves implementing policies and strategies to attract, regulate, and maximize benefits while mitigating potential risks. Key considerations include establishing a clear investment framework, actively promoting emerging markets as attractive investment destinations, offering incentives and facilitation measures, developing sector-specific policies, investing in infrastructure development, investing in human capital development, encouraging technology transfer and innovation, implementing environmental and social standards, monitoring and evaluation mechanisms, and risk management.

Clear investment laws, property rights protection, and dispute resolution mechanisms build investor confidence and attract FDI. Investment promotion through marketing campaigns, seminars, and participation in international trade fairs and forums highlights market potential and competitive advantages. Incentives and facilitation measures, such as tax breaks, investment subsidies, streamlined administrative procedures, and one-stop investment centers, can reduce the cost and complexity of doing business and encourage foreign investors to invest in emerging markets.

Environmental and social standards are implemented to ensure sustainable and responsible investment practices, while monitoring and evaluation mechanisms assess the impact of FDI on economic development, employment generation, technology transfer, and other socio-economic indicators. Risk management involves managing political, regulatory, financial, and operational risks, developing contingency plans, diversifying sources of FDI, and building resilience to external shocks.

Managing Foreign Direct Investment (FDI) in emerging markets during reverse globalization requires a strategic approach that balances the benefits of FDI with the need to foster local economic development and resilience. Strategies include selective promotion, encouraging localization, strengthening regulatory frameworks, facilitating technology transfer and innovation, investing in education and skills development, and promoting SMEs. Diversification of FDI sources beyond traditional investors from developed economies, regional integration, monitoring and evaluation, and policy coordination among government agencies, private sector stakeholders, and civil society organizations are also essential.

Selective promotion focuses on sectors aligning with the country's development goals and comparative advantages, prioritizing industries that contribute to local value addition, technology transfer, and skill development. Encouraging localization encourages foreign investors to localize production, sourcing, and employment while strengthening regulatory frameworks to promote responsible investment practices, environmental sustainability, social inclusion, and respect for labor rights.

Regional integration strengthens the attractiveness of emerging markets as investment destinations, enhancing trade agreements, infrastructure connectivity, and investment facilitation mechanisms. Regular monitoring and evaluation ensure that FDI policies remain aligned with evolving economic priorities and address emerging challenges. By adopting these strategies, emerging markets can effectively manage FDI inflows, promoting sustainable economic development, industrial upgrading, and inclusive growth.

3.4 The restructuring of global supply chains in response to reverse globalization

Supply chain restructuring is a process that optimizes the functionality of a company's supply chain to adapt to industry changes. It involves identifying weaknesses and developing strategies to rectify them. This includes optimizing manufacturing, transportation, storage, and finding new suppliers. Companies choose restructuring for improved efficiency, increased margins, growth facilitation, reduced time spent on supply chain management, and reduced logistics costs. Some businesses are reshoring productions, sourcing new suppliers, and investing in technology and automation. The restructuring of global supply chains in response to reverse globalization involves reevaluating and realigning production networks,

sourcing strategies, and distribution channels to adapt to changing market dynamics and mitigate risks associated with globalization. Key aspects of this restructuring include localization and reshoring, supplier diversification, nearshoring and regionalization, vertical integration, digitalization and automation, just-in-time inventory management, risk assessment and management, and collaborative supply chain networks.

Localization involves relocating production facilities closer to primary markets or end consumers, reducing dependence on long-distance supply chains, and enhancing supply chain resilience. Supplier diversification reduces reliance on single sourcing and mitigates risks associated with global supply chain disruptions. Nearshoring and regionalization involve relocating production facilities to nearby countries or regions with lower costs and proximity to target markets, maintaining cost advantages while reducing supply chain risks, and improving responsiveness to customer demands. Vertical integration allows companies to exert greater control over critical parts of the supply chain, reduce dependency on external suppliers, and enhance operational efficiency and quality control.

The restructuring of global supply chains in response to reverse globalization reflects a shift towards more agile, resilient, and localized supply chain models that prioritize responsiveness to customer needs, risk mitigation, and value creation in a rapidly changing global landscape.

The COVID-19 pandemic has prompted companies to diversify their supply chains, focusing on reducing dependency on single sourcing and mitigating risks associated with global disruptions. This includes sourcing from multiple regions and reshoring or nearshoring production to improve supply chain resilience. The pandemic has also highlighted the vulnerabilities of long and complex global supply chains, leading companies to prioritize nearshoring or regionalization strategies.

The pandemic has also highlighted the importance of supply chain resilience, prompting companies to invest in measures to enhance visibility, flexibility, and redundancy across their supply chains. Digitalization and automation have been accelerated, with companies that are leveraging budding technologies like artificial intelligence, IoT, and blockchain to improve supply chain visibility and collaboration.

Just-in-case inventory strategies have been adopted to buffer against supply chain disruptions, while reshoring and vertical integration have been implemented to reduce dependencies on external suppliers and enhance control over critical components or processes. Risk assessment and contingency planning are also crucial, with companies conducting comprehensive risk assessments to identify vulnerabilities and develop contingency plans.

Collaborative supply chains and inbounding networks are becoming increasingly important for mitigating risks and enhancing resilience. Overall, the pandemic has reshaped the global supply chain landscape, prompting companies to adopt more agile, resilient, and localized strategies.

3.5 The role of major powers, geopolitical alliances, and regional conflicts in influencing trade and investment patterns

Major powers, geopolitical alliances, and regional conflicts significantly influence global trade and investment patterns. Major powers, such as the United States of America, China, the European Union, and Japan, exert significant influence over global trade due to their economic size, technological prowess, and geopolitical reach. They set the agenda for international trade negotiations, establish trade policies, and wield influence over global trade rules and standards. Geopolitical alliances and trade blocs, such as the North American Free Trade Agreement (NAFTA), the European Union (EU), the Association of Southeast Asian Nations (ASEAN), and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), promote intra-regional trade, investment, and economic cooperation, while also influencing global trade dynamics and supply chain configurations. Regional conflicts and geopolitical tensions can disrupt trade and investment patterns by creating barriers to cross-border commerce, disrupting supply chains, and increasing political and economic uncertainty. Military presence and security guarantees can also influence trade and investment patterns by providing stability, security, and confidence to businesses operating in volatile or conflict-prone regions. Geopolitical competition and economic rivalries can also influence trade and investment patterns by driving strategic investments, technology transfers, and market access negotiations. Understanding the interplay between geopolitical factors and trade dynamics is essential for businesses, policymakers, and investors to navigate the complexities of the global economy and mitigate risks associated with geopolitical uncertainties and conflicts.

Regional conflicts can significantly impact trade and investment patterns, causing disruptions in supply chains, market uncertainty, and investor confidence. These conflicts can lead to delays, increased costs, and localization of production, reversing globalization. Political instability, economic uncertainty, and security risks can deter foreign investment, affecting economic development and accelerating globalization in conflict-prone areas. Trade barriers and tariffs can also be imposed by conflicting countries or neighboring states, limiting cross-border trade and increasing import and export costs.

Humanitarian crises and social and open instability can also result from regional conflicts, exacerbating poverty, inequality, and economic hardship. These impacts can weaken domestic demand for their goods and services, affecting trade and investment activities. Geopolitical realignment and regional integration efforts can also be reshaped by regional conflicts. Conflict resolution efforts can lead to changes in trade policies, economic cooperation agreements, and infrastructure investments that promote regional integration and cross-border trade. Conversely, protracted conflicts and geopolitical rivalries may hinder regional integration efforts, fragment markets, and disrupt trade and investment flows, contributing to a reversal of globalization. Addressing regional conflicts and promoting peace, stability, and

security are crucial for sustainable economic development, attracting foreign investment, and advancing regional cooperation and integration in conflict-affected regions.

4.0 Soft Power and Hard Power

Soft power and hard power are two distinct forms of influence used by countries to achieve their foreign policy objectives. Soft power involves a country's ability to influence others through attraction, persuasion, and the appeal of its culture, values, policies, and institutions, rather than through coercion or force. Examples of soft power assets include cultural exports, educational exchange programs, diplomatic initiatives, foreign aid, humanitarian assistance, and the promotion of democratic values. It enhances a country's reputation, credibility, and influence in the global and international community, fostering goodwill and cooperation. Hard power, on the other hand, also involves the use of military, economic, and coercive capabilities to achieve strategic objectives and influence other countries' behavior through threat or force. Examples of hard power assets include military forces, weapons systems, economic sanctions, trade restrictions, intelligence capabilities, and cyber warfare capabilities. Effective foreign policy requires a balance between soft power and hard power strategies, leveraging both forms of influence to achieve desired outcomes and navigate complex geopolitical challenges.

4.1 The Association of Southeast Asian Nations (ASEAN)
4.1.1 ASEAN currently consists of ten member states:
- Brunei Darussalam
- Cambodia
- Indonesia
- Laos
- Malaysia
- Myanmar
- the Philippines
- Singapore
- Thailand
- Vietnam

ASEAN operates on principles of mutual respect, non-interference in internal affairs, peaceful dispute resolution, and consensus-based decision-making. Their objectives also include promoting and initiating economic growth, social and economic progress, cultural development, and regional stability in Southeast Asia. ASEAN's activities are also organized into three pillars: Political-Security Community, Economic Community, and Socio-Cultural Community. The Political-Security Community promotes regional peace, stability, and security through dialogue, cooperation, and conflict-resolution mechanisms. The Economic

Community aims to establish a single market and production base, enhance economic integration, and promote trade and investment among member states. The Socio-Cultural Community focuses on social development, cultural cooperation, and people-to-people connectivity through initiatives in education, healthcare, environment, and cultural exchange. ASEAN maintains dialogue partnerships with countries and organizations, engages in regional forums, and aims to advance its vision of an ASEAN Community characterized by greater integration, connectivity, and unity among member states.

4.2 North American Free Trade Agreement (NAFTA)

The North American Free Trade Agreement (NAFTA) was a trade agreement signed by Canada, Mexico, and the United States in 1994, aimed at promoting economic integration and trade liberalization in North America. It was the world's largest free trade agreement at the time and aimed to eliminate tariffs and trade barriers among its member states. The primary objectives of NAFTA were to eliminate tariffs on goods traded, reduce non-tariff barriers to trade, facilitate cross-border investment, and establish mechanisms for resolving trade disputes.

NAFTA significantly liberalized trade between Canada, Mexico, and the United States, leading to increased cross-border commerce and investment. It also facilitated foreign direct investment in the region, promoting the growth of regional supply chains and integrated production networks.

However, NAFTA faced criticism for its impact on jobs, wages, and environmental standards, leading to wage stagnation and environmental degradation. In response, the United States, Canada, and Mexico renegotiated NAFTA, resulting in the United States-Mexico-Canada Agreement (USMCA). The USMCA, which entered into force on July 1, 2020, retains many aspects of NAFTA while incorporating updates and revisions to address new challenges and priorities in trade and investment.

4.3 The European Union (EU)

Member States: The EU currently has 27 member states:
- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany

- Greece
- Hungary
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden

The European Union (EU) is a multifaceted political entity that governs the political, economic, and social landscape of Europe. It comprises various institutions, including the European Commission, which proposes legislation, implements policies, and manages daily operations. The European Parliament and Council is the legislative body that represents the citizens and co-legislates with the Council of the European Union. The Council of the European Union is the main decision-making body, coordinating policies and setting strategic priorities. The European Council also provides strategic direction and resolves key political issues. The EU's single market promotes economic integration, competition, and prosperity by eliminating trade and investment barriers. The eurozone, a subset of EU member states, facilitates trade, investment, and monetary stability. The EU has jurisdiction over various policy areas, including trade, customs union, competition policy, agriculture, climate change, immigration, justice, human rights, and foreign affairs. Enlargement has promoted democracy, stability, and prosperity, but also presents challenges like Brexit and migration. Despite these, the EU seeks to promote peace, prosperity, and solidarity among its citizens.

4.4 The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

Member Countries: The CPTPP includes 11 member countries:
- Australia
- Brunei
- Canada
- Chile
- Japan
- Malaysia

- Mexico
- New Zealand
- Peru
- Singapore
- Vietnam

The Comprehensive Trade Partnership (CPTPP) is a trade agreement in the Asia-Pacific region that aims to promote trade liberalization, economic integration, and regulatory coherence among its member countries. It aims to eliminate tariffs, reduce non-tariff barriers to trade, enhance investment flows, and promote cross-border cooperation in areas such as intellectual property, labor standards, environmental protection, and e-commerce. The CPTPP provides improved market access for member countries' exports by lowering or eliminating tariffs on various goods and services and establishes common rules and standards for trade and investment. It contributes to regional economic integration and cooperation in the Asia-Pacific region, fostering closer economic ties and deeper engagement. The CPTPP is expected and anticipated to have significant economic benefits for member countries, including increased trade and investment flows, enhanced competitiveness, and greater economic growth. It was signed in March 2018 and has been ratified and implemented by several countries. The CPTPP represents a landmark trade agreement in the Asia-Pacific region, highlighting the importance of regional trade agreements in shaping the global trade landscape.

4.5 Future trends and scenarios related to reverse globalization and its impact on regional economic development.

Reverse globalization is a phenomenon that is expected to shape regional economic development in the future. This can be influenced by geopolitical shifts, technological advancements, economic policies, and societal changes. Some potential scenarios include regionalization and localization, where companies prioritize regional markets and production networks over global expansion, leading to more resilient and self-sufficient regional economies. Trade diversification and regional integration may be increased as countries seek to mitigate risks associated with reverse globalization. Technological advancements, such as automation, artificial intelligence, and digital platforms, are likely to continue shaping the future of reverse globalization and regional economic development.

Resilience and risk management are usually also expected to be prioritized, with countries diversifying sources of supply, investing in local production capabilities, and enhancing preparedness for future disruptions. Governments may implement policies to incentivize domestic production, promote strategic industries, and build critical infrastructure to enhance economic resilience.

Sustainable development and green growth are also expected to be influenced by environmental concerns and climate change considerations. Greater emphasis on sustainable development practices, renewable energy investments, and

green technologies could promote inclusive and environmentally friendly growth. Social and political dynamics, such as demographic shifts, migration patterns, and governance structures, will also shape the future of reverse globalization and regional economic development.

Companies are shifting towards reshoring or nearshoring production facilities to reduce dependence on global supply chains and mitigate risks from disruptions. This could lead to the revitalization of domestic manufacturing sectors in certain regions, creating opportunities for local job growth and economic development. Supply chain diversification is expected to result in more flexible and agile supply chains, benefiting regional economies with competitive advantages in certain industries. Technological advancements like automation and automation will continue to reshape production processes and supply chain management, attracting investments in high-tech industries and digital services. Reverse globalization may prompt regions to strengthen intra-regional cooperation and integration, prioritizing trade agreements, infrastructure projects, and investment initiatives. Changes in consumer preferences, influenced by sustainability, health consciousness, and ethical considerations, may drive demand for locally sourced products and their services. Governments are most likely to implement policy measures to support domestic industries, stimulate economic recovery, and foster innovation in the post-globalization era. Geopolitical dynamics, including shifts in global power structures, trade alliances, and security concerns, will influence regional economic development patterns.

5.0 Findings

The impact and influence of global trade policies, geopolitical tensions, technological and sight advancements, changing consumer and customer preferences, FDI flows into emerging markets, and the restructuring of global supply chains.

Changes in global trade policies, such as protectionist measures and trade agreements, significantly affect emerging markets' access to international markets and investment opportunities. Technological advancements, particularly in automation, digitalization, and e-commerce, present both opportunities and challenges for emerging markets.

Changing consumer preferences, driven by sustainability, health consciousness, and digitalization, impact emerging markets' export markets and investment attractiveness. To adapt, emerging markets need to diversify their export products, improve product quality, and invest in branding and marketing strategies.

Reverse globalization trends, characterized by supply chain restructuring and reshoring of production, have implications for FDI flows into emerging markets. The restructuring of global supply chains in response to reverse globalization has mixed implications for emerging markets. Major powers and geopolitical alliances significantly influence trade and investment patterns in emerging markets. Future

trends, such as increased regionalization, digital transformation, and sustainable development initiatives, could impact emerging markets' economic development trajectories.

Understanding these trends is crucial and significant for policymakers, businesses, and investors to anticipate and adapting and understanding to the changing global landscape and capitalize on emerging opportunities.

6.0 Suggestions

Policymakers should develop proactive trade policies to promote openness and facilitate trade and investment flows while addressing protectionism and trade imbalances. Diplomatic efforts should be strengthened to reduce geopolitical tensions and to create a stable and steady environment for economic growth and investment.

Investment in research and development can help harness technological advancements and promote innovation in emerging markets. Businesses should diversify supply chains to mitigate risks associated with reverse globalization, evaluate the impact on FDI flows, and embrace digital transformation to enhance efficiency and competitiveness.

Industry associations and trade organizations should advocate for regional economic integration and cooperation, provide support and guidance to companies, and monitor geopolitical developments. Future research should explore the long-term implications of reverse globalization on regional economic development, explore emerging technologies, and analyze regional integration initiatives and trade agreements' effectiveness.

Stakeholder collaboration should be fostered among governments, businesses, academia, and civil society to address common challenges, facilitate knowledge sharing, and encourage dialogue to address global challenges.

7.0 Conclusion

The research on "Reverse Globalization and Regional Economic Development: Assessing the Implications for Emerging Markets" highlights the complex interplay of factors influencing reverse globalization, including global trade policies, geopolitical dynamics, technological and technical advancements, changing consumer and customer preferences, and the restructuring of global supply chains. It highlights the impact and effects of reverse globalization on foreign direct investment (FDI) flows into emerging markets, as companies reassess their supply chain strategies and production footprints due to geopolitical uncertainties and supply chain disruptions. The study also highlights the restructuring of global supply chains, as companies opt for more localized, resilient, and agile production networks. The study also highlights the influence of major powers, geopolitical alliances, and regional conflicts on trade and investment patterns in emerging markets. It also gives insights

to global policymakers, businesses, and stakeholders on future trends and scenarios related to reverse globalization, such as regionalization, digital transformation, and sustainable development. The research emphasizes the need for proactive measures to address the implications of reverse globalization on regional economic development in emerging markets.

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CHAPTER 9

Enhancing Business Transformation through AI-Powered Personalized Recommendation Systems for Electronic Goods

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ABSTRACT

This study explores the significant influence of Artificial Intelligence (AI) on business transformation, specifically within the electronics industry. The research is based on a data-driven approach aimed at understanding consumer preferences and choices when purchasing electronic goods through e-platforms. The study seeks to benefit online retailers, manufacturers, and reviewer platforms by creating a database that facilitates highly personalized and relevant product recommendations. The study comprehensively reviews sequence-aware recommender systems, categorizes recommendation tasks, analyzes algorithm solutions, and discusses methodological approaches. Leveraging advanced machine learning algorithms, the research emphasizes the potential of AI-powered personalized recommendation systems to evaluate user experiences, facilitate informed purchasing decisions, and drive business growth. The methodology involves quantitative analysis using a hybrid recommendations system that integrates collaborative filtering and content-based filtering to predict consumer behavior. By applying this approach, sellers can strategize based on consumer preferences, in turn improving algorithm settings to provide accurate and diverse recommendations for electronic goods, ultimately leading to increased sales and enhanced customer satisfaction. This abstract encapsulates the study's focus on leveraging AI to understand consumer preferences and enhance personalized recommendation systems for electronic goods sold through e-platforms.

Keywords: Electronic goods, Personalized consumer experience, User-item interactions, Data-driven insights, Algorithmic solutions.

1.0 Introduction

Recommender systems are a popular and powerful tool for e-commerce, helping users navigate through vast amounts of information. These systems use feedback from other users to offer personalized suggestions based on a user's history, preferences, and limitations.

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They use various algorithms and methods to recommend informational items and are also known as information filtering systems or recommendation engines. In daily life, people make recommendations through various means including spoken words, news reports, reference letters, and surveys in general. Recommender systems assist and augment this social process, helping people find the most interesting and valuable information across a range of products and services. Collaborative filtering is used in recommender systems to suggest items based on the preferences of a user's peers, rather than content-based filtering, which recommends items based on their similarity to items previously favored by the user.

2.0 Literature Review

Onyeka (2022)[1]. Customer Behavior Prediction Using Recommender Systems (Doctoral dissertation, Dublin, National College of Ireland).

The researcher provides a comprehensive review of various studies and research works related to recommender systems and customer behavior analysis in the e-commerce and financial sectors. Several key studies have been highlighted, each contributing unique insights to these domains.

In 2019, Wakil *et al.* introduced a new model to assess how product classification, pricing, and previous customer behavior impact the performance of recommender systems in e-commerce. Their research confirmed the effectiveness of their model in enhancing the performance of recommender systems in the e-commerce industry by analyzing these variables.

Zhou and Hirasawa (2019) delved into the utilization of genetic network programming (GNP) and ant colony optimization (ACO) to solve sequential rule mining problems in time-related transactional databases. Their study emphasized the importance of evolving technology in empowering recommender systems to accurately predict customer interests and needs proactively.

The need to include pertinent contextual information in recommender systems was highlighted by Adomavicius and Tuzhilin (2011). They emphasized how crucial it is to take time and place it into account when making recommendations to users to improve their relevancy and accuracy. To integrate context-aware recommendations, the study suggested algorithmic paradigms such as contextual prefiltering, post-filtering, and modeling.

Abid *et al.* (2018) conducted research using logistic regression and discriminant analysis to predict customer behavior concerning defaulting loan payments in commercial banks in Tunisia. Their study aimed to optimize loan limits by accurately predicting customer behavio1r. Logistic regression outperformed discriminant analysis in predicting customer behavior with a significantly lower error rate, showcasing the effectiveness of this predictive modeling approach.2

Overall, the literature review emphasizes the wide-ranging applications of recommender systems across various industries and underscores the importance of

utilizing customer behavior analysis to improve decision-making processes and optimize business strategies. The discussed studies offer valuable insights into the changing landscape of recommendation technologies and their impact on customer-centric businesses.

Srifi, M., Oussous, A., Ait Lahcen, A., & Mouline, S. (2020)[2]. Recommender systems based on collaborative filtering using review texts—a survey.

The research focuses on integrating user review texts into recommender systems, especially in the context of collaborative filtering (CF) based recommender systems. The document underscores the valuable and diverse information that can be obtained from user reviews, such as review words, review topics, and review opinions, and discusses how these elements can enrich rating profiles and user preferences.

Furthermore, the document presents a survey of existing review-based CF recommender systems and categorizes them into systems based on words, topics, and sentiments. It explores these systems' tangible advantages in reducing rating sparsity and enhancing prediction accuracy. Furthermore, it underscores the necessity for additional research in this field, proposing that combining different review-based CF recommender systems and utilizing advanced text mining techniques could produce more impactful outcomes. The authors also acknowledge that while there has been significant progress in review-based CF recommender system research, there is still room for further exploration. They discuss the potential of using advanced text mining approaches to identify complex relationships among reviews and ratings.

Overall, the literature review focuses on the incorporation of user review texts into collaborative filtering recommender systems, the different types of review elements that can be extracted, the categorization of review-based recommender systems, and the need for further research in this area.

Sarwar, B., Karypis, G., Konstan, J., & Riedl, J. (2001, April)[3]. Item-based collaborative filtering recommendation algorithms.

The document titled "Item Based Collaborative Filtering Recommendation Algorithms" by Badrul Sarwar, George Karypis, Joseph Konstan, and John Riedl from the GroupLens Research Group at the D3epartment of Computer Science and Engineering, University of Minnesota, presents a comprehensive study on recommendation algorithms. This literature review will explore the main points covered in the document. The research focuses on item-based collaborative filtering, an approach widely used in recommendation systems. This method computes item similarity by analyzing co-rated items, enabling personalized recommendations based on users' interactions with items. The algorithm calculates the similarity between items i and j through co-rated pairs obtained from diverse users, enhancing the accuracy and relevance of recommendation results.

Acknowledging the significance of collaborative filtering in recommendation systems, the document emphasizes the importance of computing item similarity for generating effective recommendations. By examining the co-rated items among

users, the algorithm can identify patterns and preferences, leading to improved recommendation accuracy.

Furthermore, the research highlights the significance of user-item interactions in collaborative filtering, especially within the framework of item-based approaches. By examining how users interact with items, the algorithm can establish valuable connections and improve the prediction of user preferences. This ultimately enhances the overall user experience and satisfaction with the recommendation systemThe literature review highlights the valuable insights provided by item-based collaborative filtering recommendation algorithms. These algorithms utilize item similarity computation and user-item interactions to create efficient and accurate recommendation systems that cater to the diverse needs and preferences of users across different domains.

Roy, D., & Dutta, M. (2022)[4]. A systematic review and research perspective on recommender systems.

The literature review provides an insightful analysis of various existing recommender systems. The review covers a range of systems and their applications, including a neuro-fuzzy web recommendation system, a recommender system for distance education, a system for automatic vending machines, a ubiquitous learning system, and a semantic hotel recommender system. Each of these systems leverages different techniques such as fuzzy rules, collaborative approaches, genetic algorithms, decision trees, Bayesian networks, association rule mining, and fuzzy logic. The review follows a comprehensive methodology, including the use of forward and backward searching techniques to select 60 articles that represent the domain literature. It is important to note that the review focused on English papers and was based on specific descriptors related to recommender systems. The classification framework and article distribution by journal title provide an overview of the sources included in the review. Furthermore, the literature review acknowledges the limitations of the study, such as the ex4clusion of non-English papers, unpublished papers, and research papers published before 2011. It also highlights the potential for future research to extend the study to cover more diverse artic5les on recommender systems by adding additional descriptors and keywords for searching.

Overall, the literature review offers a valuable synthesis of existing recommender systems, their applications, and the methodologies used to select and analyze relevant research papers.

Song, B., Gao, Y., & Li, X. M. (2020)[5]. Research on collaborative filtering recommendation algorithm based on mahout and user model.

Collaborative filtering algorithm is widely used in personalized recommendations. Machine learning can optimize the system by reducing calculation time. The recommendation system is an interdisciplinary field developing for 20 years. Personalization in recommendation systems is crucial for e-commerce websites. Mahout aims to implement adjustable machine learning algorithms. It runs

on the Hadoop platform for handling big data. Establishing a user model is essential for personalized recommendations. User-item scoring matrix is used to represent user preferences. Predicting unknown scores based on similarity between users. Calculating similarity to find users with similar preferences. Item-based collaborative filtering is recommended due to its stability and low commodity similarity matrix update frequency.

Recommendation strategy involves similarity calculation between items and generating recommendation lists based on user behavior. Utilizes Naive Bayes classification algorithm for creating a Bayesian model for recommendation process. User model construction using historical data and offline calculation for machine learning-based recommendation. User-based collaborative filtering algorithm yielded smallest error and had high accuracy in pushing resources based on user information needs. Correlation matrix analysis showed that user-based collaborative filtering recommendation strategy outperformed other algorithms. Naive Bayes classification algorithm divides data into training and test sets based on historical data. Thorough process includes feature vector representation, category probability calculations, and classification application. User model construction using machine learning and offline calculation for recommendation model.

Prediction of recommendation model based on accuracy and training sets evaluation for user ratings. User's basic information is utilized for feature vector extraction and preliminary recommendations. Continual filtering of samples yields final recommendations for the user. Designing a model using Naive Bayes classification algorithm for machine learning-based recommendation. Using the model, User 1 gives Item 3 a score of 3, indicating interest and potential recommendation. User-based collaborative filtering recommendation strategy had high accuracy for user information needs. Outperformed other algorithms in most cases, making it suitable for resource pushing based on user needs. User model recommendation engine uses the Mahout framework. It combines the Nave Bayes classifier to establish a user model.

The collaborative filtering recommendation algorithm based on the user model is a machine learning algorithm. It provides more effective and personalized recommendations for users. The recommendation algorithm running on the Hadoop platform solves practical problems and improves the running speed in a network environment with large data. Model-based algorithms have essential reference values to improve the quality and speed of user search information in the online recommendation field. The collaborative filtering algorithm uses the Apache Mahout framework and has been improved in various studies. Other studies have focused on personalized job recommendation systems and application of Naive Bayesian classification algorithm in data prediction. The authors acknowledge the Basic Research Foundation of Universities in Liaoning and the 13th Five Year Plan of Education Science in Liaoning Province.

Feng, Y. (2023)[6]. Enhancing e-commerce recommendation systems through the approach of buyer's self-construal: necessity, theoretical ground, synthesis of a six-step model, and research agenda.

The document emphasizes the use of the grounded theory technique informed by constructivism and the interpretive paradigm to understand human behavior and consumer influences. It also discusses the synthesis of literary analysis to direct research topics and formulate ultimate theories. The focus is on generating a comprehensive overview of existing knowledge and theories, particularly in the realm of marketing research. Additionally, the methodology employed in the study integrates psychological cues experienced by consumers into algorithms, bridging gaps between different domains.

Sikka, R., Dhankhar, A., & Rana, C. (2012)[7]. A survey paper on e-learning recommender system Recommender systems in e learning context intelligently recommend actions to learners based on previous learners' actions. These systems aim to enhance course material navigation and aid online learning process.Diverse interests and expertise levels of learners on the Internet challenge traditional one-size-fits- all learning models.Personalized systems are crucial to adapt to learners' interests and expertise levels. Types of Recommender Systems are Recommender systems may be collaborative filtering, content-based filtering, or hybrid filtering, These systems help users identify the most relevant learning items.

Recommendation systems for e learning can be user profile-based or use common access patterns. They involve learning modules that infer access models and advising modules that recommend actions. Recommender systems in e commerce make suggestions based on customer access and purchase behaviors. Techniques like collaborative filtering are used to predict customer preferences. E-learning recommendations consider pedagogical appropriateness and item delivery customization. Unlike other domains, e learning recommendations focus on both item choice and delivery. Approaches like random prediction, frequent sequences, and collaborative filtering are used in building recommender systems. Collaborative filtering requires users to rate items for accurate recommendations. Collaborative filtering, though effective in other domains, may not be suitable for accurate recommendations of e-learning activities. The focus in e-learning is on recommending beneficial learning activities and optimizing course material navigation.

Recommendation algorithms find items similar to user-liked items. Items for recommendation are chosen based on content correlation. Recommender systems aim to suggest actions based on previous learners. Web mining techniques can be used for intelligent recommendations in e- learning. Personalized e-learning systems adapt to individual preferences and learning progress. Dynamic aspects of personalization are essential for improved learning outcomes. Recommendations are based on learner navigation history and preferences. The framework includes offline data preprocessing and online prediction of recommendations. The proposed system

recommends learning materials based on content similarity and learner ratings. Framework design focuses on efficient recommendation strategies for e- learning. Recommendations based on user interactions and system observation.

User-centered evaluation approach ensures pedagogically sound recommendations. The research compares learning outcomes using different recommender systems. The proposed content-based filtering system shows significant improvement in student performance. Recommender systems can enhance online learning experiences through personalized suggestions. Software agents using data mining techniques can improve resource navigation and learning activities. Study on measuring learner's performance in e-learning recommender systems at Multimedia University. The research includes evaluating learners' behavior and web access patterns using data mining technology. Efficient methods like Rectree and item-based collaborative filtering for recommendation algorithms. Analysis of user-based and item-based prediction algorithms for recommendation agents.

Noh, D. K. (2010)[8]. Enhanced Multi-Site Hybrid Simulations Using an Internet-based Grid System for Construction and Civil Engineering Facilities.

KOCEDgrid is an Internet-based grid computing system designed to provide a shared infrastructure for construction and civil engineering facilities in Korea. It connects twelve universities, research institutes, and government facilities, allowing dispersed facilities to access high-speed computing, large databases, and advanced equipment. KOCEDgrid integrates large-scale experimental facilities, computing facilities, and digital libraries into a single virtual laboratory, enabling remote participation in experiments and collaboration among researchers. It facilitates multi-site online experiments, distance learning, dispersed design, resource management, data management, telepresence, and collaboration services. Hybrid simulation on KOCED grid seamlessly combines analytical and physical models of a structure, allowing researchers to model well-understood parts in a finite element program while testing highly nonlinear parts in the laboratory. It faces challenges such as errors in modeling, numerical simulation, and experimental testing, as well as problems in controlling actuators and network delays.

It provides resource management, data management, telepresence, and collaboration services, supporting distributed teams to work together and allowing remote access to experiments. High-quality images and video recordings are transmitted in real- time, and experimental procedures and measurement protocols can be delivered to test sites in real time. The hybrid simulation technique faces fewer capacity restrictions than conventional laboratory testing and allows researchers to take advantage of unique capabilities available in different laboratories. It also enables the avoidance of physically modeling complex features and interactions and supports the modeling of well-understood and highly nonlinear parts of a structure.

Hybrid simulation faces challenges such as errors in modeling, numerical simulation, and experimental testing, as well as problems in accurately controlling

actuators and network delays. Similitude law considerations and the need to estimate bounds on cumulative errors are also important challenges. Hybrid simulation seamlessly combines analytical and physical models of a structure and simulates their response in the time domain, enabling the testing of highly nonlinear parts in the laboratory. It allows the control systems of physical experiments and computer simulations to communicate and influence each other's behavior over the course of the experiment. The MOST (Multi- sites Online Simulation Test) experiment uses a steel framework to model the effects of an earthquake on a single- story building, representing a two-bay steel frame.

It is based on the multi-site pseudo-dynamic substructure (MS PSDS) testing method, which divides the structure to be tested into subassemblies for testing and integration within a single computational simulation. The mini MOST experiment is a portable and less expensive version of the original MOST experiment, designed to be installed in an average laboratory for demonstrating NEESgrid service components. It consists of tabletop-sized equipment emulating the University of Colorado portion of MOST, along with two computational nodes running on MATLAB numerical simulations. The mini MOST experiment was implemented on the KOCEDgrid, with modified NEESgrid software and a collaborative environment for hybrid simulation. It utilized KOCEDpop, computational nodes, a data acquisition (DAQ) system, and minimalist equipment for modeling the subassemblies.

The KOCED grid provides facilities for managing hybrid experiments, including a hybrid portal, metadata editor, control and monitoring applications, and the KRAS (KOCED Resource Allocation Service) for resource allocation. All data and metadata created during the setup and execution of an experiment are managed by the data management service, which also provides a replay function and registers the data in the KOCED data center. A real-time remote controller and viewer were developed to extend the user's view and control over the remote equipment during a hybrid experiment on the KOCEDgrid. The controller and viewer were implemented using NEESgrid software components, providing real-time control messages and multimedia data streams. The SRCV (SNU remote controller and viewer) uses NEESgrid security infrastructure and Java-based components to provide platform-independent remote control and real-time data viewing. It sends control messages to the equipment through the NTCP server, manages data from sensors, and communicates with the DAQ system and NEESgrid components for real-time monitoring.

The mini MOST experiment showcased the capabilities of the KOCEDgrid service components and provided a platform for education, training, and outreach. The development of the real-time remote controller and viewer enhanced the user's control and analysis of hybrid experiments while ensuring quick detection and resolution of equipment errors. OGSA integrates grid and Web service concepts and technologies. OGSI specifies interfaces and protocols for interoperability between grid services. GT3 and GT4 are implementations of OGSA/OGSI. GT4 integrates

OGSI in web service architecture using WSRF. Migration from GT3 to GT4 for grid services in KOCEDpop. GTCP, the WSRF version of NTCP, is used for control. Adoption of Narada brokering for its integration with GSI. Provides reliable event brokering and streaming functions. OpenSees is an open-source software for computational simulation.

Used for modeling mini MOST experiments and integrating with OpenFresco. Increasing the number of experimental types in hybrid simulation. Optimizing simulation code for reduced run time. KOCED aims for a flexible combination of physical devices and computational nodes. Increasing scalability and efficiency of hybrid simulations. Comparison of simulation times in mini MOST experiment on NEESgrid and KOCEDpop. Achieving faster simulation times with a higher specification server. Initial establishment of connections between computational and experimental models, followed by model initialization. Building stiffness matrices through basic connection tests and simulating pseudo-dynamic structure. Proposing transactions to corresponding models and validating proposals. Checking the relaxation of the device, sending execution messages upon acceptance, and preparing data for the next step. Adopting a check-and-go method for maintaining the integrity of atomic operations. This style ensures high reliability but may not be necessary for general civil engineering simulations.

Introduction of a real-time controller and viewer for a user-friendly interface. Development of GTCP plug-ins for hybrid simulation models and inclusion of computational nodes in OpenSees. Reduction of simulation time by minimizing transaction checks and choosing execution speed-reliability tradeoff. KOCEDgrid's continuous evolution towards a more accurate, efficient, and user-friendly hybrid simulation environment. Usage of high-speed network service KOCEDgrid linking various resources for collaborative hybrid simulation. Migration to GT4 and GTCP, successful implementation of OpenSees hybrid simulation model Osman, N. A., Noah, S. M., & Darwich, M. (2019)9.

Contextual sentiment based recommender system to provide recommendation in the electronic products domain. International Journal of Machine Learning and Computing Recommender systems aim to provide personalized recommendations for users in the electronic products domain. The use of collaborative filtering technique is popular but faces limitations such as data sparsity and scalability. The increasing overload of information on electronic products makes effective decision-making difficult for consumers. Contextual sentiment analysis can enhance recommendation quality by considering user comments and sentiments. Sentiment analysis helps in understanding user preferences beyond explicit ratings. By integrating sentiment analysis, recommender systems can improve recommendation item popularity.

Contextual information sentiment analysis reduces term ambiguity and enhances recommendation quality. The inclusion of unrated reviews and ratings minimizes data sparsity and enhances RMSE and MAE values. Recommender

systems are classified into content- based, collaborative, and hybrid approaches. Collaborative filtering systems analyze historical interactions to provide personalized recommendations. Content-based filtering evaluates items based on profile attributes. Hybrid techniques aim to combine content-based and collaborative filtering approaches. Application of Recommender Systems in E- Commerce, Recommendation methods are crucial in the electronic product domain for material choice, software compatibility, and decision-making, Collaborative filtering algorithms have been successful in recommending relevant products with high accuracy. Sentiment analysis plays a key role in understanding sentiments, attitudes, and opinions from textual data.

SA applications include areas such as commercial products, politics, stock market prediction, and customer relationship management. Sentiment in recommender systems needs to be correlated with numerical ratings for accurate classification. Identifying sentiment-expressing words is important in sentiment analysis. SentiWordNet dictionary is a popular resource in sentiment analysis for identifying words used to express preferences. Similar sentiment dictionaries have been created for other languages and domains. Research works have tackled cross-domain sentiment classification to improve accuracy in recommender systems. Creating resources and techniques help in addressing cross-domain sentiment analysis challenges. Several research works have focused on sentiment analysis of product reviews. Sentiment analysis can be integrated to overcome data sparsity and domain sensitivity in recommender systems. The proposed model aims to integrate textual reviews into the user-item ratings matrix for better recommendations. Merging textual reviews with rating data can address data sparsity problem in recommender systems.

Conventional sentiment models lack semantic and contextual information, leading to domain sensitivity issues. Ambiguity of opinion words in different domains calls for enhanced sentiment approaches. The process involves textual review conversion, sentiment analysis techniques, and enriching the user-item matrix. Applying domain- sensitive sentiment lexicons improves the accuracy of sentiment analysis. Domain-sensitive sentiment lexicons fine- tune sentiment analysis models for specific domains, improving overall accuracy. Applying contextual sentiment analysis can overcome data sparsity and domain sensitivity issues in recommender systems. Used the Stanford SNAP Electronic Product Reviews corpus for context-based sentiment analysis. Applied linguistic rules like OR and AND to generate sentiment scores for adjectives.

Generated sentiment lexicon sensitive to the domain of the corpus. Combined scores from sentiment strength and contextual rules for accuracy improvement. Described the process of converting textual reviews into sentiment ratings. Used contextual rules lists for sentiment rating calculation. Established a model to integrate sentiment ratings into the recommender system framework. Formulated a method to remove duplication between actual and sentiment ratings. Evaluated the effectiveness

using RMSE and MAE metrics. Compared conventional sentiment analysis model with contextual information-based model. Performed experiments on Amazon Dataset with 2000 reviews and 5000 ratings. Calculated RMSE, MAE, and Sparsity levels for evaluation. Collaborative Filtering Models-- Conducted experiments using ratings-based CF, sentiment CF, and contextual sentiment CF models, Expanded lexicons in context with a domain-specific lexicon.

Performance Metrics- Used MAE, RMSE, and Sparsity to measure error rate, prediction accuracy, and data sparsity, Sparsity level in electronic product dataset was found to be quite high at 99.80%. The initial experiment results showed different factor ratings for sentimentCF and contextCF. The best performance was achieved with a factor value = 0.7. A further experiment demonstrated a decrease in sparsity level using the proposed model. The sparsity level decreased from 99.80% to 99.70%. Contextual information improved the resolution of ambiguous words in electronic product reviews. The proposed sentiment-based model optimized performance and reduced data sparsity. The proposed model enhanced the performance of electronic product recommender systems. It achieved the best RMSE and MAE values.

Future works include implementation and evaluation in other domains like medicine. Research supported by Universiti Kebangsaan Malaysia and the Malaysia Ministry of Education. References include matrix factorization techniques, hybrid product recommendation procedures, and recommender system articles. Topics cover algorithms, collaborative filtering, and improvement strategies. Research focuses on sentiment analysis of product reviews. Includes work on sentiment lexicon generation and minimally supervised sentiment lexicon induction. Explores approaches to cross-domain sentiment analysis. Involves a systematic literature review on sentiment analysis. Involves mining and summarizing customer reviews. Presented at the Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. Work on recommendation systems using sentiment analysis. Focus on combining content-based and collaborative filters.

3.0 Recommender System

Recommender systems utilize algorithms and information filtering techniques to generate personalized recommendations for users to help them make informed decisions. These systems are widely used in domains such as online shopping, booking, and audio and video recommendations. Although recommendation systems are not new, due to the vast number of available choices and the growing number of users seeking recommendations, it has become difficult to make appropriate choices without filtering the data. Several factors impact the recommendation process, including user satisfaction levels, likes/dislikes, age group, gender, occupation, region, locality, and community. However, recommender systems face several problems and challenges that affect their performance. One such

problem is the "cold start problem," which occurs when a new user enters the system or a new product is added to the catalog. This makes it difficult to predict user preferences when there is not enough rating history available.

A hybrid recommender system can improve the effectiveness of traditional recommendation systems by considering various demographic attributes of new users, such as age, gender, occupation, preferred electronic devices, purchase history, company, website similarity of existing users, and more. This approach results in more accurate and relevant recommendations for new users compared to traditional methods.

Figure 1: Recommender System
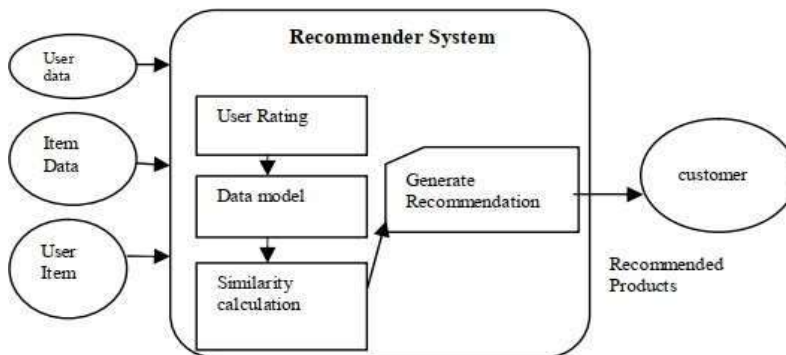
Source: Secondary data

The main objective of recommendation systems is to provide relevant suggestions and recommendations for products or objects that match the interests of users. Electronic item recommendations that use recommendation systems to identify users can significantly enhance the user experience by offering personalized product suggestions based on their browsing history, purchase behavior, and preferences. This, in turn, helps to attract more and more users to the platform. There are different algorithms and methods that recommendation systems can utilize to provide tailored recommendations.

A personalized recommendation system for electronic items combines collaborative filtering, content-based filtering, and machine learning algorithms to suggest products to users.

Here's a general overview of how it works:

Start

3.1 Triggered when a user interacts with the recommendation system (e.g., visits the website or opens the app).

4.0 Data Collection and Storage

- Collect user behavior data (e.g., items viewed, purchased, rated).
- Collect item attributes and categories.

To simulate data collection and storage for an electronic items recommendation system, we can use Python to create a basic example that uses dictionaries to represent user behavior data and item attributes:

Class recommendation system

```
    def init_(self):
        self.user_behavior_data = {}
        self.item_attributes = {}
    def collect_user_behavior_data(self, user_id, item_id, behavior):
        if user_id is not in self.user_behavior_data:
        self.user_behavior_data[user_id] = []
        self.user_behavior_data[user_id].append((item_id, behavior))
    def collect_item_attributes(self, item_id, attributes): self.item_attributes[item_id]
    = attributes
# Retrieve user behavior data
user_1_behavior_data = rec_sys.get_user_behavior_data(user_id=1)
print("User 1 behavior data:", user_1_behavior_data)
# Retrieve item attributes
item_1_attributes = rec_sys.get_item_attributes('electronic_item_1')
print("Item 1 attributes:", item_1_attributes)
```

5.0 Preprocessing

- Remove noise from the data
- Handle missing values
- Transform the data into a suitable format for analysis.

To simulate preprocessing steps for a recommendation system for electronic items, we can create a basic example using Python that includes noise removal, handling missing values, and data transformation:

```
import pandas as PD
import numpy as np
# Sample data
data = {
        'user_id': [1, 2, 3, 4, 5],
        'item_id': [101, 102, np.nan, 104, 105],
        'rating': [5, 4, 3, np.nan, 2],
        'timestamp': ['2023-01-01', '2023-01-02', '2023-01-03', '2023-01-04',
        '2023-01-05']
# Create a data frame from the sample data
df = pd.DataFrame(data)
# Remove noise (e.g., drop rows with missing item_id or rating)
df_cleaned = df.dropna(subset=['item_id', 'rating'])
```

In this, we use pandas to create a data frame from sample data representing user interactions with electronic items. We then perform preprocessing steps to

remove noise (rows with missing values), handle missing values (fill NaN values with the mean rating), and transform the data (convert the timestamp column to date time).

6.0 Collaborative Filtering

- Create User Matrix: A matrix is created with rows representing users and columns representing items, with cells containing ratings or other measures of user-item interactions.
- Calculate similarity between users or items: Similarity between users or items is calculated based on their interactions. Common similarity measures include cosine similarity and Pearson correlation.
- Select a neighborhood of similar users or items: Users or items most similar to the target user are selected.
- Generate neighborhood-specific recommendations.

Here's a basic Python implementation of recommendation system using a collaborative filtering for electronic items, which uses a simple dataset and cosine similarity for calculating user-item similarities:

```
import numpy as np
from sklearn. metrics.pairwise import cosine_similarity
# Sample user-item interaction data
user_item_matrix = np.array([ [5, 4, 0, 0, 3],
         [0, 0, 0, 2, 4],
         [3, 0, 0, 0, 5],
         [0, 0, 4, 0, 0],
         [0, 0, 5, 4, 0]
# Calculate user-user similarity using cosine similarity
         user_similarity_matrix   = cosine_similarity(user_item_matrix)
# Recommend top item
   top_item_index = np.argmax(recommendation_scores)
   recommendations.append(top_item_index)
   print("Recommendations:", recommendations)
```

This demonstrates how to create a user-item matrix, calculate user-user similarity using cosine similarity, select a neighborhood of similar users, and generate recommendations based on the neighborhood. For practice, we are using a larger dataset for collaborative filtering.

In the future, we will use more sophisticated algorithms

7.0 Content-Based Filtering

- Represent items using their attributes
- Create user profiles based on item interactions

- Calculate the similarity of items and user profiles.
- Generate recommendations which uses item similarities.

This Python code implements recommendation system for electronic items using a content-based filtering. This uses item attributes to represent items and calculates the similarity between items and user profiles using cosine similarity:

```
# Sample item attributes
item_attributes = {
        'item_1': 'smartphone high-resolution camera fast processor',
        'item_2': 'laptop lightweight long battery life',
        'item_3': 'smartwatch heart rate monitor fitness tracker',
        'item_4': 'tablet large display portable',
        'item_5': 'headphones noise-canceling wireless comfortable'
}
# Sample user profiles based on item interactions
user_profiles = {
        'user_1': ['item_1', 'item_2'],
        'user_2': ['item_1', 'item_3', 'item_5'],
        'user_3': ['item_2', 'item_4']
}
```

This demonstrates how to represent items using their attributes, create user profiles based on item interactions, use cosine similarity to calculate item and user profile similarity, and generate recommendations depend on item similarities. For practice, we used a larger dataset and more detailed item attributes to make more accurate recommendations. Features are derived from user-item interactions and item attributes.

8.0 Machine Learning Algorithms

- Extract features from user-item interactions and item attributes
- Train machine learning models to predict user preferences
- Generate recommendations based on model predictions.

Here's an implementation of a machine learning-based recommendation system for electronic items in Python. This uses a simple dataset and a logistic regression model for demonstration purposes:

```
# Sample user-item interaction data
data = {'user_id': [1, 1, 2, 2, 3, 3, 4, 4, 5, 5],
        'item_id': [101, 102, 101, 103, 104, 105, 105, 106, 104, 107],
        'rating': [1, 1, 1, 1, 1, 1, 1, 1, 1, 1],
        'timestamp': ['2023-01-01', '2023-01-02', '2023-01-03', '2023-01-04',
        '2023-01-05', '2023-01-06', '2023-01-07', '2023-01-08', '2023-01-09',
        '2023-01-10']
        }
```

```
# Sample item attributes
item_attributes = {
        '101': 'Smartphone high-resolution camera fast processor',
        '102': 'laptop lightweight long battery life',
        '103': 'smartwatch heart rate monitor fitness tracker',
        '104': 'tablet large display portable',
        '105': 'headphones noise-canceling wireless comfortable',
        '106': 'smart speaker voice control music streaming',
        '107': 'fitness tracker step counter sleep monitor'
}
```

This is an example of how to extract features from user-item interactions and item attributes. We then train a machine learning model (logistic regression) to predict user preferences, and based on the model predictions, generate recommendations. To improve the recommendations, we are using a larger dataset and more advanced algorithms for practice.

9.0 Integration and Ranking

- Combine suggestions generated by collaborative filtering, content-based filtering, and machine learning algorithms.
- Rank recommendations based on relevance to the user.

10.0 Presentation

Present the ranked recommendations to the user through personalized recommendation widgets.

11.0 End

11.1 End of the recommendation process

This diagram provides a high-level overview and may not capture all the complexities of personalized recommendation systems. The actual implementation could involve additional steps, optimizations, and feedback loops.

Feedback Loop: A personalized recommendation system includes a feedback loop where user interactions with the recommended items are collected and used to further improve the recommendations. This continuous learning process helps the system adapt to changing user preferences.

A personalized recommendation system for electronic items is a combination of data collection, preprocessing, collaborative filtering, content-based filtering, machine learning, ranking, and feedback mechanisms, providing users with relevant product suggestions.

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CHAPTER 10

Beyond Traditional Boundaries: Investigating Consumer Attitudes and Preferences towards Robo Advisors in Digital Wealth Management

Neerav Chhabhaiya* and Priyanka Dhoot**

ABSTRACT

The field of wealth management has seen a radical transformation with the introduction of Financial Technology (Fintech) and Wealth Technology (WealthTech), which present cutting-edge solutions. Robo Advisors have become well-known among them due to their automated money management offerings. The study aims to understand the consumer attitudes and perceptions regarding Robo Advisors in wealth management, to investigate the factors influencing consumer adoption of Robo Advisors and finally to identify opportunities and challenges associated with integrating Robo Advisors into digital wealth management practices. By employing a convenience sampling technique with 103 participants, the study gathers information about how consumers view robot advisors in the context of wealth management. The results shown that young people are drawn to robo advisors because of their ease, accuracy, and customisation features. However, there's a distinct absence of human engagement and personal touch, highlighting a potential problem in fully accepting this technological innovation in wealth management methods. Automation provides scalability and efficiency, but human interaction cultivates the trust, empathy, and thoughtful decision-making that are essential to wealth management. It is suggested that wealth management should blend robo-advisors with human expertise to form a comprehensive hybrid model.

Keywords: Wealth management, Robo advisor, Digital wealth management, Fintech, Hybrid model.

1.0 Introduction

Robo advisers have brought about a dramatic change in the way people think about investing and financial planning in the field of wealth management. Financial technology, or fintech, has taken the wealth management industry by storm in recent years with the rise of robo-advisers. Comparing these automated investment platforms to traditional financial advisors, they frequently provide more accessible and affordable algorithm-driven financial advice and portfolio management services.

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A paradigm change has occurred as a result of the use of technology into wealth management strategies, pushing the bounds of convention and altering consumer attitudes and preferences. It is imperative for financial service providers and investors to comprehend the intricacies of consumer behaviour in this changing environment. Consequently, in order to identify the underlying variables that affect adoption and usage patterns, this research will cross traditional boundaries to examine customer attitudes and preferences regarding robo advisers in digital wealth management. The shift towards digital wealth management systems has been influenced by multiple reasons, including as technological progress, shifting demographics, and changing consumer demands.

Thanks to the widespread use of smartphones and internet connectivity, people can now access financial services and information like never before. By providing streamlined, user-friendly interfaces that ease the investing process and give people the power to take charge of their financial destinies, robo advisors take advantage of this digital shift. Data-driven decision-making and algorithmic intelligence are two major features of robo advisers that set them apart from traditional financial management services. Robo advisers are able to offer individualized investment advice based on each client's risk tolerance, financial objectives, and time horizon by utilizing large volumes of financial data and advanced algorithms. In addition to improving the effectiveness and precision of investment decisions, this data-driven strategy promotes user trust and openness.

Furthermore, robo advisers are more widely available to the public than traditional financial advisors because they frequently have lower costs and minimum investment requirements. Tech-savvy investors and digitally savvy millennials who look for affordable solutions without compromising performance or quality may find this democratization of investment appealing. Furthermore, the modern consumer's increasingly mobile and hectic lifestyles are well-suited to the availability of investing services at any time and from any location.

Although robo advisers have many advantages, there are still obstacles and doubts around their widespread implementation. Consumers continue to have concerns about cybersecurity, data privacy, and the influence of humans in decision-making. Moreover, some people who value the direction and comfort offered by traditional financial advisors may be discouraged by the automated investment platform's seeming lack of individualized human connection.

The purpose of this study is to comprehend customer perceptions of robo advisers in the context of digital wealth management. It looks at the factors that affect consumer behaviour, such as concerns, decision-making processes, and motivations. The study intends to support strategic decision-making in the financial services sector by offering insights into the changing landscape of digital wealth management. It looks into the perceived advantages and disadvantages of automated investment platforms, adoption drivers and constraints, and changing customer behaviour dynamics in the quickly growing fintech-driven wealth management market. Beyond

conventional limits, the research offers insightful information on how the field of digital wealth management is developing.

2.0 Literature Review

2.1 Wealth management transformation

(Dziawgo, 2021) research states that the advent of Wealth Tech, which is propelled by digitization and the uptake of technologies like blockchain, robo-advisory, big data, and artificial intelligence, is drastically altering the wealth management industry. (D. Salampasis, 2017) the research draws attention towards the transformation that is leading to the development of a hybrid advisory model that combines human expertise with robo-advising.(Russ Kliman, 2018) Wealth Tech's core technology, cognitive computing, is also vital to the empowerment of financial intermediaries and the improvement of customer interaction. (Silvia Avira, 2023) Improved relationships with external parties, real-time access to financial data, and enhanced operational efficiency are all benefits of the digital transformation of financial management, which includes wealth management. (Lee, 2022) According to the empirical results, several push (i.e. perceived inconvenience), pull (i.e. transaction efficiency, perceived personalization and mobile wealth management scenarios) or mooring (i.e. product market expertise and affective commitment) factors are identified that significantly affect switching intention from traditional wealth management to digital wealth management.

2.2 Emergence of robo advisors in wealth management

(K.Phoon, 2017) The emergence of robo-advisors in wealth management has disrupted the traditional industry, offering lower fees, greater transparency, and better expected returns. (Hakala, 2019) These digital platforms use algorithms to create and manage portfolios, providing a low-cost and standardized approach to financial advice. (Jill Fisch, 2019) Robo advisers use algorithms to offer personalized financial advice, offering portfolio management services at lower fees and growing in popularity among younger demographics. Hybrid models combine automated features with human advisory services to cater to diverse client preferences.

2.3 Consumer's perception & acceptance of robo advisors

(Tanpat Kraiwanit, 2022) research on the acceptance of robo-advisors for investment reveals several key factors that influence acceptance of robo advisors such as income, investment knowledge, and the value invested in financial instruments. (A. Sabir, 2023) the study examined that perceived ease of use, usefulness and convenience are key potential drivers that generates consumer's positive attitudes towards robo advisors. (Christian Hildebrand, 2020) shown that conversational robo advisers can improve the perception of the firm and trust, which increases the acceptance of recommendations and asset allocation. All of these results

point to the possibility that a combination of the robo advisor's unique features, knowledge, usability, and trust all influence consumer perceptions and acceptance of robo advisers.

(Dominik Jung, 2018) research emphasized the importance of trust, transparency, and usability in the robo advisory models. (D.Piotrowski, 2022) states that demographic and socio-economic factors such as less financial literacy , poor network and limited technology in underserved demographic area act as barriers to acceptance of robo advisors. (Nanjundaswamy, 2023) The adoption of robo-advisory services for individual investment management is examined in this study, with a particular emphasis on three important variables: perceived trust, perceived efficacy, and perceived usability. It implies that these automated platforms are more likely to be used by investors who have a stronger background in finance. Surveys are used in the study to evaluate the relationship between investor willingness to employ robo-advisors and perceived factors.

The results indicate that in order for robo-advisor businesses to attract tech-savvy investors, they must prioritize developing trust, communicating the efficacy of their services clearly, and creating user friendly interfaces. (Ms Mridula M Menon, 2022) the research study explores how investors with moderate to high financial knowledge view Robo Advisory, an AI tool used for wealth management. Investors are interested in Robo Advisory for its data analysis, potential to avoid human error, and ease of use. Gender and age don't affect interest in Robo Advisory much, but income does. Investors with higher incomes are more interested in Robo Advisory's data analysis and avoiding human error. The study recommends future research with more people and broader demographics. (Lukas Brenner, 2020) the research demonstrates that there is a rising convergence between investor behaviour and FinTech. This study looks at the relationship between the demand for human financial guidance and robo-advisors and finds a negative association. Robotic adviser users, especially younger, tech-savvy investors, were 15.8% less inclined to consult human advisors, maybe because they preferred unbiased advice and felt less afraid of fraud.

Even with its limitations related to data age and correlation-focused methodology, this study advances our knowledge of the potential impact of robo-advisors on investor behaviour. (Bai, 2023) the robo-advisor usage is positively correlated with a person's perceived financial satisfaction after controlling for covariates related to financial literacy and other demographic factors. Moreover, the study reveals that age moderates the association between robo-advisory usage and financial satisfaction. The results are robust after regressing financial satisfaction on robo-advisory by different age groups.(Nikiforova, 2017) according to study, robo-advisors have drawbacks that need to be addressed even though they provide advantages like less fees and simpler access to wealth management services. Among these include the absence of emotional support and interpersonal interaction. (Juan Coffi, 2022) the research reveals that while fintech solutions like robo-advisors offer

automated investment advice, they cannot completely replace human financial advisors. Instead, they complement each other, catering to different market segments based on income levels and wealth distribution. The role of financial advisors is evolving, requiring flexibility, technological savviness, and diverse skill sets. This includes embracing fintech solutions to remain competitive. Diversity and trust are crucial in the financial services industry, as it enhances client-advisor relationships and promotes personal finance management. The study also emphasizes the utmost need for financial literacy and education, urging educational institutions to revise their curricular to include advanced levels of financial technology literacy to better prepare future professionals for the industry. (Tan Zi Yi, 2023) this study contributes to the understanding of factors influencing millennials' adoption of robo-advisors by highlighting the positive influence of financial knowledge. Millennials with a stronger financial background demonstrate a greater willingness to utilize robo-advisory services. This finding aligns with the established role of financial literacy in technology adoption.

2.4 Robo advisors scenario in India

(Ankita Bhatia, 2020) The emergence of robo-advisors in India has the potential to address the behavioural biases of investors (Bhatia, 2020). However, there is a need to increase awareness and trust among individual investors, with cost-effectiveness, data security, and behavioural biases being key factors influencing their perception. (Indu Nain, 2023) The current landscape of robo-advisory services in India is characterized by ease, convenience, time factor, and transparency, with a suggestion to combine automated robo-advisory with a human touch for optimal services. (Arti Chandani, 2021) Despite the potential, there is a lack of awareness about robo-advisors among millennials, suggesting the need for educational initiatives.

3.0 Objectives

1. To understand consumer's attitude and perceptions towards robo-advisors in wealth management.
2. To investigate the factors influencing consumer adoption of robo-advisors in wealth management.
3. To identify opportunities and challenges associated with the integration of robo-advisors in Digital wealth management practices.

4.0 Research Methodology / Approach

1. *Research Approach:* The research adopts a quantitative approach to explore and analyse consumer attitudes, preferences, and perceptions towards robo advisors in digital wealth management. This approach enables the collection of numerical data that can be statistically analysed to draw conclusions.

2. *Research Design:* The research design is cross-sectional, aiming to gather data at a single point in time. This design is suitable for investigating consumer attitudes and preferences towards robo advisors and understanding the factors influencing their adoption in wealth management.
3. *Sampling Technique:* Convenience sampling is employed to collect data from respondents. This method involves selecting individuals who are readily available and accessible. Given the nature of the study, convenience sampling is appropriate for reaching a diverse range of participants efficiently.
4. *Sample Size:* The target sample size for this study is 103 respondents. While convenience sampling may introduce some bias, this sample size is deemed adequate to provide meaningful insights into consumer perceptions and preferences towards robo advisors in digital wealth management.
5. *Data Collection:* Data is collected by using a structured questionnaire distributed to respondents through online. The questionnaire consists of closed-ended questions designed to measure consumer attitudes, perceptions, and factors influencing their adoption of robo advisors.

5.0 Data Analysis and Interpretation
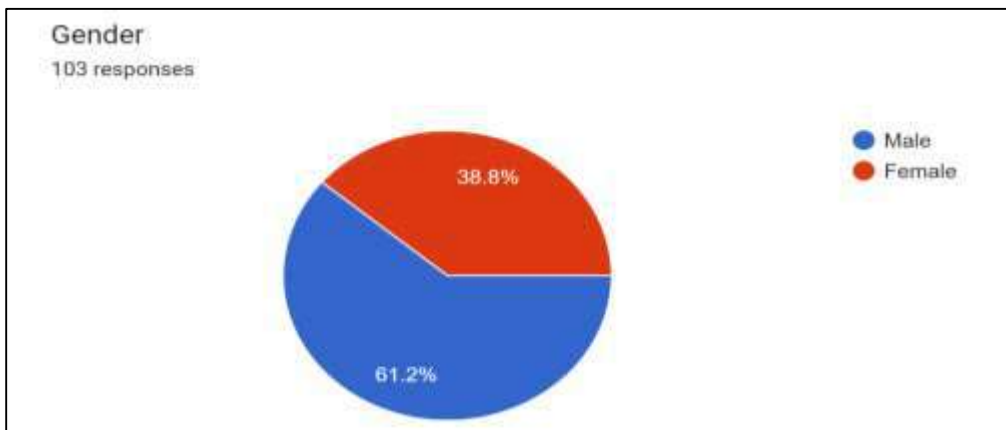
5.1 Demographics Analysis
5.1.1 Gender of respondent

Table 1: Gender of Respondent

Gender	No. of respondents	Percentage
Male	63	61.2%
Female	40	38.8%
Total	103	100%

Source: Primary data

Figure 1: Gender of Respondent

Source: Primary data

Interpretation: The gender distribution of the respondents who participated in a survey about perceptions of robo-advisors. Out of 103 respondents, 61.2% were male and 38.8% were female. It is important to note that a balanced sample size is ideal for surveys to avoid bias. In this case, the sample has more males than females. This means the results may skew towards male perceptions of robo-advisors.
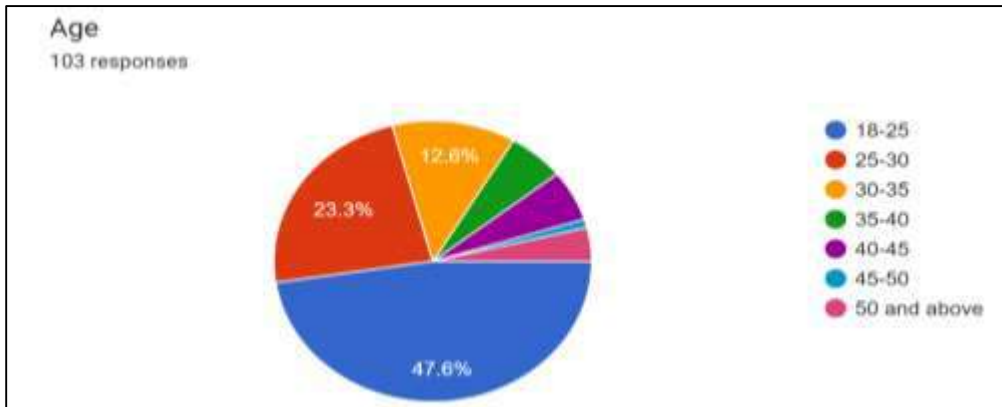
5.1.2 Age group of respondents

Table 2: Age Group of Respondents

Age	No. of Respondents	Percentage
18-25	49	47.6%
25-30	24	23.3%
30-35	13	12.6%
35-40	6	5.8%
40-45	6	5.8%
45-50	1	1%
50 and above	4	3.9%
Total	**103**	**100%**

Source: Primary data

Figure 2: Age Group of Respondents

Source: Primary data

Interpretation: The data shows that the majority of respondents are younger, with 47.6% aged between 18-25 and 23.3% aged 25-30. This indicates that younger individuals are more interested in robo advisors, possibly due to their familiarity with technology, comfort with online financial services, and openness to innovative investment solutions. However, older age groups' lower participation may indicate challenges in engaging them with robo advisor services, possibly due to scepticism towards technology, preference for traditional financial advisors, or lack of awareness about robo advisors.
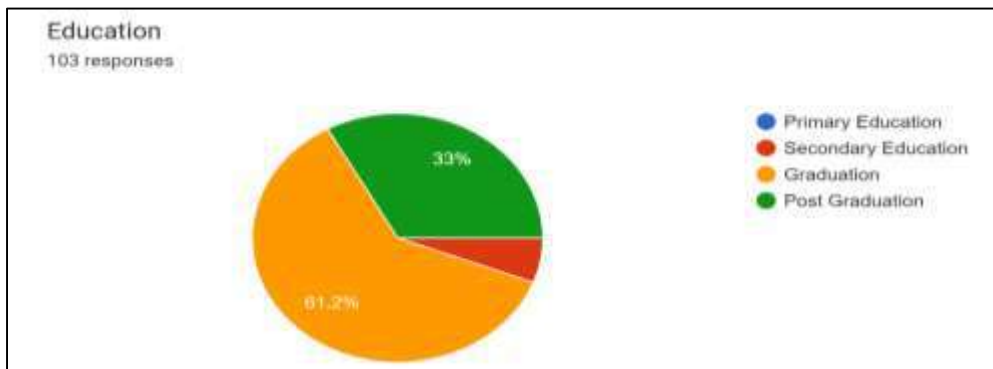
5.1.3 Education level of respondents

Table 3: Education Level of Respondents

Education	No. of Respondents	Percentage
Primary Education	0	0
Secondary Education	6	5.8%
Graduation	63	61.2%
Post Graduation	34	33%
Total	103	100%

Source: Primary data

Figure 3: Education Level of Respondents

Source: Primary data

Interpretation: The survey results indicate a predominantly educated respondent pool, with the majority having completed either Graduation (61.2%) or Post Graduation (33%). Interestingly, no respondents reported having only Primary Education. This suggests that those who engage with robo advisors tend to have higher levels of education. The relatively high percentage of Graduation and Post Graduation respondents implies a certain level of familiarity and understanding of financial concepts, which may influence their perceptions and attitudes towards robo advisors. Further analysis could explore how education levels correlate with specific attitudes or preferences towards robo advisors, potentially revealing insights into the target demographic for such financial services.
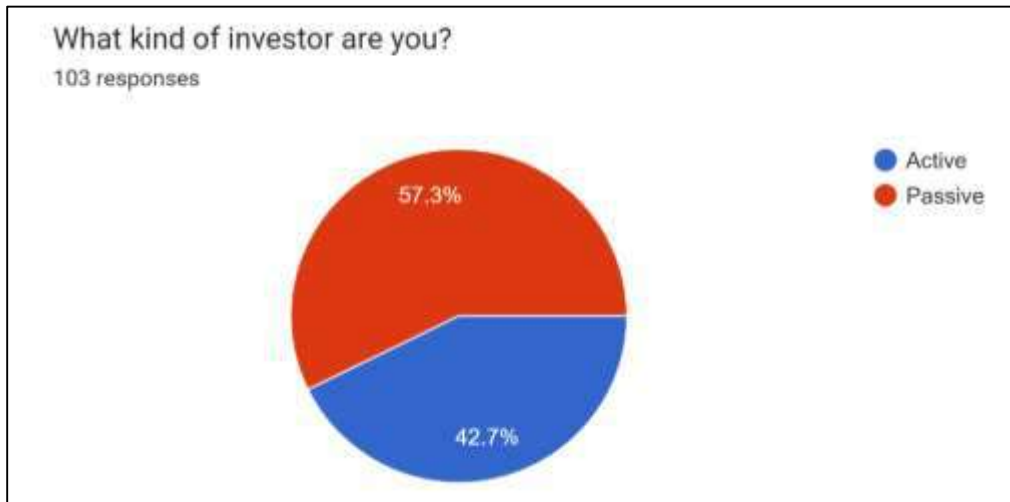
5.2 Investor profile
5.2.1 Type of investor

Table 4: Type of Investor

Investor	No. of Respondents	Percentage
Active	44	42.7%
Passive	59	57.3%
Total	103	100%

Source: Primary data

Figure 4: Type of Investor

Interpretation: The data presents findings on investor behaviour, where 103 respondents were categorized into active and passive investors. Of these respondents, 44 (42.7%) identified as active investors, while 59 (57.3%) identified as passive investors. This indicates a majority of respondents lean towards passive investment strategies. The results suggest a notable trend towards passive investing, possibly influenced by factors such as the rise of index funds, the proliferation of robo-advisors, and the growing popularity of passive investing philosophies like buy-and-hold strategies. This shift towards passive investing may reflect a broader sentiment among investors seeking lower costs, reduced complexity, and potentially comparable returns to active strategies over the long term.
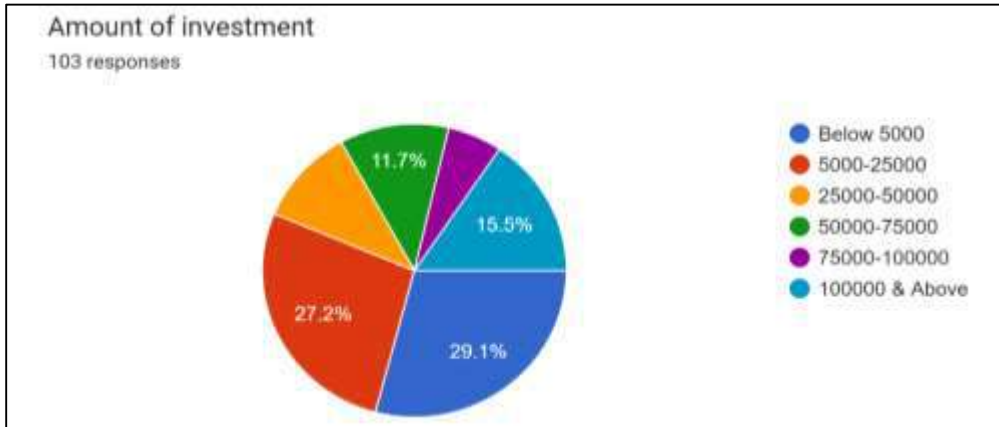
5.2.2 Amount of investment

Table 5: Amount of Investment

| Amount	No. of Respondents	Percentage
Below 5000	30	29.1%
5000-25000	28	27.2%
25000-50000	11	10.7%
50000-75000	12	11.7%
75000-100000	6	5.8%
100000 & Above	16	15.5%
Total	103	100%

Figure 5: Amount of Investment

Source: Primary data

Interpretation: The survey data on robo adviser's attitudes and opinions reveals a diverse range of investment levels among participants. A significant portion of respondents (29.1%) had investments under 5,000, while 27.2% were interested in intermediate investments (5,000-25,000). However, the number of respondents decreases as investment amounts increase, with fewer people making larger investments. Interestingly, 15.5% invested 100,000 or more, indicating wealthy investors.

5.2.3 Sources of information for making investment decisions

Figure 6: Sources of Information for Investment
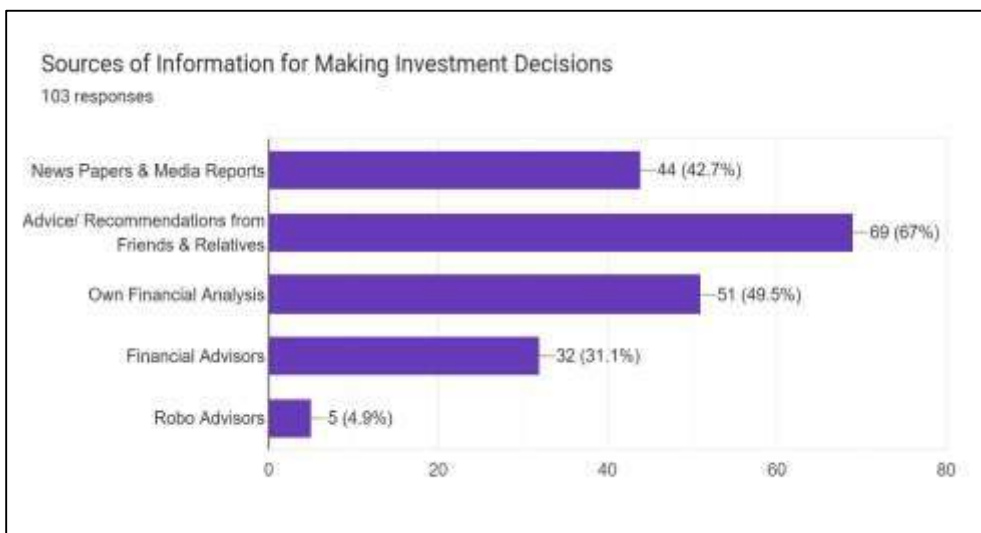
Source: Primary data

Interpretation: According to survey respondents relied on a variety of sources for making investment decisions. Friends and relatives were the most popular source, with 67% of respondents reporting using their advice or recommendations. This was followed by news papers and media reports (42.7%) and their own financial analysis (49.5%). Financial advisors were used by 31.1% of respondents, and robo-advisors were the least popular source, used by only 4.9% of respondents. Overall, the data suggests that people are more likely to consult with friends and family and conduct their own research before making investment decisions than they are to seek advice from professional financial advisors.
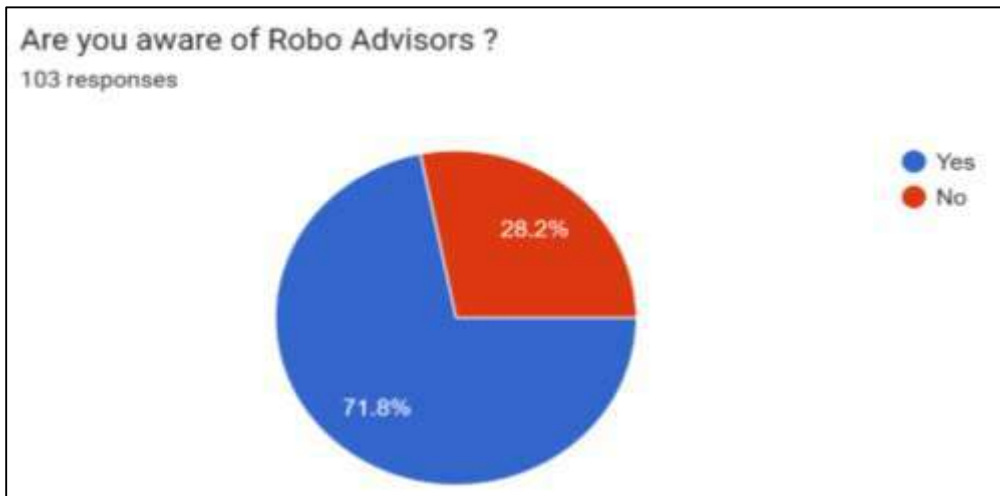
5.3 Familiarity with Robo – Advisors

5.3.1 Awareness of Robo – Advisors

Table 6: Awareness of Robo Advisors

Awareness	No. of respondents	Percentage
Yes	74	71.8%
No	29	28.2%
Total	103	100 %

Source: Primary data

Figure 7: Awareness of Robo Advisors

Source: Primary data

Interpretation: The data indicates a notable level of awareness regarding Robo-Advisors among respondents, with 71.8% acknowledging familiarity with this technology, while 28.2% reported no awareness. This suggests that a significant

portion of the surveyed population is informed about Robo-Advisors, indicating a growing prominence of these automated financial advisory services. However, the proportion of those who are unaware signifies that there is still room for increasing awareness and understanding of Robo-Advisors within the broader population. Overall, these findings highlight both the progress made in the adoption of automated financial tools and the potential for further education and outreach efforts to enhance awareness.
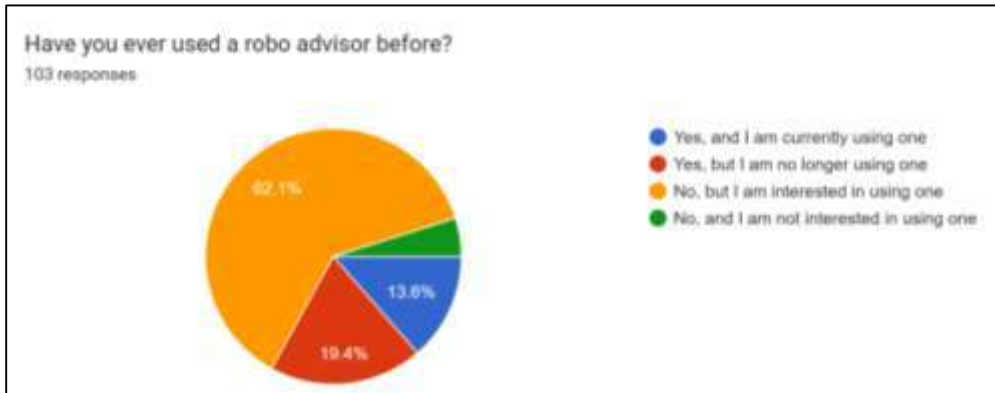
5.3.2 Have you ever used a robo advisor before?

Table 7: Usage of Robo-Advisors

Particulars	No. of respondents	Percentage
Yes, and I am currently using one	14	13.6%
Yes, but I am no longer using one	20	19.4%
No, but I am interested in using one	64	62.1%
No, and I am not interested in using one	5	4.9%
Total	103	100 %

Source: Primary data

Figure 8: Usage of Robo-Advisors

Source: Primary data

Interpretation: The survey data shows a significant interest in robo advisors, with 62.1% of respondents expressing interest. However, 19.4% have stopped using them after trying one, indicating a drop-off in adoption. The 13.6% currently using robo advisors show value and continued usage, while the small percentage (4.9%) is not interested, suggesting some prefer traditional methods or have reservations about automated investment platforms. The data suggests a growing interest in robo advisors, but also emphasizes the need to address user concerns and improve the user experience to ensure sustained adoption and satisfaction.

5.3.3 Which of the following Robo-Advisory products listed below, which are widely used in India, are you familiar with or have you used before?

Table 8: Robo Advisory Products Familiarity

Robo – Advisory Products	No. of respondents	Percentage
Angel Broking ARQ	9	8.7%
5Paisa Auto Investor	2	1.9%
Scripbox	4	3.9%
FundsIndia	1	1%
Sharekhan NEO	4	3.9%
ET Money	8	7.8%
OroWealth	0	0%
Goalwise	0	0%
Robonam	0	0%
Invezta	0	0%
Zerodha	60	58.3%
Other	15	14.6%
Total	103	100%

Source: Primary data

Figure 9: Robo Advisory Products Familiarity
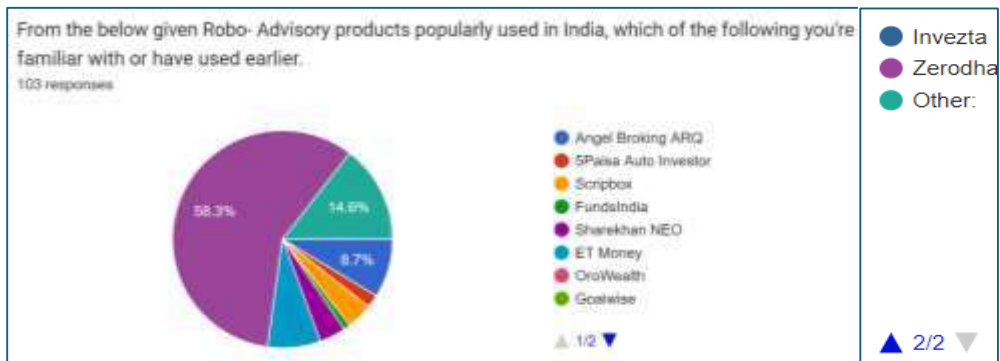
Source: Primary data

Interpretation: Based on the survey data, Zerodha emerges as the dominant Robo-Advisory product in India, with 58.3% of respondents indicating its use, reflecting its widespread popularity and market penetration. Other notable platforms like Angel Broking ARQ and ET Money also exhibit significant usage, with 8.7% and 7.8% respectively. However, several other options listed, including OroWealth, Goalwise, Robonam, and Invezta, received no responses, suggesting either limited awareness or adoption among the surveyed population. Overall, the data underscores Zerodha's strong presence in the market, while also indicating room for growth and competition among other platforms.

5.4 Consumer's perception about Robo-Advisors

5.4.1 How likely are you to consider using a robo advisor to manage your investments?

Table 9: Consideration of Robo Advisors for Investment

Particulars	No. of Respondents	Percentage
Very likely	28	27.2%
Somewhat likely	48	46.6%
Neutral	23	22.3%
Somewhat unlikely	3	2.9%
Very unlikely	1	1%
Total	103	100%

Source: Primary data

**Figure 10: Consideration of Robo Advisors for Investment**
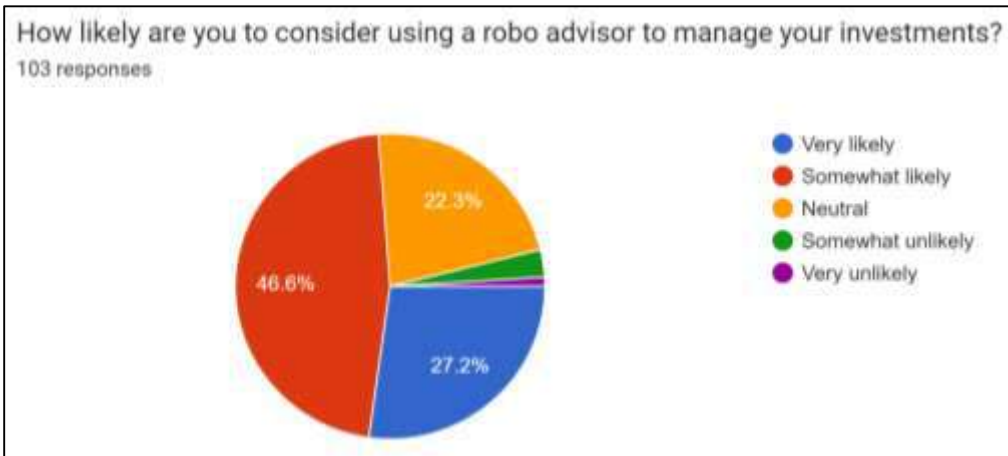
Source: Primary data

Interpretation: The data shows a growing interest among consumers in using robo advisors for investment management. Almost 73.8% of respondents are either very likely or somewhat likely to consider using these systems, indicating a growing acceptance and trust in automated investment management systems. However, only 3.9% expressed some level of reluctance, with 2.9% being somewhat unlikely and 1% very unlikely to use robo advisors. This suggests that reservations or concerns may be due to factors such as trust, perceived complexity, or preference for human interaction in financial matters.

5.4.2 What factors would influence your decision to use a robo advisor?

**Figure 11: Factors Influencing Robo Advisor Usage**
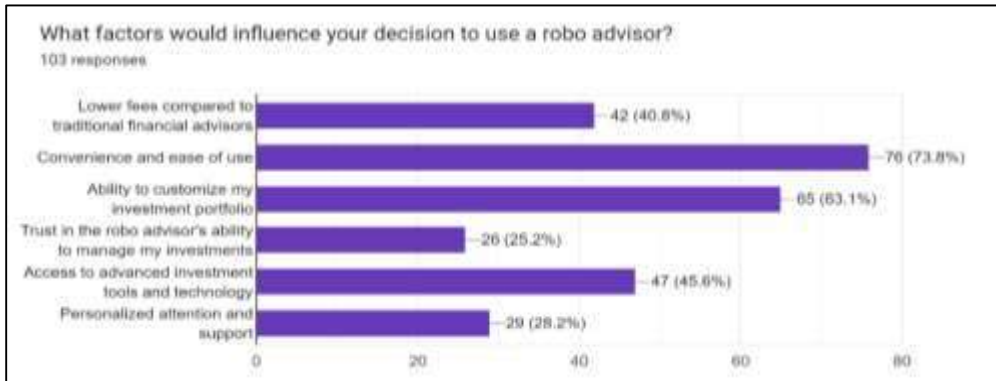
Source: Primary data

Interpretation: The data analysis on factors influencing the adoption of robo-advisors reveals that convenience emerges as the primary driver, with 73.8% of respondents prioritizing ease of use. Cost-effectiveness follows closely, with 40.8% favouring lower fees compared to traditional financial advisors. Moreover, 63.1% seek the ability to customize investment portfolios, indicating a desire for control over their investments. Trust in the robo-advisor's management, access to advanced tools, and personalized support also play roles, albeit to a lesser extent. In essence, the findings underscore convenience, cost, and customization as pivotal factors shaping the preference for robo-advisors.

5.4.3 According to you what are the advantages of using Robo- Advisory Services?

**Figure 12: Advantages of using Robo- Advisors**
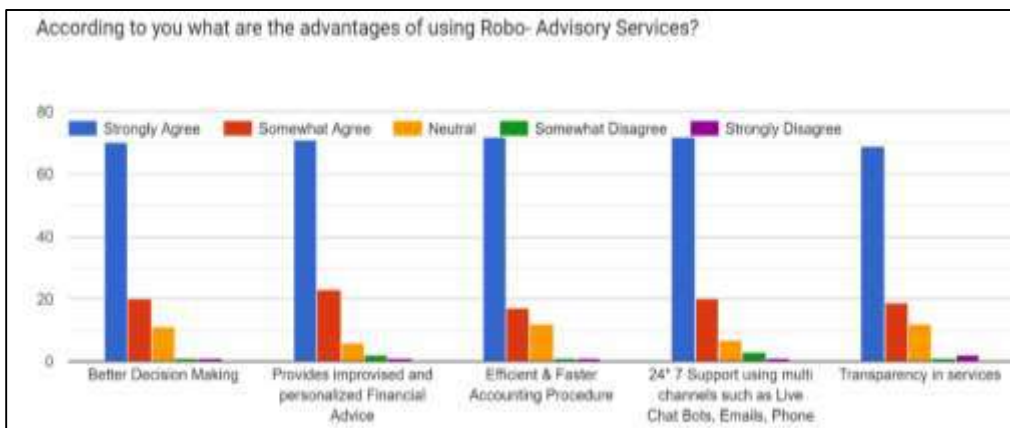
Source: Primary data

Interpretation: The bar chart illustrates consumer sentiment regarding the benefits of robo-advisory services, with a significant majority (80%) valuing the ability of robo-advisors to make superior decisions through algorithmic automation, potentially mitigating emotional biases. Following closely, roughly 60% appreciate the personalized financial advice robo-advisors offer, tailored to individual risk profiles and goals. Additionally, nearly 40% of respondents highlight the efficiency and speed of robo-advisors in handling accounting processes. Overall, the data underscores consumers' recognition of robo-advisors' advantages in data-driven decision-making, personalized guidance, and operational efficiency.

5.4.4 What are the technical features that should be offered by an online investment Advisor?

Figure 13: Online Investment Advisor Features
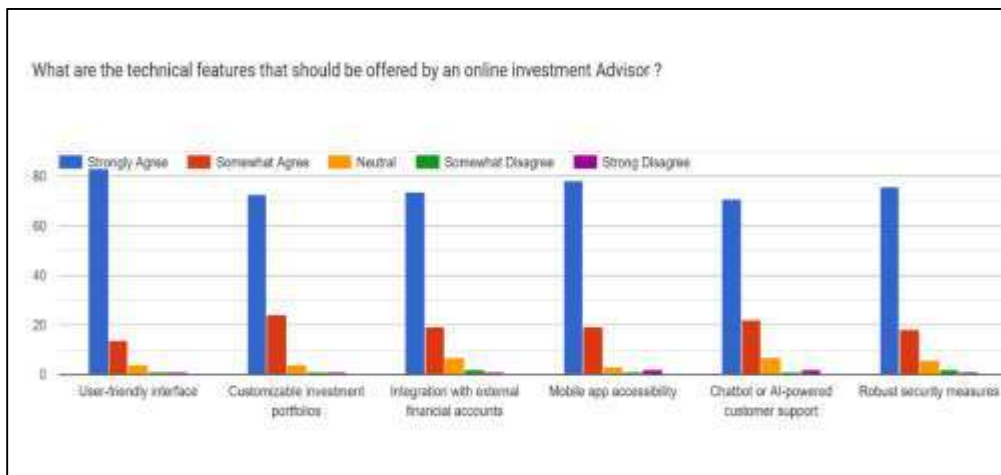
Source: Primary data

Interpretation: The data shows that a high percentage of users agree that online investment advisors should offer user-friendly interfaces (80% strongly agree and somewhat agree), customizable investment portfolios (76% strongly agree and somewhat agree), and mobile app accessibility (72% strongly agree and somewhat agree). This suggests that investors find these features to be important. Fewer users find chatbots or AI-powered customer support (52% strongly agree and somewhat agree) and integration with external financial accounts (48% strongly agree and somewhat agree) to be important features for online investment advisors. However, a significant majority still agrees that these features are important. Overall, the data suggests that users prefer online investment advisors that are easy to use, offer customization, and are accessible on mobile devices.

5.4.5 For which of the following investment objectives would you consider to get support from Robo Advisor?

Figure 14: Robo Advisor Investment Objectives
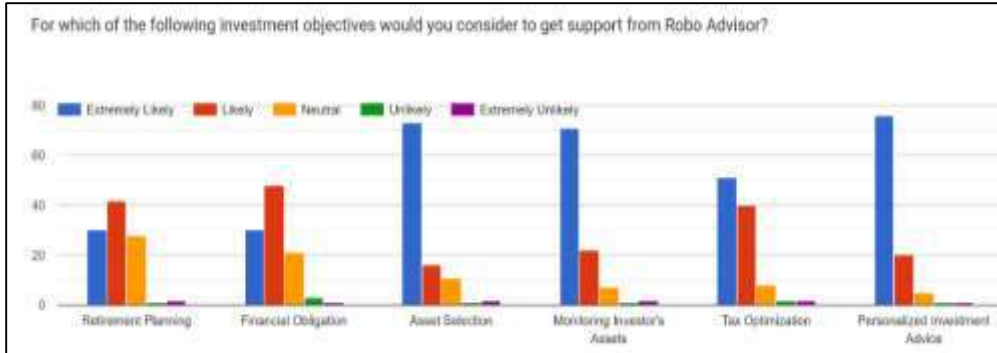
Source: Primary data

Interpretation: The survey suggests that investors primarily favour robo-advisory services for tasks such as asset selection and monitoring, as well as for receiving personalized investment advice. However, for more complex investment objectives like retirement planning, meeting financial obligations, and optimizing tax strategies, robo-advisory services are viewed less favourably. This indicates that while investors appreciate the convenience and efficiency of automated platforms for certain aspects of investing, they still value human expertise and guidance for more nuanced financial goals.

5.5 Opportunities & Challenges for Robo – Advisors

5.5.1 How important is human interaction in your wealth management decisions?

Table 10: Importance of Human Interaction in Wealth Management

Particulars	No. of Respondents	Percentage
Very Important	62	60.2%
Somewhat Important	40	38.8%
Not Important at all	1	1%
Total	**103**	**100%**

Source: Primary data

Interpretation: The data reveals that human interaction holds significant importance in wealth management decisions, with 60.2% of respondents indicating it as "very important" and 38.8% stating it as "somewhat important." Only a minimal 1% considered human interaction as "not important at all." This overwhelmingly positive response underscores the value individuals place on interpersonal

communication and guidance in financial matters. The high percentage of respondents emphasizing the importance of human interaction suggests that while technological advancements may offer conveniences, the human touch remains paramount in wealth management, likely due to factors such as trust, personalized advice, and emotional reassurance.

Figure 15: Importance of Human Interaction in Wealth Management

How important is human interaction in your wealth management decisions?
103 responses

- Very important
- Somewhat important
- Not important at all

38.8%
60.2%
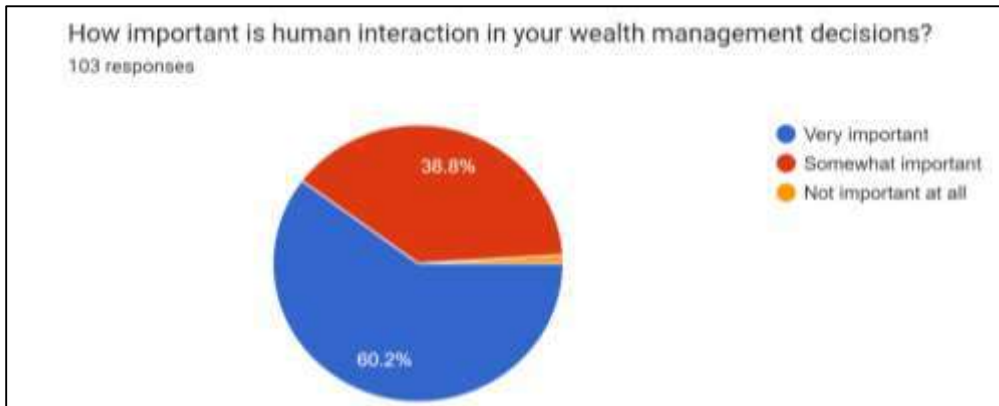
Source: Primary data

5.5.2 What concerns or drawbacks do you have about using a robo advisor?

Figure 16: Drawbacks of Robo – Advisor

What concerns or drawbacks do you have about using a robo advisor?
103 responses

Lack of personal interaction with a financial advisor — 62 (60.2%)
Limited ability to ask questions and get advice on investments — 22 (21.4%)
Fear of technology failures or glitches — 69 (67%)
Concerns about the security of my personal and financial infor... — 39 (37.9%)
Limited ability to customize my investment portfolio — 10 (9.7%)

Source: Primary data

Interpretation: The primary concerns among respondents regarding robo-advisors revolved around the lack of personal interaction with financial advisors, with 62% highlighting this issue. Security of personal and financial information was also a significant worry for 37.9% of participants. Additionally, a notable fear of

technology failures or glitches was expressed by 67% of respondents. Some felt constrained in their ability to ask questions and seek advice on investments, as mentioned by 21.4% of those surveyed. In contrast, only 9.7% expressed concern about the limited ability to customize their investment portfolios. Overall, the findings suggest that people are more apprehensive about the impersonal nature of robo-advisors and the security of their information rather than the customizability of investment options.

5.5.3 Are you interested in a hybrid financial service merging human expertise with robo efficiency for investment management?

Table 11: Hybrid Financial Service

Particulars	No. of respondents	Percentage
Very likely	57	55.3%
Somewhat likely	20	19.4%
Neutral	18	17.5%
Somewhat unlikely	6	5.8%
Very unlikely	2	1.9%
Total	103	100%

Source: Primary data

Figure 17: Hybrid Financial Service
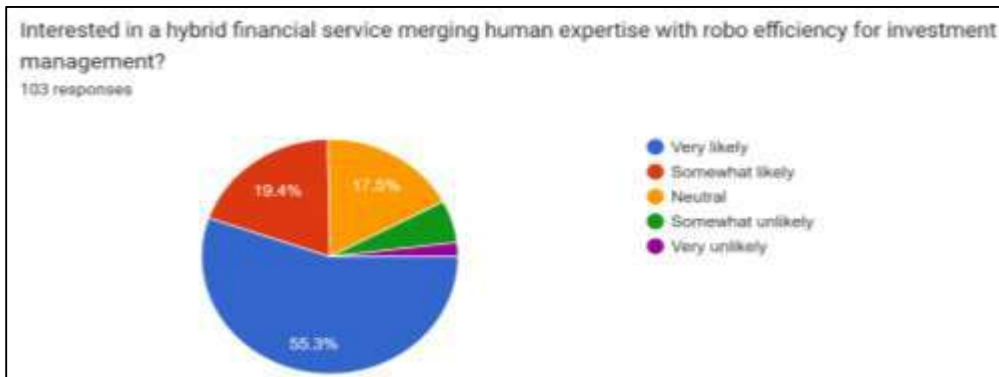
Source: Primary data

Interpretation: According to the statistics, there is a lot of demand for a hybrid financial service that offers investment management and blends human knowledge and robo efficiency. More than 74.7 percent of participants indicated that they would be likely to use such a service, of whom 55.3% said they are very likely to do so and 19.4% said they are somewhat likely to do so. A mere 7.7% of respondents indicated they are somewhat or extremely unlikely to use such a service, reflecting the lack of skepticism among respondents. 17.5% of the replies were

neutral, indicating that the segment is open to the idea but needs more convincing or information. All things considered, the results point to a sizable demand for a hybrid financial service that combines human and automated capabilities for investment management.

6.0 Findings, Suggestions and Conclusion

6.1 Findings

- Nearly three-fourths (73.8%) of respondents are open to considering robo advisors for investment management, indicating a growing acceptance and trust in automated systems.
- Concerns or reluctance towards robo advisors are relatively low, with only 3.9% expressing some level of reluctance, suggesting potential reservations related to trust, perceived complexity, or a preference for human interaction in financial matters.
- Consumer sentiment towards robo-advisory services indicates a recognition of their benefits, including superior decision-making through algorithmic automation (80%), personalized financial advice tailored to individual risk profiles and goals (60%), and efficiency in handling accounting processes (nearly 40%).
- Users emphasize the importance of user-friendly interfaces (80% strongly agree and somewhat agree), customizable investment portfolios (76% strongly agree and somewhat agree), and mobile app accessibility (72% strongly agree and somewhat agree) in online investment advisors, indicating a preference for ease of use, customization, and accessibility.
- While robo-advisory services are favoured for tasks such as asset selection and monitoring, and receiving personalized investment advice, they are viewed less favourably for more complex objectives like retirement planning and optimizing tax strategies, suggesting a preference for human expertise and guidance in nuanced financial matters.
- The study reveals convenience, cost-effectiveness, and customization as the main drivers of robo-advisor adoption, with 73.8% of respondents prioritizing ease of use, 40.8% favouring lower fees, and 63.1% seeking control.
- Human interaction is deemed "very important" in wealth management decisions by 60.2% of respondents which states that there is demand of human financial advisors though high-tech solutions like robo-advisors are been present for wealth management. This preference is attributed to emotional reassurance, individualized advise, and trust.
- The lack of individualized communication with financial advisors is the main area of concern for robo-advisors, as most respondents voiced concern about it. Users get nervous about robo-advisors because they don't feel like they can get

the same kind of support and guidance from human advisors. A considerable proportion of participants expressed anxiety regarding the security of their personal and financial data, which is another noteworthy issue. The concern about using robo-advisors is heightened by the possibility that private data could be compromised by cyberattacks. stability of automated financial platforms and their capacity to reliably provide secure, accurate services devoid of human involvement. Moreover, a significant proportion of participants express concerns regarding technological malfunctions or malfunctions, which may erode their trust in the dependability and efficiency of robo-advisors. These worries are a reflection of a larger mistrust of the reliability of automated financial systems and their capacity to provide reliable, secure services devoid of human involvement.

- There is high demand for hybrid financial service for investment management because hybrid services provide personalized financial advice and automation for efficient transactions and portfolio management, appealing to investors seeking tailored solutions. They offer faster and more accurate financial decision-making by combining human expertise with robo-advisors. Human expertise contributes to risk management strategies, while robo components offer data-driven insights and analysis. Hybrid services balance accessibility and personalized service, offering expert advice when needed and convenience for routine transactions. Advancements in technology allow hybrid services to integrate artificial intelligence and machine learning algorithms for predictive analytics and real-time monitoring, providing investors with valuable insights and timely recommendations.

6.2 Suggestions

- Enhance User Experience and Customization: Focus on improving user-friendly interfaces and offering customizable investment portfolios tailored to individual preferences.
- Address Security Concerns: Implement robust cybersecurity measures such as encryption protocols, multi-factor authentication, and regular security audits to build trust in the platform's security.
- Provide Human Interaction Options: Offer hybrid services combining automated features with access to human financial advisors to cater to users who value personalized advice.
- Educational Resources: Invest in resources to help users understand robo advisor services, their benefits, and how they fit into their financial planning strategy.
- Transparency and Communication: Communicate clearly about the platform's operations, algorithms, fees, and performance metrics to build trust with users.
- Continuous Innovation: Stay abreast of technological advancements and evolving consumer preferences to innovate and improve services continuously.

- Regulatory Compliance: Ensure compliance with relevant regulatory requirements to protect consumer interests and maintain trust in the integrity of the services offered.

6.3 Conclusion

The results of this survey offer insightful information on customer preferences and views regarding robo advisers in digital wealth management. Robo advisers are becoming more and more popular overall, as many respondents are willing to give them some thought when it comes to financial management. Youth is more driven towards high tech solutions like robo - advisors because of their techno savvy attitude. Adoption is largely driven by factors like cost-effectiveness, personalization, and convenience. But in the constantly changing world of financial services, challenges including the intricacy of financial planning responsibilities, the absence of human interaction, and the security of financial and personal information remain. In the midst of digital revolutions and technology breakthroughs, solving these problems calls for a careful balancing act between innovation and maintaining the security and confidence of people's financial data. Furthermore, to guarantee openness, responsibility, and the integrity of the financial planning process, extensive laws and ethical concerns are still necessary. The study emphasizes how crucial it is to combine human knowledge with robo adviser technology in order to satisfy customer demands for tailored guidance and emotional comfort. The integration of human assistance with automation in hybrid financial services is emphasized as a viable approach to address the varied demands of investors. For further study in investigating consumer perceptions and attitudes towards robo-advisors in wealth management, it is essential to conduct a comprehensive longitudinal study tracking changes in attitudes and behaviours over time. This study should include qualitative research methods to delve into the underlying reasons behind consumer attitudes, alongside comparative analysis of different robo advisor platforms to identify best practices and areas for improvement. Additionally, a regulatory impact study would be valuable in understanding how regulatory frameworks influence consumer trust and adoption of robo advisors, informing policymakers and industry stakeholders on creating conducive environments for digital wealth management innovation.

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CHAPTER 11

Packaging Design Creativity as a Competitive Promotional Tool

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ABSTRACT

With the proliferation of technology and the fierce competition among businesses in the food industry, food companies have realized how important it is to have innovative packaging design as a competitive advantage over rivals. Packaging should be distinctive, add value for customers, and accurately represent the brand. For food companies that often create innovative packaging to improve their brand positioning by drawing consumers' attention to their products and influencing their ultimate purchase intentions, studying the factors that influence consumer attraction, intentions, and behaviors will be highly helpful. In light of this, examining inventive food packaging can assist businesses in preserving the harmony between originality and creativity in tandem with visually appealing and useful design by putting; Your goods will be distinctive. on store shelves and online with unique packaging. Additionally, it will increase customer trust and position your business as a reliable supplier of superior goods. Investing in innovative and high-quality packaging design is crucial to growing a profitable company. New technology to improve consumer experience, user friendliness, and notions of environmental social responsibility. In order to improve communication with the target audience and adapt to their changing needs and lifestyles, packaging is constantly evolving through the use of innovative concepts, various printing materials, technologies, and clever solutions integrated with digital media. The study's analytical descriptive approach to food packaging samples aimed to highlight recent trends in the food industry's creative packaging, identify, elaborate, analyze, and discuss factors that lead to unique food packaging having a significant influence on consumer experience and preferences toward products. Product packaging can include promotional components in a variety of ways, such as coupon codes, secret URLs, or QR codes that link to exclusive deals, discounts, or giveaways. Taking use of this chance to the most, think of including interactive games into packaging to increase interaction and improve the brand experience.

Keywords: Package Design, Promotion, Consumer Behavior, Innovation and Creativity, and Smart Package Marketing Process, packaging as a marketing tool, perception.

1.0 Introduction

1.1 Objectives
1. To understand Gorgeous and appealing packaging has the power to grab customers' attention, sway their ultimate purchase choice, and convey information about the superiority and benefits of a product over rivals.

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2. To identify It can also encourage impulsive purchases from prospective customers when a sale is about to close.
3. The goals are framed by the positioning, consumer demands, brand story, and competitive environment in order to find a special and unique place that the brand can call its own. The goals clarify and define the task and lay the groundwork for the brand's visual expression.
4. To understand Active packaging refers to the addition of additives to the packaging system to maintain or extend the quality and shelf life of fresh vegetables or livestock products, while smart packaging systems are systems that monitor the condition of packaged foods to provide relevant quality information.

1.2 Research methodology
1.2.1 Study goals and methods

- Researchers focus on analyzing multiple case studies in the food sector, examine the fundamentals of creative packaging, and identify elements that could draw consumers to the package over those of competitors in the same category through the use of a theoretical framework, qualitative methodology, and secondary data analysis.
- The researchers also seek to identify the key components that could influence consumers' purchasing decisions and behavior, as well as to draw attention to the novel and eye-catching aspects of packaging.
- The paper is descriptive and analytical in nature.
- This article attempts to analyze "Packaging Design Creativity as a Competitive Promotional Tool".
- According to research needs, my research is completely based on secondary data.

1.3 Introduction

Packages can now play a dynamic role in food preservation, containment, protection, and marketing thanks to innovation and inventiveness Innovative packaging technologies are referred to by a variety of terms, including interactive, active, smart, intelligent, and other user-friendly features that support the preservation of food safety and quality in packaging. Additionally, package design aids in brand recognition, marketing, and promotion, particularly during fierce rivalry. Beautiful and appealing packaging has the power to grab customers' attention, sway their choice to buy, and convey information about the benefits and qualities of a product relative to rivals. It can also encourage impulsive purchases from prospective customers at the point of sale. The researchers draw the deduction that three primary phases in the consumer's interaction with innovative package design based on the literature review. The (feeling stage) serves as the beginning point and is attained through the design. Attractive factor, then move on to the (attractive phase) of unique and creative packaging trends. Additionally, the

consumer's experience is also influenced by the package (feature), which creates an advantage, through many techniques such as; easy to use, comfortable to handle, easy to hold, protective, safe and reusable. All these packaging functions are performed by various design elements of the. Many researchers emphasize the importance of packaging design in the branding process, as it reflects identity of any company and defines packaging as the external appearance of the product, containing many attractive things. factors such as: design, shape, material, color and label, towards consumer awareness, emphasize that packaging must be attractive, recognizable and differentiate products. According to Packaging design is considered an important part of a brand's sales in the commercial market, therefore, it should have both promotional and informational roles. also confirms define its attractive role in conveying information about product attributes to customers. Furthermore, presents packaging as a silent salesman in stores and as the only communication between the product and the final consumer at the point of sale.

With the increasing use of mobility and social media, Interactive design ideas can be used to engage and communicate with consumers. The interactive and innovative package can not only be more targeted but also more personalized and integrated. Another perspective: interaction design defines the structure and behavior of the interaction system, to create relationships between people, products and services they use. The interactive experience thus extends from the pleasing appearance of packaging design and ease of use to the preservation functionality of packaging and communication through digital media such as the use of codes QR or AR technology. The function of packaging also meets consumer needs such as preparing and preserving food at home. The growing food industry is developing methods that can easily monitor and preserve the freshness and safety of foods throughout their shelf life. Additionally, considers it as an attractive tool to attract consumers' attention and their perception of the quality of the product. In contrast, suggests that consumer behavior will be less influenced by visual stimulation if they are more involved in a product category, whereas, they need more information and time to evaluate products

2.0 Literature Overview

2.1 Attractive design and user experience

Despite the drawbacks of globalization and the requirement for rapid manufacturing across the board, packaging became more and more comparable. Package design continues to play a crucial part in identifying and promoting brands; 52% of US food shoppers state that appealing packaging designs draw them in, while 44% of Chinese consumers say they would want to customize the soft drink packaging. As previously mentioned, packaging is crucial to the marketing of products. Research revealed that product package design is valued as a marketing variable that enhances the value of products; therefore, design elements influence the

overall appearance of the package. It also emphasizes the importance of customer preferences and purchasing patterns when designing any box, he demonstrates how design can emotionally connect with the consumer and influence their choices because packaging has a great deal of emotional power.

According to the statement, clients are inclined to form judgments about the food product's quality by relying on their personal experience with handling the package. Based on this, proposes a two-step decision-making process: first, the customer should decide how to handle the product package, which highlights the significance of design as a first step in the initial decision for product examination. Next, following a direct examination, the second step started with functionality to further encourage the purchase intention. Additionally, the packaging design ought to pique their interest sufficiently for them to choose the box from the shelf among the other things, which may enhance their desire to make a purchase, particularly for new items. Because demonstrated that packaging on store shelves let customers to assess quality without actually seeing the goods, packaging is prioritized over content.

However, discovered that other elements like perceived quality and price could have an impact on purchasing intention. also looked at how consumers felt about the milk package. The findings demonstrated the significance of packaging design and its components in consumer purchasing behavior; for example, text, graphics, and colors are highly effective at grabbing the attention and influencing the decision-making of the customer. Additionally, emphasizes how all package components—such as color, shape, size, materials, and logo—should work together to support the positioning of the product. And marketing plan, also identified six elements that manufacturers and designers had when developing any type of package, there are several factors that need to be considered. Design, size, color, photos, texture, and taste. We can discuss the key elements that make the packaging sector appealing and appealing in the next phase.

2.2 Attractive design components

Package design, according to, is crucial. For instance, coffee customers base their expectations of the acidity and sweetness of coffee on the design, color, and typefaces of the labels, which differ only in their edges' roundness or angularity. Additionally, emphasize that the idea of packaging finishes texture affects consumers' positive perceptions and evaluations of the product inside, such as the perception that a glossy package of the same brand of products is competent, but a matte package of a coffee brand is sincere. Additionally, "Transparent Design" can make for appealing food packaging since it lets customers view the actual product and sense its freshness while reading the label.

2.2.1 Colors

The product's packaging color is the most important component, according to, followed by the visuals, discovered that the color of the box may have an effect,

particularly if it is distinctive for a certain brand. According to, attraction is the most potent color function since it draws customers in during the purchase and represents the overall experience. According to, credibility is crucial in this situation since a package should be truthful without exaggerating the worth of its contents. In the food business, for instance, the color of the juice container should match the color of the actual juice within.

A study by elaborates on the meanings of colors in the packaging sector, discussing the color of the container as a sign that uses either happy or negative emotions to elicit and transmit a certain promotional message to customers. For example, orange denotes affordability, red denotes excitement and stimulation, purple denotes stateliness, yellow denotes black signifies power and is associated with cheer and gladness. However, certain studies, such as, highlight how social and cultural contexts, as well as trends, can influence color semantics; as a result, colors in one culture may have a different meaning from those in another. Additionally, colors are utilized in promotions to denote different gender divisions. For instance, pink color is associated with female items, and blue color is associated with male products. Furthermore, revealed a relationship between the flavor and container properties and the color and shape of the packaging. The study examined four different designs for coffee packages: pink/round, green/angular, and pink/angular. The results revealed that participants anticipated the pink-labeled coffee to taste sweeter than the green-labeled coffee, however the coffee in the More acidity was predicted for the green labeled coffee than for the pink labeled coffee.

Figure 1: Colourfull Packaging Design

2.2.2 Graphics

Holograms can draw in customers and encourage them to touch the package, which in turn encourages them to sample the product, just as graphic colors, lines, signs, and symbols are seen to be appealing features on packaging. Additionally, said that consumers are drawn to product packaging with graphics, particularly for less well-known businesses and items that offer experiential benefits. There are a variety of ways to convey the image type on packaging, including showcasing the product, its advantages, its usability, its emotional appeal, its impact after use, the brand name and personality, and the use of photographs of well-known individuals as presenters.

Figure 2:Grapgic Design Related Packaging Design

2.2.3 Typography

According to, font size is crucial for packaging because it draws attention from customers and has the potential to deceive or confuse consumers with information. It also creates a visual hierarchy by drawing the eye into the composition through the entry point, which is a prominent visual or typographic treatment. Furthermore, the fonts' style and color will mostly influence the mood that the package conveys. Generally, color is dictated by how the typeface or fonts contrast with the background, although margins, leading, and word spacing also play a part.

Figure 3: Topography Implemented Design Related Packaging Design

2.3 Usability of packaging

Packaging's come in three distinct variants, we's learnt, marked by primary, secondary an' distribution. Each bit an' bob should mesh harmoniously to magnify the product's positioning' on the market, an' reinforce its strategies for sellin'.

Packages serve four purposes: legal, functional, sustainable, and promotional. It has been noted by numerous scholars, including, that package functionality ought to be simple to use, contain, and safeguard. Given that the product's functional duty involves safeguarding it from outside dangers, maintaining its quality while placed on shelves, extending its lifespan, making it simple for customers to use, and protecting it while it is being transported and stored.

Highlights the role that physical safeguarding against factors in the environment such as compression, temperature, etc. plays in the functionality of a package. Barrier defense against environmental hazards such as dust, water, and insects; convenience of handling or transportation by grouping the little items into a single container. Furthermore, it serves an educational purpose by elucidating the product's use, transportation, recycling, and disposal.

In addition to serving as a marketing tool, closed packaging has been shown to keep products safe from theft and to make handling, opening, and closing as well as recycling easier. Because it is crucial to prevent potential harms to the items during their transportation, storage, sale, and exploitation, some academics, such as, refer to protection as the fundamental role of packing. Additionally, protection keeps parcels and\ the product itself from any environmental elements, such as dust, moisture, water, light, and temperature, that could have an impact on its quality. Recent discussions have highlighted the increasing adoption of "porous packaging materials" in food packaging practices, acknowledged for their potential in mitigating the transmission of viruses. This adaptation underscores a pivotal shift towards enhancing public health safety measures within the packaging industry.

Because it encourages the circular economy, which replaces the linear economy, which operates on the model of "acquire, produce, consume, discard," leading to the generation of waste, and eliminates waste through the cycle "make, use, return, recycle, reuse."

Figure 4: Packaging Usability & Experience

2.4 Creativity and innovation

Creativity and innovation are two sides of the same coin that are connected to one another states that the function of creativity is to generate original, non-existing ideas, and the function of innovation is to incorporate these novel concepts into practice. The innovation may be applied as an invention in its original form or altered and refined into a different form. As a result, in order to stand out from the competition and get awareness, new approaches to product packaging design and marketing have to be taken claims that innovative businesses will be able to handle environmental difficulties more quickly and effectively than non-innovative ones. As a result, brand-new, cutting-edge packaging solutions known as **"hybrid packages"** start to arise. These packages mix printed images and electronic components to function together on the packaging. Innovative Packaging encompasses a variety of forms and forms, including die-cuts and distinctive shapes, 3D printing, sensory products, smart containers, and more. Your offerings will be distinguished on store shelves and online with unique packaging. Additionally, it will increase customer trust and position your business as a reliable supplier of superior goods.

Investing in innovative and high-quality packaging design is crucial to growing a profitable company. Innovative packaging presents a special chance for firms to stand out from the competition. Fashion brands have the ability to create an exceptional unpacking experience by using innovative design elements, distinctive forms, interactive features, or customized touches.

For enterprises to thrive, creativity and innovation are paramount. These components not only enable entrepreneurs to distinguish themselves from their competitors but also adapt to volatile market dynamics, address challenges, foster expansion, embrace calculated risks, attract stakeholders, and cultivate a culture of ongoing enhancement.

Figure 5: Creative & Innovatative Packaging Design

2.5 Advantages of innovative & creative packaging

Innovative designs and solutions used in creative packaging not only make products stand out from the competition, boosting sales and growth, but also offer more economical and sustainable solutions for the whole package life, from the

assembly line and warehouse to retail shelves and consumers' hands. Innovative packaging ideas can improve a company's marketing strategy for a product and lower shipping and storage expenses by using sustainable and innovative designs. Proceed to explore further information on the subject by continuing to read the subsequent sections innovative packaging that promotes sales and sustainable packaging that contributes to a better future.

2.5.1 Marketing that works

The packaging of a product can have a significant impact on its marketing strategy since it communicates the product's style, goals, and values. Packaging design at the point of sale needs to grab the customer's attention in a split second and persuade them to pick up the box and make the buy. Products can stand out in a sea of identical goods because to creative packaging strategies that use eye-catching colors, eye-catching forms, and convenient features. Additional crucial factors to take into account include simplicity, portability, and storage. To keep the bottles, secure throughout transit, unique wine shipping boxes, for instance, can include custom logos, striking outside colors, practical handles, and imaginative cushioning methods. It is possible to package and construct retail display boxes. creating imaginative kits that are tailored to specific holidays, seasons, or marketing campaigns. In addition to providing tamper evidence and safety during transportation, creative packaging also includes closures that make it simple for buyers to access the goods after purchase.

Figure 6: How Packaging Helps You Achieve the 5 Ps of Marketing

2.5.2 Creative and sustainable packaging

Finding innovative ways to manufacture, package, ship, and store goods using renewable resources is necessary for sustainable packaging solutions that help conserve energy and decrease waste. By means of innovative sustainable packaging, enterprises can make a positive impact towards a safer and healthier future.

To cut down on hazardous waste, try substituting more environmentally friendly packaging materials for non-recyclable ones. Innovative designs that enable lighter weights, better storage, and smaller packing can lower transportation costs by lowering the energy and fuel required to ship more products. Personalized packaging that uses innovative padding and safeguards can reduce the need for Styrofoam or

plastic bubble wrap, which are frequently used to protect goods from harm while being transported or stored. Eco-friendly blister packs composed of recyclable materials more graphic area is made possible by using paperboard and a minimal quantity of plastic, opening up new creative marketing possibilities. Get in touch with us right now to explore further into the details regarding how imaginative packaging may support your objectives.

Figure 7: Sustainable Packaging Solutions for Eco-Conscious Consumers

2.5.3 Novelty in packaging features (Form & die cuts – substance – 3D printing)

It has been observed that numerous enterprises necessitate support in acknowledging the imperative of innovation within their products and services, necessitating collaborations between a lot of institutions, including industries and research institutes. Researchers have recently emphasized the value of imaginative shape, die-cuts, and materials when creating packaging and promotional items. suggest that a novel and inventive packaging design could serve as an effective means of product identification and classification. And according to , Besides aligning with consumer needs in terms of size, as indicated by 48% of respondents, packaging must also be easily graspable, as noted by 50% of consumers, to stimulate their purchasing decision. Furthermore, the design of the packaging plays a crucial role in grabbing consumer attention (47%), aiding in the identification of products in retail environments (47%), and facilitating ease of use (48%). Consequently, innovative packaging trends are emerging that leverage distinctive die-cut designs to captivate consumers, meet their preferences, integrate seamlessly into their lifestyles, and enhance their satisfaction. As an illustration, a The container that provides a single dose and is wrapped in a polymeric substance is what drives the current economic trend . Within the food sector, numerous businesses have employed packaging systems to enhance the consumer experience.

Examples of these systems include zippered bags and small pouches that allow the user to preserve food that isn't used. According to , rounded designs and other geometric shapes are preferred by customers due to their increased aesthetically pleasing, less irksome, and appealing. Additionally, a new packaging material like fiber form could be creative because it is robust, lightweight, recyclable, and renewable. It's a smarter kind of packaging that can be shaped into three dimensions

and create unique cuts and shapes, particularly when it has a customizable design with a natural look and feel. sense. Another cutting-edge packaging trend allows customers to finish eating the contents of the container after it has been opened, is sustainable for one use, and uses 3D printing to make packages out of sugar, mushroom slices, and a gelatinous material made from seaweed.

Figure 8: Eco-friendly Packaging using 3D Printing

In order to implement this strategy, **"KFC"** introduced an adjustable coffee cup packaging in the UK in 2015. The cup is made of a wafer that is coated in sugar paper and white chocolate that can withstand heat. Furthermore, the creative packaging that vanishes after consumption is a form of sustainable packaging. For example, "MonoSol, LLC creates" water-soluble bags that dissolve and separate from the food within while it cooks.

2.6 The packaging industry's use of senses experience as an ingenious tool

Numerous alternative approaches exist to communicate with customers than just writing on a product box. You can use their sense of sight, sound, touch, smell, or any other sense to convey messages. Competitors have recently focused on the sensory experience that customers can acquire from items in a variety of ways, such as hearing, touching, and seeing, as these factors affect consumer perception. Researchers proposed that a consumer's firsthand, multisensorial experience with a product would aid in their assessment of its quality.

2.6.1 Visual

More than 80% of brand communication was predicated on the "sight sense," which is highlighted in recent marketing study as the most important sense that could influence a purchase.

2.6.2 Odor

75% of all emotions are produced daily by smell, according to. These days, brands try to leave a lasting impression on consumers by using scents in their packaging. One example of this is "Belmont," which created a sports shoe packaging that smelled like freshly cut grass to entice encourages consumers to acquire the product for the purpose of engaging in outdoor jogging activities.

2.6.3 Make contact

Taking into account visually appealing features such as texture, research supports the notion that packaging finishes have a positive impact on consumers' positive perceptions and assessments of the product within, such as when they perceive a matte container coffee brand to be a genuine brand, but a shiny package on the same brand's merchandise was seen as a capable brand. According to some researchers, such as, packaging with unusual qualities may pique consumers' interest and prompt them to remove the package from the shelf. As a result, factors like texture, color, weight, and style of the materials may improve the touching experience, which significantly enhances customer loyalty. In this context, "Naoto Fukasawa" developed the innovative packaging concept known as "Juice-Peel" or "Fruit skin," which he unveiled during the "Haptic exhibition" in Tokyo in 2004.

2.6.4 Hearing

Discovered that one's psychological condition, emotions, and moods might all be impacted by their experience hearing. Many instances highlight this, such as the 2016 launch of a specially-designed theater food packaging, which included popcorn, by the ticketing app Today Tix. The strategy intends to deliver "silent snacking" innovations, as opposed to the package that makes a loud noise when used.

Figure 9: Texture in Packages

3.0 Sampling

Five case studies from the food business made up the sample since it represents a broad spectrum of consumer preferences and encompasses the most frequently utilized products in their daily routines. Through analysis, three key dimensions were delineated by the researchers during their examination of the product packaging: attractive design, packaging functionality, and originality and creativity in packaging, as shown in figure (5). The findings of the analytical investigation could benefit and supply food industries and the sample was made up of twelve case studies from the food business since it represents a broad spectrum of customer needs and includes the most common products they use on a daily basis. Three key elements were demonstrated by the researchers when they examined the

product packaging, such As shown in figure (1 & 2), the first factor was an aesthetically pleasing design, the second was the usefulness of the packaging, and the third was originality and creativity in the packaging. The analytical study's findings may be helpful in giving food manufacturers and marketers crucial knowledge about the innovative and successful aspects of package design. As the case studies highlight emerging trends that potentially boost the products' competitive advantages, they can also help food companies and other businesses create packaging that effectively entices, engages, and persuades consumers. The connection between packaging components and the customer experience.

Figure 10: The Relationship between Packaging Elements and the Overall Customer Journey
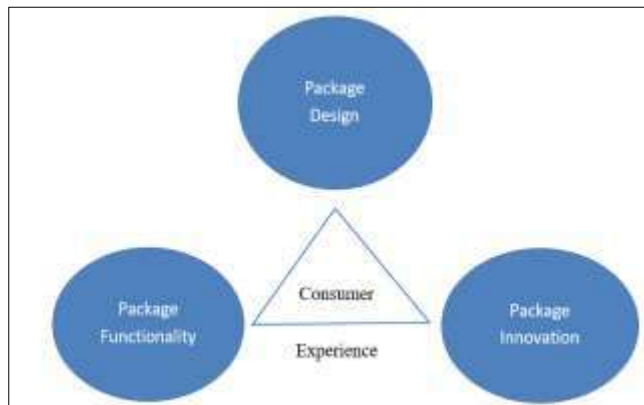
3.1 The objective of this research is to provide answers to the following questions:

- How does the product's package design affect consumers as stimulants?
- What are the latest developments in the food industry's inventive packaging?
- Which component of the food creative product packaging is the most important?

4.0 Case Study Outcomes

Table 1 illustrates the findings of the examination of case studies, which encompass as follows: Table 1. Case studies
Case 1: "Jooze" is the product name

The vibrant juice box, which looked as appealing as real fresh fruit, on the "Jooze" juice package reflects the freshness theme.

- In addition to the happy feeling and healthy style, the illustration with the unique forms shows the fruit slice with an attractive die-cut, making it easy for consumers to identify and classify the product.

- Despite the attractive appearance of the package, its functionality was low because it is difficult to hold while drinking the product, especially for children due to the straw's placement and direction during the sucking process. However, the packaging material is suitable because it protects the juice while being lightweight. The font size was unique and white like ice, with contrasts of high, medium, and low depending on the color of the real fruit.

- The straw's location and direction during the sucking process make it difficult for children to hold while drinking the product, despite the package's attractive appearance. However, the packaging material is appropriate because it protects the juice while being lightweight.

Case2: "Del Monte" is the product name:

- The packaging for the "Del Monte" product recognizes and categorizes color as a stimulant, reflecting the actual fresh color of the banana fruit.

- The bottle cover label design was creative and relied on the consumer's experience, as if they are addressing actual fruit; the cutting edges replicate the sensation of actually cutting a genuine banana, despite the inadequate use of imagery.

- The fonts on the cover help customers understand what a genuine banana feels like.

- The products are made of glass, which is more healthful than plastic packaging but is brittle when stored or used

Case 3: "Amora" is the product name

- Stand-up containers of "Amora" are distinguished by their graphic representations, color schemes, and typographic choices, effectively illustrating the ketchup and mayonnaise within. The brand name is prominently featured in a contrasting palette of red and white

- To differentiate itself from competitors, the brand strategically employs shape and hue; for instance, ketchup is associated with the color red.

- mayonnaise, on the other hand, employs the color white, which is closer to its true hue.

- The font's visual hierarchy directs the consumer's attention to the bottle's most prominent visual design features.

- The design of the product was deemed appealing, compact, user-friendly, easily resealable, protective against environmental hazards, and environmentally sustainable owing to the container's reusability post-consumption

- In the restaurant sector, another variety of product packaging incorporates a pump feature for utilizing the contents of larger containers easily without the need for manual handling. The incorporation of distinctiv humorous character designs not only establishes brand distinction among competitors but also captures consumer interest, instilling a sense of delight that potentially influences purchasing decisions.

Case 4: "Bla Bla" is the product name

- The humorous "Bla Bla" box graphics and design had a big impact since the product's many characters' reactions and colors can draw in customers and make them feel happy. Each image has a mouth full of biscuits, giving the impression that the subject is enjoying the food.

- The name of the product reflects its purpose and is intimately linked with the graphical representations.

- Utilization of a distinct font size and color in the product's initial label effectively captures consumer attention within the visual hierarchy of the bottle design. Additionally, the packaging's design is notably child-friendly, promoting the container's repurpose after the product's depletion.

Case 5: "Fruits Smart Package" is the product name

"Smart package for fruits" These intelligent packaging options are primarily found in the grocery store since the Ripe Sense sensor on them provides valuable information regarding the freshness of the meat or fruit.

- Characteristics of food items, such as their crispiness, solidity, or succulence, trigger alterations in the sensor's hue, thus facilitating consumers in determining and selecting the desired product for purchase.
- Such packaging solutions mitigate the risk of damage to the packaging since consumers are able to inspect the condition of the food without necessitating the opening of the package.
- Predominantly, smart packaging technologies for meats or fruits have adopted transparent designs, facilitating the swift and efficient assessment of the food's quality by the smart sensors.

5.0 Conclusions

Based on the study of the case studies and the review of the literature, we can draw the conclusion that packaging is an essential tool for all brands to meet the wide range of market difficulties. Rapid transformations impact the packaging industry globally for a variety of reasons, including differentiating the brand from rivals, drawing in customers, and streamlining product utilization through package functionality, engagement, and communication.

Customers, and have an impact on their purchase choices. The findings indicate that a large number of businesses made greater investments to create a distinctive and creative package using three key components. The initial aspect pertains to the visual appeal of the packaging design; the secondary aspect focuses on the practicality of the packaging, including the properties of the material, its application, and the provision of safety and the third is the use of creative and inventive solutions in the benefits and external structure of the package. These factors indicate that a lot of eye-catching packages are created and concentrated on enhancing customer satisfaction with a positive brand experience. One of the best practices in that regard is the creative application of "AR" technology, which started to integrate with the packaging function and functioned as a helpful communication tool, increasing consumer interaction by familiarizing them with the product and

augmenting this with supplementary details regarding its benefits. Consequently, it is presupposed that the application of "AR" in packaging modification based on consumer preferences may increase in the future. This might help close the gap between product packaging and customer wants by creating a memorable experience.

Lastly, we recommend that designers and marketers use innovative design, particularly in advertising campaigns, and leverage the newest technology to position products, grab customers' attention, and persuade them to buy. Additionally, businesses should uphold and fulfil their commitment to social responsibility by offering "Eco-Friendly" and "Sustainable Packages" that help the environment and customers alike. Food companies should also be mindful of the functionality of their packaging, particularly in light of the widespread adoption of "E-Commerce," which lengthens delivery times. Hence, it is imperative that they opt for materials that ensure the protection of their products, particularly during emergencies and pandemics like "Covid-19," when packaging materials need to be more secure from the point of shipment to the point of consumer delivery.

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CHAPTER 12

A Literature Review on Marketing Gamification Effectiveness

Prasad Deshpande* and Joe Lopez**

ABSTRACT

Objective: To study marketing gamification & its effectiveness on customer engagement.

Introduction to the concept: Playing games, increases our euphoric brain activity, which influences our reactions and behavior. Gamification has been shown to boost customer motivation, engagement and retention when applied to business promotion. Consequently, this increased sales, collected customer information and advanced branding.

Method: Comprehensive review of literature on marketing gamification. Summary Table is provided.

Findings: Gamification can be adopted by Banking Industries, Travel & Tourism Industries, Retail Industries, Apparel Industries. Gamification and metaverse are two different concepts and it is possible to apply in metaverse. Some the research pointed out the negative aspects of gamification like manipulation and exploitation with respect to risks and difficulties which needs to be studied in detail.

Practical Implication: The outcome of this paper will help gain an understanding of usefulness of marketing gamification in targeted markets.

Keywords: Gamification, Brand Advocacy, Community Building, Customer Engagement.

1.0 Introduction to the Term Gamification & Application in Customer Engagement

Marketing gamification has now emerged a marketing strategy to engage customers with the product and services. The application of gamification strategies leads to benefits beyond customer engagement, such as customer loyalty and brand endorsement. Understanding the concept of gamification is interesting. The term 'gamification' was introduced by Nick Pelling – a computer programmer and game developer, in the year 2002. And subsequently the term 'gamification' received popularity in February 2010, a year when D.I.C.E. (Design Innovate Communicate and Entertain) summit was organized in Las Vegas.

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Later In 2011, Deterding & et al proposed that gamification is "the use of game design elements in non-game context". This is still internationally used. Another definition of gamification is: "the process of using Game Thinking and Game Dynamics to Engage Audiences and Solve Problems" (Zichermann and Cunningham, 2011).

A renowned company, Starbucks has also adopted marketing gamification in their marketing strategies and through this strategy, company was able to attract new customer as well ensured that customer as engaged on its website. The company – Starbucks – termed this strategy as Starbucks rewards. When a customer purchases a drink at any of its outlet, customer earns some rewards and can accumulate these rewards. These rewards later on can be redeemed to purchase a drink or can be given as a gift. This way company ensured that customers remain loyal to the organization and increase the sales. During his journey, customer can reach to gold status when a greater number of drinks are purchased during a certain period.

Another example of marketing gamification is by Magnum Ice Cream. Here, company termed this strategy as pleasure hunt. In this, engaging game, customer is given an experience to move forward and backward on the website using smartphone or tablets and can get a feel to try various clothes, check in & experience stay in hotels located at different locations and even visiting spas without leaving customers' home/office. It is a virtual journey and during this virtual journey, customers remain engaged throughout its stay on website but at one point customer gets fed up by these experiences and at the same time, customer come across two variants of Magnum Ice-creams. If customer purchases first variant of Magnum Ice-cream, customer earns some points (and this is mandatory) and customer continues his journey. The ultimate reward is Magnum Caramel Ice-cream which is presented at the end which according to company is the ultimate pleasure but for the same, customer has to go through various experiences. This way company was able to engage customer for longer duration on its website and was able to portray that the final product – Magnum Caramel Ice-Cream - is only true pleasure and can get with the rewards/points earned during the stay on website.

## 2.0 Evolution of Term & Extent of Use in Different Industries

The term 'gamification' was introduced by Nick Pelling – a computer programmer and game developer, in the year 2002. And subsequently the term 'gamification' received popularity in February 2010, a year when D.I.C.E. (Design Innovate Communicate and Entertain) summit was organized in Las Vegas. Later In 2011, Deterding & et al proposed that gamification is "the use of game design elements in non-game context". This is still internationally used. Another definition of gamification is: "the process of using Game Thinking and Game Dynamics to Engage Audiences and Solve Problems" (Zichermann and Cunningham, 2011). Through Gamification, customers (players) can be kept engaged on company's

website and can be widely used in different industries. To name a few industries who actually used gamification as marketing strategy – Education, Retail, FMCG, Banking, Healthcare, Entertainment, Training, Travel & Tourism etc.

3.0 Statistical Evidences of Use & Impact of Gamification

Figure 1 gives us statistics that Gamification has its presence in following industries worldwide – Education - 4%, Financial – 4%, Entertainment – 18%, Retail – 9%, Healthcare / Wellness – 4%, Consumer Goods – 10%. So, there is lot of scope in each industry to adopt gamification as marketing strategy. As technology is evolving day-by-day, marketer can formulate a gamification strategy frequently. In order to make certain that customers' (players') behavior is in organization's best interest and promote customers' (players') retention.

Figure 1: Gamification Latest Industry Statistics

Source: https://images.app.goo.gl/FGNHXgZ5Z2AXnmKF9
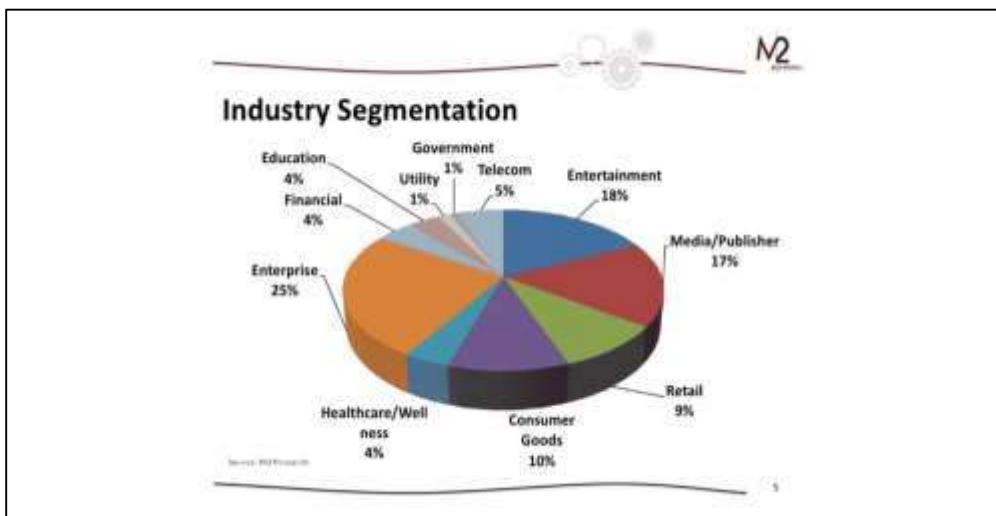
Figure 2 stressed on how employees of an organization remain engaged and become more productive only if gamification strategy is adopted in HR domain. 90% of employees claim that gamification increases productivity. Gamified tasks increase employee retention by 69% for employees who have worked for the same organization for more than 3 years. In short, retention of employees can be experienced and other activities of HR can be reduced or at times can be omitted. 72% of people believe that gamification inspires them to work harder, meaning that sense of belongingness is increased and employee remains engaged which other would have been a difficult case. 95% of employees enjoy using gamified systems ensures that employees enjoy the work creating no disturbance.

Figure 2: The Impact of Gamification
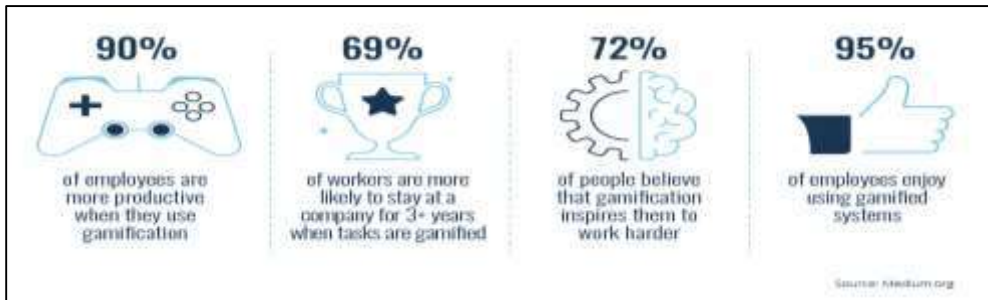
Figure 3: Retail Gamification

Figure 3 throws light on human behavior or human psychology, the technology and customer experience within retail sector. The competitive nature of humans makes them easily motivated. Being competitive is an attribute that goes back to the pre-civilization era and the same aspect can be even experienced today. This aspect – being competitive – can be included in the marketing strategy and plays a very vital role for gaining success. Now since the advancement of science and technology, marketer can take help of it and through technology, customers need can be identified at the same time marketers can provide solutions to the needs.

Figure 4 gives us details about the Gamification Market and its potential. In the year 2022, Market size was USD 12.4 B, where as it is predicted that in the year 2030, the market size would be USD 70.4 B. Also, market growth is expected to be 24.2% till the year 2023. Alone in North America revenue generated in the year 2022 was more than 40%.

Figure 4: Gamification Market

Source: https://www.psmarketresearch.com/market-analysis/advanced-distribution-management-system-market

4.0 Literature Review and Analysis

Table 1: Literature Review and Analysis

Title/Author/Journal /ISBM/DOI/Pg. No.	Research Objectives	Research Method (Sample/Test Statistics/ Geography/Segment)	Findings (Observation/ Findings)
Title - Gamification & Service Marketing. **Journal** - Springerplus 2014, 3:653. **Authors** - Roger Conaway, Mario Cortes Garay, **DOI:** http://www.springerplus.com/ content/3/1/653	**RQ1:** What characteristics attract consumers toward an enterprise's website that seeks to engage them online? **RQ2:** What implications can be drawn about assessment of gamification from a customer perspective? **RQ3:** What important characteristics do Latin American managers perceive to exist to incorporate gamification techniques in their enterprises?	500,000 thousand participants from 190 countries. These participants were registered on Amazon's Mechanical Turk (Mturk). Customer Survey was posted online in Spanish University for students & professors.	Important findings from data collected from two distinct customer segments included the existence of strong business relationships, rewards, increased competition and enjoyment features that companies may find helpful while using gamification.
			Customers will interact with websites primarily when they start with a simple task and work their way up to more difficult ones. They will be looking for quick satisfaction in the form of monetary and virtual incentives. If customers gain authority, responsibility or leadership as they advance like having a role in decision or helping to build a product – they can forgo these immediate rewards.

Title: An investigation into gamification as a customer engagement experience environment. Journal: Journal of Services Marketing September 2015 Author: Tracy Harwood, Tony Garry DOI : 10.1108/JSM-01-2015-0045	To provide empirically generated insights into a gamification approach to online customer engagement and behavior (CE & CEB).	Samsung Nation as a unit of analysis, a mixed methods research design using netnography and participant observation	The findings identify key processes and outcomes of CE and CEB within virtual gamified platforms. Insights are provided into implementation flaws deriving from gamification that may potentially impact the CE experience.
Title: Unlocking Customer Engagement: The Impact of Gamification in Modern Marketing Strategies. **Authors:** Mr. Rohith N.R, Ms. Sahana S Naik, Mr. Mohan Nayak H L, Mr.Kishore M, **Journal :** ECB ISSN No: 2063-5346 Date of Acceptance: 24/06/2023 **DOI :** 10.31838/ecb/2023.12 .6.92	(1) To explore the role of gamification in enhancing customer loyalty and brand advocacy. (2) To investigate the impact of gamification on consumer behavior, including motivation, perception and purchase intentions, (3) To identify the challenges and limitations of implementing gamification in marketing and purpose strategies to overcome them.	literature review	Gamification has emerged as a powerful approach to enhance customer loyalty, drive brand advocacy, and influence consumer behaviour. By integrating game design elements into marketing strategies, businesses can motivate and engage leading to increased satisfaction, loyalty, and positive brand perceptions. Gamification influences consumer motivation by providing intrinsic and extrinsic motivators that stimulate engagement and participation. It enhances consumer perception by creating enjoyable and interactive brand experiences, fostering positive attitudes and trust. Gamification influences purchase intentions by leveraging rewards, exclusivity, and progress tracking to incentivize consumer behaviour.
Title: Integrating five theories in pursuit of marketing success in gamification interventions: A Conceptual Paper **Author:** Freddy Marilahimbilu Mgiba **Journal:** International Review of Management and Marketing 2019, 9(2), 45-53 **ISSN :**2146-4405 DOI**:** https://doi.org/10.324 79/ irmm.7174	Despite the growing attention to gamification, few studies have theoretically explained how and why adopting game elements influences user engagement,there is a general dearth of academic literature examining the expected adoption of gamification marketing campaigns (Lucassen and	literature review	GM's proposed model Proposition 1: The customisation of gamified applications is positively impacted by accessibility (Acc); Proposition 2: The congruence and flow communication in GM is positively impacted by customisation (Custo); Reciprocity 3: Target customers will be motivated to continue using gamified applications by feelings of reciprocity (Recipr); Proposition 4: Congruence perceptions (Congru) and flow communication have a motivating effect on GM; Proposition 5: Congruence and flow communication (flow) mediate the relationship between customisation and target customers' motivation levels; Propositions 6 and 7 state that appealing technology (Attr) has a motivating effect on users, that

				gamified game costs should be balanced with the benefits that customers receive (Recipr) to encourage users to play the games, that target customers who are engaged and motivated (Motiv) are more likely to improve their intentions to engage with GM, and that customisation (Custo) of GM will positively impact users' motivation to interact with the application.
Title: Gamification in Management: Analysis and Research Direction **Author:** Vanissa Wanick, Hong Bui, **Journal:** International Journal of Serious Games **ISSN:** 2384-8766 **DOI:** http://dx.doi.org/10.17083/ ijsg.v6i2.282	(1) How can gamification be employed as a management strategy in a digital transformation era? (2) What is the main purpose for the employment of gamification in management contexts? (3) What is the future of the employment of gamification in the era of digital transformation in business organization?	reviews the published literature involving the study of gamification being applied to various management fields, including organizational studies, human resource management, marketing, finance, logistics and supply chain, and corporate governance. The systematic review		Applications that are gamified are used for community development, brand loyalty, engagement, incentive, tracking, persuasion, and productivity. The techniques are boosted by the collection of points, leaderboards, and in certain cases, badges, and they entail specific rewards systems. Gamification may be a useful tool for strategy and creativity if used properly. It's feasible that gamification will be used differently in different countries, which presents another chance for study in this field, especially when it comes to gamified applications that look at personalisation.

Table 2: Use Cases of Gamification

Sr. No.	Company	Sector	Strategy used	Results achieved
1	Google pay	Finance	Users had to accumulate "stamps" by using the app to make purchases, requesting stamps from friends, sharing stamps, and so on. Upon completion of the stamp collection, the user will be awarded INR 251.	By using this strategy, app usage rose by almost 40%.
2	SAP	IT	SAP has released the Roadwarrior App, effectively gamifying work. This software facilitated employee training and development for the sales and customer facing teams. To finish the training materials, the personnel merely needed to utilize the app to read articles, watch videos, finish sales kits and take quizzes. In return for the points they accumulated, they were given badges and a place on the leaderboard.	Overall the exercise was favourably received by SAP's sales leaders, who not only gained deeper insights into their customers but also reported greater productivity, motivation and confidence.

3	Atomic Wallet	multi-cryptocurrency non-custodial wallet	To win Polygon tokens for their in-platform wallets, users had to correctly answer a number of Polygon related questions. All participating gamers were entered into a raffle to win the prizes.	Over 256k unique players and 95% game completion were seen in Atomic Wallet's Polygon Jeopardy campaign. In addition to educating users about Polygon, it prompted increased activity on the platform.
4	Coca-Cola engaged visitors at their exhibition booth?	FMCG	They chose to create a drop game and a wheel of fate. These interactive exercises incorporated the brand's beliefs, statements, and merchandise into an entertaining experience for players at the exposition booth. The games were projected onto an enormous LED screen so that everyone could watch while others played. This captivated the curiosity of both those who were waiting for their turn and those who weren't playing but still wanted to witness the fun.	Throughout the course of the gamers' game sessions, Coca-Cola also had a lively host on hand who engaged with them and offered advice and support. Long-lasting visitor engagement was facilitated by the immersive experience that was created with the use of images, auditory signals and human connection. Over 200 gameplays were gathered in total throughout the 7-hour demonstration time, demonstrating the effectiveness of this strategy.
5	Euronics	Electronics	A very similar game to Candy Crush was made by Euronics, and it was incredibly interesting. The only thing that was different was that you had to match JBL Live Pro 2 headphones instead of candies. You received more points the more headphones you matched.	In addition to over 3300 unique leads, they received over 6100 unique page views and over 54000 games started. The astounding 16.2 minute average customer involvement time.

5.0 Analysis and Observations

While carrying out literature review, following observations can be prominently seen

1. Through Gamification, company can engage customer(players) and ultimately motivates them to a particular behavior either to purchase a product or avail a service.
2. Through Gamification, it is expected that brand loyalty to increase, recognition of a brand, and ultimately, customers are induced to purchase a product, resulting increase in revenue.
3. To give unique experience to customer(player), retailer must have a clear goal and well designed and developed App and a website.
4. Well designed and developed App and website, should not deceive customers/players nor they should be harmed or manipulated.
5. Gamification can be an effective tool for innovation if uses carefully. It's also feasible that different countries will have separate versions of gamification,

taking into differences in culture, lifestyle, technology and customer (players) education levels.

6.0 Conclusions

With the objective marketing gamification and its effectiveness on customer engagement, this paper presented a study of various organizations where gamification strategy was applied or is used in the industry. Also, this paper stresses that customer engagement is possible with the help of marketing gamification. Marketing Gamification are used in sectors like Retail, IT, FMCG and Electronics. In many cases, gamification can be used in education also. The further research can be carried out in Healthcare, Education, Retail, Training and many more sectors. The crux of gamification lies in the human behavior or human nature. Every individual is interested to remain competitive and if this behavior can be confronted with fun element, human being can remain engaged. Since humans are social beings and they like to share their engagement, achievement with their loved ones. With the help of technology, sharing an achievement is possible, particularly through social media. This behavior of customers if captured properly by marketer through gamification, companies can enjoy the benefits through brand loyalty. The customer's distinct experience will bring him/her to the social media of the company and desire will increase to check what's new the company is offering. The result of this desire can fetch a customer badges, points, rewards, digital currency (in some cases) and top ranking on leaderboards which in itself is an achievement. These badges, points, rewards, leaderboards, digital currency can be exchanged in the physical store while purchasing products.

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CHAPTER 13

Consumer Behavior in Advertising

Priyanka Kunjir*

ABSTRACT

Consumer behavior is the actions and decisions that people make when they select, buy, use, and discard a product or service. It is a process by which prospective consumers identify their requirements, acquire information, find alternatives, and make the buying/ purchase decision. It is a sequence of possible courses of action made by the consumer before having a buying eagerness and then the decision. The six main stages of the consumer buying behavior process are Need recognition, Information search, Alternative evaluation, Purchase decision, Completing the purchase, and Post-purchase evaluation. The basic attributes of consumer behavior are demographic aspects like age, gender, cultural background, and occupation, and psychographic aspects like emotions, values, urges, and lifestyle. Understanding consumer behavior is completely necessary for the sale of a product or service. It digs into how useful the product is, how pleased they are with it, and how much it is worth to fulfill their requirements. This research paper will be helpful to advertisers in understanding the willingness, wanting, and satisfaction of the prospective consumer.

Keywords: Consumer, Willingness, Behavior, Decision and sale.

1.0 Introduction

The research on how advertisements affect customer behavior has been played vital role in helping businesses connect with a wide range of prospective consumers. Prospective consumers come under broad and diverse categories. Advertisement has helped companies/ brands to reach out these varied consumers. Depending on the calibre of goods and services provided in the market, and cultivate a devoted following of customers. The venues for advertising that are currently recognized in the modern business world accept the existence of digital technology. A company may better understand the interests of its target consumers by focusing on social media and the online marketplace. Given that a substantial portion of the target market views the internet marketplace as the most convenient location to make product orders, starting a business in a free-market economy necessitates taking the initiative to engage in digital marketing. Through sales promotions and commercials, the company's marketing and advertising managers must grab customers' attention.

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Reaching consumers and influencing their opinions, purchasing patterns, and knowledge of specific products or services is the primary goal of advertisements. Advertisers want to sway consumer's decisions and decision-making processes in accordance with their advertisements and marketing objectives. Advertisers utilize a variety of medias to contact consumers. The influence of each media on the behavior of customers varies. The purpose of advertisements is to contact people and ask for their opinions about various goods and services. Advertising directors utilize this input to enhance the calibre of their goods and services.

Marketers employ a variety of advertising strategies based on how they hope to persuade potential customers. It is important to remember that every strategy seeks to encourage customers to purchase their goods and persuade them that a certain product offers greater value than comparable ones within the market. By exploring the many commercials that advertisers use to keep customers loyal and connect with them in the competitive marketplace, the research demonstrates its significance. For example, the two most well-known categories of commercials are rational and irrational ones. Informational ads, in which the advertisers concentrate more on the product's features, are examples of rational commercials. Rational advertising communicates a brand's product advantages in a direct way, using factual benefits of their product or service. However, irrational commercials highlight the emotions and social impacts of their target audience. Emotional advertising tugs on the heartstrings. It's not about what your product does, it's about how it makes your customer feel. Therefore, it is quite certain to accept the logic that knowing how advertisements affect consumer behavior is important for enhancing society's standard of living and for establishing the positions of consumers in the competitive marketplace.

2.0 Literature Review

As per the study by Bill Gates he states, "Your most unhappy customers are your greatest source of learning." As per the observation of Steve Jobs he says, "You've got to start with the customer experience and work back toward the technology, not the other way around." As per the analysis of Shep Hyken he says, "Customer service is the experience we deliver to our customer. It's the promise we keep to the customer. It's how we follow through for the customer. Its how we make them feel when they do business with us." As per the study of Seth Godin he quotes, "It's easier to love a brand when the brand loves you back." As per the observation of Chip Bell he states, "Loyal customers, they don't just come back, they don't simply recommend you, and they insist that their friends do business with you."

3.0 Methodology/ Approach

As per the qualitative method, data is collected. This method is used to identify consumer's needs, desires and motivations. As per the study, the factors

influencing their decisions while making purchases, be it ease of use, social standing, psychological satisfaction, or usefulness are recognized. The consumer's journey from awareness to buying and beyond is planned. Considering the touchpoints – online, traditional, social media and in store media where advertising can affect the behavior of consumers. Craft advertising messaging that speak to the needs, values and ambitions of your target market. To construct engrossing narratives that trigger desired reactions, use persuasive languages, storytelling techniques and motivating factors. Utilize behavioral economics, fundamentals to encourage desired consumer behavior. This may involve employing strategies

- sway decisions,
- scarcity,
- social proof,
- cooperation
- positioning

Always keeps an eye on customer feedback and campaign updates depending on outcomes. Retain honesty and integrity in your advertising methods. Steer clear of manipulative or dishonest strategies that could erode consumer confidence and damage your brands reputation. Advertising tactics are modified to stay relevant and appeal to the target audience. By taking this method, advertiser's gains inputs on how consumers behave and create ads that are more engaging, loyal and eventually increasing sales. Thus, qualitative method and content analysis method of research is applied in this paper. For this study work, different news articles, journals, television ads and their message were examined. In this research paper, content analysis was done to gain a deeper knowledge of the perspective of Indian Advertisements, their influence and their effects on the mass audience. Additionally, data was gathered using an observation tool.

4.0 Findings/ Results

The broad topic of consumer behavior in advertising include a number of subtopics, such as:

1. Effectiveness of different advertising channels – Comparing the effectiveness of digital channels (social media, online advertisements, influencer marketing) to traditional channels (TV, print and radio) will help determine which is more effective at influencing consumer behavior.
2. Effect of Advertising appeals – Examine how different types of advertising appeals (emotional, rational, fear based, humour etc) affect consumer behavior and purchase decisions.

Examples:

Emotional appeal

Ikea Brand – 'This ad can change your life as you know it'

Swedish Homeware retailer Ikea had a strange request for customers when promoting its range of cribs. This ad incorporated a hidden pregnancy strip and encouraged potential mothers to urinate on the ad and wait for the results. If the result was positive, customers then could take the ad into their nearest Ikea store and buy a brand new crib at a discounted price. Ikea collaborated with Swedish Agency Holst and Mercene Labs in the making of this ad.

Figure 1: IKEA Print Advertisement

Source: https://campaignsoftheworld.com/print/ikea-pee-ad/attachment/ikea-pee-ad-cotw-1/

Humorous appeal

Mentos Chewing Gum – Dimag ki batti jala de.

Perfetti Van Melle, the $ 1.3 Billion confectionery giant launched its Indian Operation in1994 with one brand Centerfresh. From that one brand it has grown to command a 25% value share in Indian confectionery market with around 13 brand that include Alpenliebe Chlormint, Mentos, Big Babool, Coffitos, Marbles, Centershock Fruitella etc. Mentos is its brand in the 1200 crore sugar confectionery market in India. The brand comes under the category of Chewy dragee. Dregee is a candy with smooth and relatively hard candy coating.

Worldwide Mentos is positioned on the freshness platform, the baseline being "The Freshmaker". Here in India, initially the brand was launched in the

freshness platform but later the brand has slightly extended the global positioning from Freshmaker to Smart thinking. The baseline "Dimag ki Batti Jala De" has been an instant hit with the target audience.

The campaigns are humorous and simple and O&M has been able to move flexibily with this "smart thinking "platform. Perfetti is known for its clutter breaking ideas and campaigns, the success of the horrible tasting Centershock is a proof of the marketing acumen of Perfetti. The campaigns of Chocotella and Chlormint has created a humour fashion in confectionery ads which resulted in a clutter of confectionery ads which claims to be humorous.

Perfetti has been very successful in launching this brand although market share figures for individual brands are not available. Besides spending enough money on brands, the company has also strengthened its distribution network. The brand has also been able to capture the 50 paise price point making it affordable. The target group is the youth with a cool attitude who considers themselves to be smart. Confectioneries comes under the low value, low involvement impulsive product in the convenient goods category. Here much one has to maintain the brand's share of mind and share of voice since the purchase is impulsive. Although Mentos is a sugar confectionery, it is perceived to be in the mouth freshener candy category. With the smart advertisement, this brand has created a place for itself in this category.

Figure 2: CenterShock

Source: https://www.youtube.com/watch?v=eD3RC5Y701k

4.1 Role of celebrity endorsements

Examine how celebrity endorsements affect consumer attitudes and purchase patterns, taking into consideration audience demographics, product consistency and

celebrity reputation. Brand ambassadors from a pool of famous celebs from all domains are hired to promote a particular brand, bringing in an audience that connects to that particular celebrity. Here are a few top go-to celebs in India for Branding your product the right way:

Aishwarya Rai Bachchan: She's been the backbone of the Loreal marketing strategy, working as its brand ambassador for many years in a row. Her other brand endorsements include Lux, Pulse polio campaign and Coke**.**

Figure 3: Aishwarya Rai Bachchan – L'oreal

Source: https://www.pinterest.com/pin/740138519994643024/

Amitabh Bachchan: Amitabh Bachchan is associated with both, commercial and government campaigns. He is the Brand Ambassador for the City compost campaign, Awareness of Hepatitis campaign and big brands like Cadbury, Dabur, and Emami.

Figure 4: Amitabh Bachchan – Commercial Campaigns of Cadbury

Source: https://creativethinksmedia.com/best-of-big-b-the-king-of-indian-advertisements/

Hrithik Roshan: Along with promoting his own online brand HRX, he has worked in campaigns by Mountain Dew, Oppo Mobile, and Tata Tigor.

Figure 5: Hrithik Roshan – Tata Tigor

Source: https://www.mediainfoline.com/advertising/mountain-dew-unveils-tvc-hrithik-roshan

Katrina Kaif: One of the few ladies that represent the Lux brand, she has also worked with Shahrukh Khan in Lux campaigns. Other Brand ambassador deals include Etihad Airways, Pantene and Spice Telecom**.**

Figure 6: Katrina Kaif – Titan Raga

Source: https://www.campaignindia.in/video/titan-raga-shows-sprightly-katrina-kaif-in-new-tvc/415690

Virat Kohli: Another star cricketer who recently teamed up with his Wife for the Manyavar Mohey campaign. His other endorsements include Cinthol, Nike, Fasttrack, Pepsi and Flying machine.

Figure 7: Virat Kohli & Anushka Sharma – Manyavar Mohey

Source: https://www.advertgallery.com/newspaper/manyavar-mohey-celebration-wear-for-mens-and-women-ad/

M. S. Dhoni: India's Captain Cool started on his amazing run of campaigns after a successful career in the cricket world. Being an avid fan of bikes himself, he is the Brand ambassador of TVS motors and Exide. Along with those, there is Titan Sonata, Aircel and Bharat petroleum.

Figure 8: MS Dhoni – TVS Star City

Source: https://ar.inspiredpencil.com/pictures-2023/tvs-star-city-with-dhoni

Varun Dhawan: Due to the recent movie of the young star, Sui Dhaga, he and is co-actor Anushka Sharma are the official brand ambassadors of the Skill India campaign. Other endorsements include Frooti, Lux Cozi, Reebok, and Maruti Suzuki Arena.

Figure 9: Anushka Sharma & Varun Dhawan - Skill India campaign

Source: https://www.latestgkgs.com/current-affairs-4479-a
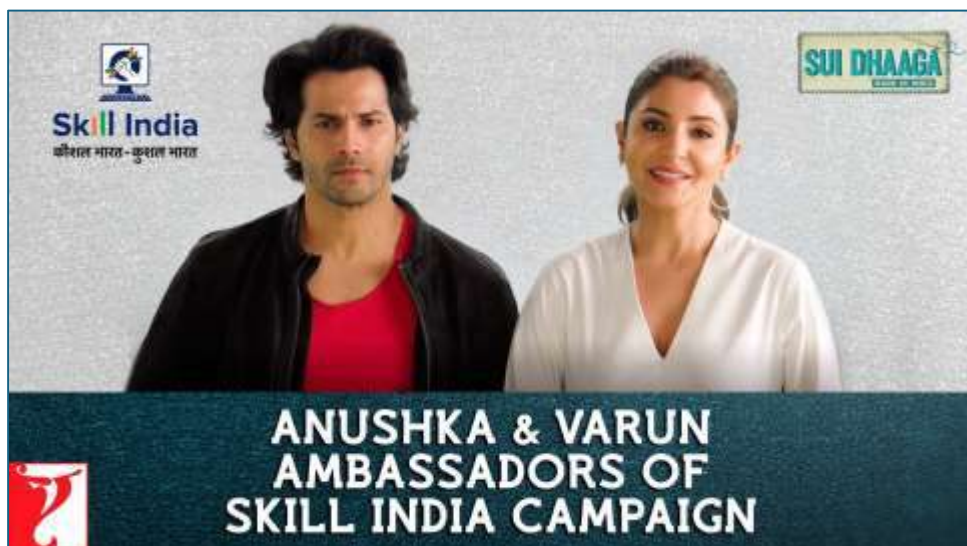
The list of brands that Akshay has worked with over the years is quite impressive and includes Thumps Up, Dollar Industries, Kurkure, Massey Ferguson, Policybazaar, Lodha, Sparx, Honda, Fortune Cooking Oil, Berger, Horlicks, Emami, Mylab, Harpic, Prince, PagarBook, Peter England, GOQii, and many more.

Figure 10: Akshay Kumar – Thumps Up

Source: https://www.scoopwhoop.com/humor/stupid-indian-ads-2/

Shahrukh Khan: Recently, the detergent brand Tide announced Shah Rukh Khan as their brand ambassador. Besides this, he endorsed several brands, which include Everest Spices, Rungta Steel, Sunfeast Dark Fantasy, FabriCare, the ICC Men's Cricket World Cup, Realme, Myntra, D'YAVOL X, and Ultratech Cement. His business endeavors also have a strong relationship to Dubai. He serves as a brand ambassador for Dubai Tourism's "Be My Guest" campaign, which highlights the friendliness and attractiveness of the city. His support has greatly raised Dubai's status as a popular travel destination worldwide.

Figure 11: Shahrukh Khan – Dubai Tourism

Source: https://www.hindustantimes.com/entertainment/bollywood/dubais-burj-khalifa-wishes-shah-ruk h-khan-on-his-birthday-with-a-bright-message-101667450716975.html

Ranbir Kapoor: Oreo, Lenovo, Coca-Cola, Lays, Virgin Mobile, Asian Paints, Renault, Panasonic, Tata Docomo, Flipkart, John Players, TAG Heuer, Yatra.com, and Askme.com are a few well-known brands that have been endorsed by Ranbir Kapoor. Through these endorsements, he raises his brand awareness and gains clout with a wider range of consumers.

Figure 12: Ranbir Kapoor – Tagheuer

Source: https://www.advertgallery.com/newspaper/tag-heuer-aquaracer-beyond-the-edge-ad/
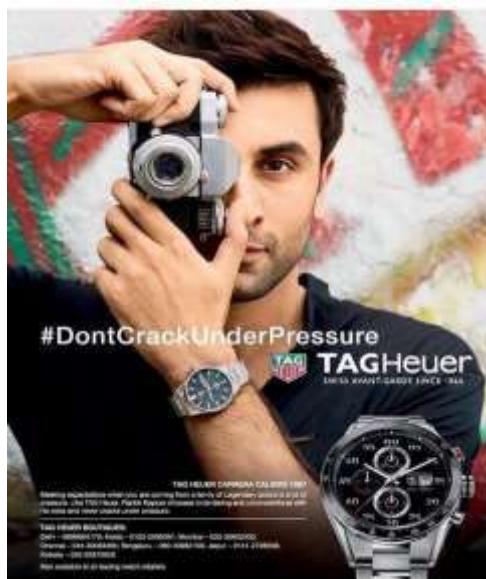
Cross-Cultural Perspectives: Examine how consumers' responses to commercials are influenced by cultural context and consider how marketers should adapt their campaigns to suit various cultural contexts.

Consumer culture is observed to be influenced by the employment of several advertising tools in India, including celebrity endorsements, comedy, language, clothes, religion, patriotism, festivity, and lifestyle. Other emotionally engaging elements utilized in Indian advertisements were romance, technology, family, friendship, and the surrounding environment. However, there is no disputing that Indian commercials have influenced society in both positive and harmful ways, contributing to the development of gender stereotypes, conflicts between religious and ethnic groups, and occasionally deceiving young people.

Another factor contributing to the stereotype of Indian women is advertising from India. She is consistently portrayed as the ideal housewife, mother, and daughter-in-law. A picture of her making sure everyone is happy and taking care of them all becomes the standard for society as a whole. It is important to remember that some members of our society lack the education necessary to understand that an advertisement is merely a depiction of a product, not a reflection of the needs or demands of the general public. It influences people, and they respond to it similarly. Children now make up a sizable portion of the consumer base, possessing both influence and spending power. However, it's important to note that kids lack the capacity for judgment and analysis. They are unable to assess the veracity of the material and distinguish between marketing and entertainment.

Additionally, certain Indian advertisements that use sensuality in their branding are posing ethical questions. Although the advertisements are aimed at young people, who are often accepting of such imagery, this is inappropriate given that a wide range of the target audience watches the ads and some may not find them appealing.

In India, a few crucial elements exist. Respect for one's elders, mother-son relationships, wife-husband relationships and the observance of important festivals are among the important features of Indian culture.

Respecting one's elders is a tradition in India, as it is in many other Asian nations. One way to show respect for one's elders is to address them not just by name but also with suffixes like "ji," which in Hindi implies respect, or something similar. For example, in cricket, the most popular game in India, junior players address veteran players as "Bhai," which translates to "elder brother." In contrast, this is rarely, if at all, done in other nations like England and Australia. In addition, customers eventually purchase products based on underlying values rather than superlatives. This means that effective advertising must resonate with consumers on both counts. As a result, this concept appears frequently in Indian advertising.

In Indian culture, mother-son relationships are unique. For this reason, well-known Indian films such as "Deewar," starring Amitabh Bachchan and Shashi Kapoor, who plays a sons role and Neerupa Roy in Hindi cinema, who play a son and

mother, respectively, serve as good examples of this idea. For example, one seldom often, if ever, sees a hero in English films promising to always love and respect his mother. This is a typical scene in Indian movies.

Even now, in Indian movies, the special mother-son relationship is highlighted. For instance, in the Hindi movie "Helicopter Eela," the heroine (a famous actress named Kajol), a single mother, and her adult son both go to college together. This film (released in 2018) prominently features the special relationship this mother has with her adult son.

Similarly, mother-son relationships cover all sectors and are regularly featured in Indian advertising. Vicks Vaporub, a P&G-owned product that is said to relieve cough, congestion, and colds, is shown to foster a stronger link between a kid and his mother when the latter uses it on the boy when he is sick.

In a similar vein, "Complan" helps a boy grow taller and allays the anxieties of the worried mother. In India, adult males also form strong bonds with their mothers, not simply male children. More recently, Nokia has featured an adult guy who is too preoccupied with his employment to spend time with his mother. That's why the mother is furious. In order for his mother to stay in contact, he offers her a Nokia phone.

From the era of the Indian epics the Ramayana and Mahabharata, this facet of Indian culture has been passed down. The main heroes of the Ramayana, Ram and Seetha, are a husband and wife team that stick together through good times and bad. Hinduism's holy book, the Manu Smriti, declares that "husband and wife must respect the eternal bond of matrimony." The reason the husband-wife relationship is so sacred in India may be due to the subtle effect of these scriptures that have been passed down through the generations for hundreds of years.

It's possible that the "Pati-Pathni" (husband-wife) relationship is unique everywhere, which explains why weddings are significant in practically every culture. But this bond is not just unique, but potentially even essential in India. India is predominately a Hindu nation, and Hindu marriage is a serious and holy institution in which the husband and wife coexist peacefully and support one another's "faithful progress."

Furthermore, the spouse is viewed by the wife as a god or divinity. Even though times are changing, India still has a lot of these old ways of thinking. Four days after the full moon day in October or November, women in northern India observe a fast called "Karva Chauth" in honour of their husbands' health. This is exclusive to India. Some advertisements, like this one from Hero Motorcorp, incorporate this with ease. A self-assured young lady rides a Hero scooter to work, is preoccupied with her career, and fasts for Karva Chauth—another distinctively Indian holiday—while her spouse plans a lovely moonlit meal for her that takes her by surprise.

About 80% of people in India are Hindu, making up the majority of the population. The primary festivals in India are Diwali, which falls between October

and November each year, Pongal, also known as Makar Sankranti, Ganesh Chaturthi, which falls between September and October each year, and Ramzan, which is observed by the large Muslim community. The majority Hindu community celebrates these three festivals. Hindus celebrate Diwali by donning new garments and popping crackers; in certain parts of India, they also purchase new durables, appliances, and electronics. People honour the sun god on Makar Sankranti Day, which is known as Pongal in southern India. This day also signifies the sun's ascent from Capricorn to Cancer, or from south to north, and is very important. This typically signifies a fresh crop's harvest.

Diwali is observed by buying and wearing new clothes, relishing in sweets, giving gifts to friends and family, and bursting crackers as a symbol of the triumph of good over evil. The features listed above are common in Indian advertisements. The Indian retailer Pantaloon, which specializes in clothing, features a young woman making friends with a man who also happens to be her brother's buddy. Over Diwali and brand-new Pantaloon clothing, they become close and fall in love. The commercial heavily incorporates the Diwali theme (crackers, fresh outfits, and sweets). Lenovo also displays the spirit of Diwali. A cab driver gives his son a Lenovo laptop, asks him to sit in the back, and tells him he needs to advance financially and become a corporate leader (with the Lenovo, of course!). As a result, a variety of goods highlight elements of Diwali, a significant component of Indian culture. For example, the Pongal theme is used very well by Britannia Milk Bikis, a well-known brand of biscuits that are enriched with milk. On the day of the celebration, they boil milk and let it boil or overflow outside the pot, signifying an abundance of prosperity and happiness. When the mother doesn't feed the child enough milk, the child uses Britannia Milk Bikis.

It's also noteworthy that certain businesses adapt their advertisements to various languages and geographical areas. For instance, a young couple celebrating Pongal in a forest retreat is depicted on Amazon (a Tamil advertisement; Tamil is the official language of the state of Tamil Nadu in south India). This demonstrates how Amazon adapts its advertisements for different occasions and/or geographical areas.

5.0 Negative Aspects of Indian Culture and Advertising

An example of this is India's fixation with fair or light-coloured complexion. There is a common belief in India, among many other places in the nation, that "fair skin is beautiful while dark skin is not." Numerous brands cater to this idea, such as Fair & Lovely (owned by Unilever's Indian division) and Fairever (owned by Cavinkare, an Indian firm). They have been reinforcing this idea in their advertising for a long time, and by taking advantage of this unfavourable perception, they have achieved enormous sales volumes.

One black young woman in the advertisement is turned down by her parents. Following her use of Fair and Lovely, she develops fair skin, becomes extremely

successful, is sought after by airline corporations for the position of air hostess, and is also admired by attractive men. Although it is ethically unacceptable corporations have catered to near-racist stereotypes and made money from them.

But lately, perhaps as a result of social media's influence, corporations might be toning down these messages. This advertisement highlights how Fair and Lovely maintains one's skin fresh and protected. As a result, the recent advertisements have tempered the idea that "fair alone is lovely." Therefore, it may not be able to cater to such negative cultural sensitivities as it was in the past. Businesses could find it safer to stay out of these kinds of disputes.

Nonetheless, advertising has the potential to modify certain unfavourable cultural sensitivities. For example, women who are menstruating are generally forbidden from going into the kitchen, and especially from handling pickles, in Indian households.

P&G features a young woman getting her menstruation and touching the pickle in an advertisement. The goal of this advertisement is to modernize and update cultural elements that are antiquated.

Similarly, there was a clear preference for male children in several Indian states. Women would frequently terminate their unborn children in the early stages of pregnancy after realizing they are having a female kid; this is similar to female infanticide. The Indian government launched a campaign known as "Beti Bachao, Beti Padhao," or "save the girl child," in an effort to oppose these harmful cultural preconceptions. Prime Minister Narendra Modi is seen in this advertisement strongly urging people to treat boy and girl children equally and to stop discriminating against girls.

5.1 The following are the main points to remember from this subsection

In the past, advertising would take advantage of unfavourable cultural sensitivities; but, in the modern era, this is becoming less common. This is not just unethical, but it might not even be wise. Instead, advertising should concentrate on improving these damaging aspects of Indian society; everyone would benefit from this. Brands will enjoy a rise in sales and be viewed as more responsible by the public, which will benefit society as a whole.

Consumer Decision-Making Process: Examine how advertising affects the psychological aspects of consumer decision-making as well as each step of the process (awareness, contemplation, purchase, and post-purchase evaluation). Four psychological factors—motivation, perception, learning, and attitude or belief system—have an impact on consumer behavior. Motivation relates to the consumer's inner demands. Being able to inspire confidence in your customers is an effective strategy. Brand Loyalty and Repeat Purchase Behavior: Examine the ways in which advertising efforts help increase customer repeat business and brand loyalty.

When people stick with a brand even when competitors are providing comparable goods or services, this is known as brand loyalty. Customers not only

keep interacting with and buying from the same brand, but they also develop favourable perceptions of it. In summary, brand loyalty is a key factor in determining how consumers behave and interact with brands. It encourages repurchases, builds confidence and trust, encourages word-of-mouth advertising, creates emotional bonds, and improves client retention.

Example - Customers at Amazon have a remarkable level of brand loyalty, particularly because of its Amazon Prime service. Free two-day shipping, video streaming, and Prime Day specials are just a few of the perks that draw users to Amazon every day.

Figure 13: Amazon Prime

*Source: Amazon.in: Amazon Prime - 30 Day FREE Trial*

This week marks the 15th birthday of the iPhone, which continues to be one of the most widely used smartphones worldwide with a sizable and devoted fan base. It is difficult for a user to leave Apple's walled garden after they have entered the company's ecosystem of products and services, which is well-known.

In terms of happiness and brand loyalty, iPhone users in the US outperform customers of every other brand, according to data from Statista's Global Consumer Survey. When it comes to customer satisfaction, 29% of iPhone customers reported being pleased and 64% stated they were extremely satisfied with their present smartphone. With 58 and 33, respectively, Samsung, Apple's biggest rival, was also the brand that most closely matched Apple's customer satisfaction rating.

Ethical Considerations in Advertising: Assess the moral effects of various advertising tactics and how they affect customer perception and brand trust. Advertisers with purpose entails taking an inclusive, responsible, and moral stance. Consumers want brands to be genuine and purpose-driven, especially in the face of uncertainty and change. Marketers can significantly impact their organizations by using purpose-driven marketing to foster customer loyalty and increase company value. How to build trust is the key question in this area. Putting customers and

communities first is how leading with values builds trust. Authenticity and real, customized experiences combined with a moral advertising approach are crucial.

Figure 14: Apple

Source:https://th.bing.com/th/id/OIP.YkUYy-3OjZiexUyY2VotmAHaIS?rs=1&pid=ImgDetMain
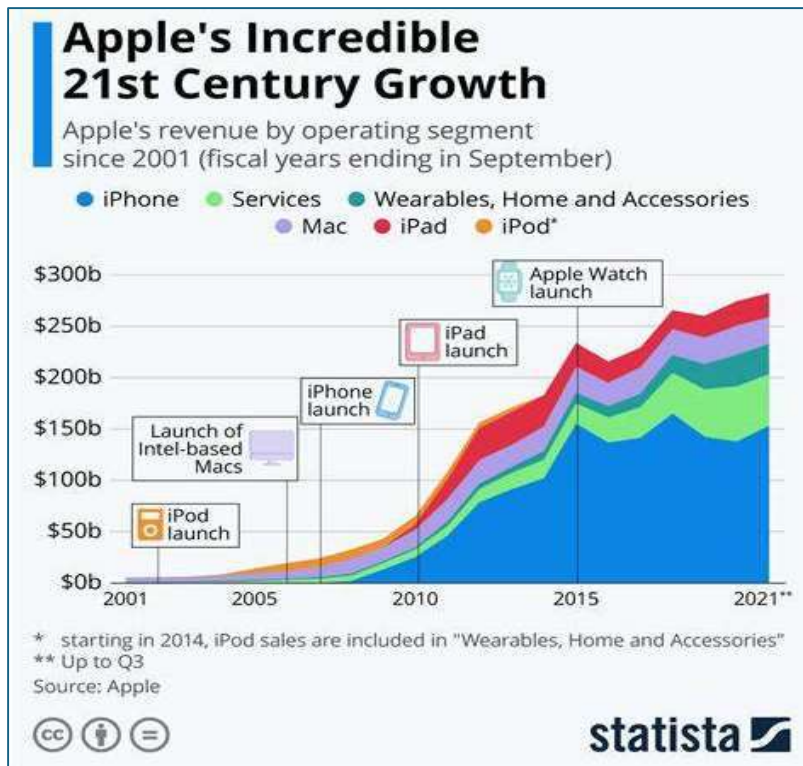
A collection of moral guidelines that direct an individual's or an organization's behavior or the course of an activity is known as ethics. Truth, justice, and equity in messaging and the customer experience are the cornerstones of ethical advertising. An ethical commercial aims to uphold human dignity and is truthful and accurate. It also looks at the possible for data bias in analytics and the advertising environments that are selected for placement. In addition to the necessity of conducting ourselves, our businesses, and our relationships with consumers in a fair, honest, and forthright manner, transparency is the most significant ethical guiding principle.

To create a more reliable digital marketplace, the IAE's (Institute of Advertising Ethics) strategy has set nine principles for ethical advertising.
1. The pursuit of truth and the highest ethical standards in serving the public is a shared goal across advertising.
2. When producing and distributing commercial information to consumers, professionals in the fields of advertising, public relations, and marketing

communications have a duty to uphold the highest standards of personal ethics.

3. Both online and offline, advertisers should make a clear distinction between corporate communications, public relations, and advertising and news and editorial content and entertainment.

4. In the interest of complete disclosure and openness, advertisers should explicitly disclose all material factors, such as payment or acceptance of a free product, that affect endorsements in social and traditional channels, as well as the identities of endorsers.

5. Based on the type of audience their advertisements are intended for as well as the nature of the product or service they are promoting, advertisers ought to treat customers fairly.

6. Customers' right to privacy should never be violated by marketers through marketing communications, and their decision to engage in sharing their information should be clear-cut and simple.

7. In order to resolve advertising practices, advertisers should collaborate with industry self-regulatory programs and abide by all applicable federal, state, and local advertising regulations.

8. Members of the team developing advertisements should be allowed to voice their ethical concerns internally, and advertisers and their agencies, as well as online and offline media, should privately discuss any potential ethical difficulties.

9. Confidence in the public relations and advertising industries

5.2 What is the model of AIDA advertising/ marketing?

Elias St. Elmo Lewis developed the AIDA marketing model, a concept for advertising, in the late 1800s. The model states that a customer follows a predetermined path, or steps, that are analogous to a marketing funnel in order to make a purchase. Actually, the abbreviation for awareness, interest, desire, and action is AIDA. As they get closer to the bottom of the funnel, the number of customers at each level gradually decreases. Although there are now variations that add stages to the paradigm, it is largely still in use today, especially with the advent of digital media and its interactive aspects.

Awareness: To raise awareness of their new product, the iPhone X, Apple is one corporation that used a variety of approaches and an unexpectedly inventive campaign.

Interest: Netflix is one company that used the offer of a one-month free trial to generate interest in its service at the introduction of their new product in India.

Desire: By offering beauty and skin care recommendations and guidance, L'Oreal builds trust with their target audience and sparks their desire for its products and services.

Action: One firm that effectively engaged its target audience through social media is Dove. The company encourages its followers to share their posts using the hashtag. #ShowUs

6.0 Conclusion

The analysis indicates that the independent factors and mediating factor have a significant effect on the dependent variable. Consumer purchasing patterns are shaped by their sociodemographic characteristics and the frequency of their monthly visits to retail establishments.Strong correlations exist between Price and Discount (PRD), Reason for Visiting (REV), Brand and Promotion (BRP), Customer Buying Pattern (CBP), Service Quality (SEQ), and Store Ambience (STA).

The purchasing behavior of customers is significantly affected by the existence of both an independent variable and a mediating factor. The 25 to 35 age group is very driven to make frequent purchases, and this is influenced by a variety of personal, familial, and other reasons. Gender is one of the most important factors to take into account when examining customer purchasing behavior in structured retail establishments. Changes in lifestyle, such as frequent trips to retail establishments for a variety of reasons such promotions, discounts, and atmosphere, have an impact on consumer purchasing habits. The results show that customers' sociodemographic characteristics and frequency of visits have a significant influence on their shopping behaviors in structured retail stores.

Customers use likes, shares, and comments on social media platforms to determine the popularity and authenticity of a product or service. This phenomenon is known as social proof. Purchase decisions can be strongly influenced by positive social proof. Providing guidance for future research in this area of how Consumer Behavior influences the impact of marketing communication and advertising in India is one of the objectives of this chapter. There is little organized research in this managerially significant field, as was previously claimed and presented. Thus, we provide guidance to researchers regarding the types of study opportunities that are available in this field.

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CHAPTER 14

Teaching Sounds through Poetry to the Digital Natives

Pronema Bagchi*

ABSTRACT

Today's learners are surrounded by the ambient noise from social media; there are constant beeps and clicks of content sharing amongst the youth. However, there are even some podcast tracks and audiobook files that do become popular with the Gen Z. Amidst this pandemonium of sounds, what gets transformed from a cacophony to a melody is the sound of poetry. Phonology is the most primary level of linguistic analysis, mastering which is a great challenge. Poetry is the tool that provides the medium to best understand the nuances of sounds in language learning. Post pandemic, the emphasis on enhancing the digital classroom has worked in the favor of the digital natives. This paper is therefore, sought to analyze the way in which sounds manifest in poetry, the method of delivering the phonological aspect of language to the target group, and the multimodal environment that caters to the needs of students who get fascinated by disruptive technologies.

Keywords: Phonology, Poetry, Digital natives, Multimodal environment, Disruptive Technologies.

1.0 Introduction

Once a child is born, the first cry let out by the newborn becomes the source of happiness and bliss for each and every one associated with the child. This sound produced by the newborn becomes the child's identity and the kid, through the medium of their voice, establishes a relation with the people around them as well as the world at large. The sound therefore, is the primary unit of any language that gains prominence in articulatory and auditory matters which further, helps the individual to define and distinguish one speech sound from the other. These speech sounds, combined to form words, phrases, sentences, and discourses can be encoded and decoded in the process of communication. Language is primarily an auditory set of symbols and English per se, is a stress-timed language as compared to most other Indian languages which are syllable-timed. Hindi, for instance, is syllable-timed (Crystal, 1995) whereas some of the Dravidian languages such as Tamil and Telugu are mora-timed (Murty, Otake, & Cutler 2007).

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A naïve listener of English tries to make sense of the speech sounds to decipher meaning of the spoken word; an experienced listener too goes through a similar process of encoding and decoding the speech sounds. If the delivery of these sounds become faulty, it automatically leads to erroneous interpretation or creates a barrier in understanding what the speech of the person is. Hence prima facie, sounds of English language must be treated as building blocks of a healthy and meaningful process of communication.

The sounds of English language are present in the world in different types of settings and variety of media. The ambient noise of social media is both engaging and distracting at the same time; the content shared in English by the youth on several platforms grabs attention of the masses, and the podcast tracks and audiobook files especially in the English language are gaining popularity amongst the Gen Z learners who, on an average, are between the age group of 12 – 27 right now. It is this age group that is going to form the focus of the current research and will be referred as the target group or the focus group henceforth. The said focus group is also believed to have born at the cusp of the change of a millennium (between 1997 to 2012) and therefore, are more digitally sound in the era of technological innovations. The researcher believes that there certainly is a lot of chaos and confusion amounting from the emerging varieties of English language that fascinates the young adults. So, amidst the pandemonium of sounds and styles of pronunciation in English, there is one genre of literature that can convert the cacophony into a melody – which is undoubtedly the form of poetry. Hence, the present paper is a modest attempt to study the way sounds of English can be taught through the means of poetry to the digital natives or the Gen Z learners.

2.0 Rationale and Objectives of the Study

Phonology, morphology, syntax, semantics, and pragmatics are the five levels of linguistic analysis. In the English language, phonology is the scientific study of the 44 sounds; morphology is the scientific study of words and formation of words; syntax is the scientific study of grammar and rules of sentence construction; semantics is the scientific study of lexical meanings; and pragmatics is the scientific study of meanings in context. Since phonological competence is the stepping stone to gain pragmatic competence (the highest level of linguistic understanding), it is necessary to make the target group realize the importance of sounds of English language through the most authentic sources and resources. In the 21st century, there is a lot of emphasis on soft skills and spoken communication which involves using the language for communication in an efficient manner. Efficiency does not come from speed and fluency alone but, diction as well as pronunciation with an appropriate use of stress on syllables marks the effectiveness of a 21st century communicator.

In light of the above-mentioned rationale, the study has the following objectives:

- To understand the nuances of sounds used in English language;

- To appreciate and apply poetry as a beneficial tool for teaching sounds of Englishlanguage;
- To explore the possibilities of using disruptive technologies with regard to the teachingof English language in a multimodal environment;
- To consider pedagogical implications of teaching sounds through the medium of poetryto the digital natives.

The study will proceed with the help of the above-given rationale and objectives for establishing a positive correlation between the two variables viz. sounds of English language and poetry for enhancing the linguistic competence in general and phonological competence inparticular of the digital natives.

3.0 Review of Related Literature

As this paper discusses about the digital natives, it is imperative to know more about the study habits of the learners who are addressed as 'Gen Z or the demographic cohort succeeding the millennials' (news: 2023). These learners do experience a general apathy towards learning many a times due to lack of curiosity and even more dangerously, lack of independence. The digital media engages the target group to such an extent that the content creates sensory overload on the said group leading to learner passivity.

Morrain (2024) has recently discussed about the issue of cognitive overload in a LinkedIn post complaining about the act of teachersburdening the students with too much information thereby creating a discrepancy between the "language processing demands of an activity" and the "language processing limits of the learner". This article identifies the problem area and defines the problem statement with regardto the general learning tendencies of the digital natives; however, it does not suggest any solution to the problem. On the contrary, the LinkedIn feed by Jeffrey Brown tries to not only consider the issue of sensory overload but also recommend the ways in which similar problematic situations can be mitigated in the context of gifted children, which too is a very sensitive area.

He feels that it is a challenge to understand the neurodivergent minds of the gifted children but, at the same time, "being neurodivergent presents its own set of challengesand benefits" (2024). He outlines the mitigating strategies unlike the earlier article, for sensory overload, communication hurdles, and many more issues by drawing the readers' attention to the fact that if channelized properly, cognitive overload can lead to developing incredible precision and, communication hurdles can consequently lead to heightened cognitive activity with the formation of exceptional memory amongst the gifted children.

Herein unfolds the major hypothesis of the present study that if taught innovatively, the digital natives will learn the language better; and the minor hypotheses can be unpacked in the following manner – learning the sounds of English

language will enhance the linguistic ability of the digital natives; and poetry can provide the best platform to the digital natives to teach sounds of English language. In the article 'Cin(E) – Poetry: Engaging the Digital Generation in 21st-Century Response', Stuart D. (2010) bases his thesis on the argument that there is no right or wrong interpretation of the poem. What matters the most is the creation of experiences of poetic texts in the digital times through the means of creative responses that in turn "encourages thoughtful interpretation and analysis". This article comes very close to the present study in terms of teaching poetry to the digital natives but the point from where it differs from the present study is that it considers the teaching of poetry as an end in itself and not as a means to teach the sounds of English language.

Another scholarly work by Sastre and Garcia (2022) traces the transformation of text on paper to digital poetry. The paper also describes the creativity and digital literary reading practices in initial teacher education as a crucial activity for imbibing into the classes of digital literature. The article very well paves way for the creation of cyberpoems that can be presented and worked upon in school classrooms to augment the "digital practices of literary reading" of students who enjoy such digital literary mediation exercises. Through a collection of such scholarly articles, the researcher of the present study affirms the happiness quotient associated with doing literature in the digital medium and therefore, delves deeper into analyzing the way in which poetry can play a pivotal role in teaching sounds digitally through the use of multimodal environment and disruptive technologies. Rosario (2009) in fact, takes a deep dive into the genre of digital poetry by harping on the complex relation shared between "poetry (verbal text) and images (audio-visual)" under the larger framework of digital poetics practices.

However, the research strongly believes that much work needs to be done in the topic of the present study.

4.0 Methodology

The COVID-19 pandemic forcing the world to make a paradigmatic shift to online learning right at the beginning of 2020 and, the excessive dependence on Learning Management Systems (LMS) for e-learning itself, marked the introduction of disruptive technology in the field of education. Softwares like Canvas LMS, Microsoft Teams, Google Classroom, MasterStudy WordPress LMS, etc. and tools even in the form of mobile applications like Zoom, Moodle, blackboard, Schoology, Skype, etc. granted the global citizens with the boon of virtual learning. These technologies helped streamline the digital classrooms by making the process cost-effective, less time-consuming, user-friendly, and most importantly, providing an easy access to information on the LMS or through the said applications. Disbursement of knowledge indeed became faster and easier due to the disruptive technologies in the education sector.

There is undoubtedly a long list of education pioneers across the globe. But, the trajectory of the digital classroom can be traced back to the first instance of "students learning from computer terminals that were interlinked to form a network" (Sarkar, 2020) at the University of Illinois, USA in the 1960s, even before the advent of the internet. Many statisticians found out the surprising increase in the number of enrolments happening for online courses in 2020 and even blended-based learning in 2021. This whole rise in online content sharing platforms for ensuring the feasibility of the process of education and reliance on digital media especially for language learning classes, empowered the remote learners to the hilt. Since this kind of disruptive technology had a great impact on the teaching-learning environment, the students ingeneral and the digital natives in particular too, started experimenting in the online classrooms.

During the pandemic as well as the post-pandemic period, there was enormous responsibility on the facilitators of language and literature classes to ensure that students get involved in the learning process instead of falling prey to visiting multiple tabs of their choice and hopscotching with social media websites while the online classes or even classes in the hybrid mode were being conducted. Therefore, the current research is sought to analyze the way in which sounds in poetry can serve as a learning tool to attract the attention of the target group, how the same can be delivered digitally, and how can the multimodal environment cater to the needs of students wanting to learn the phonological aspects of language in an innovative manner.

The researcher would now demonstrate the ways in which this whole study can be implementedin the classroom especially for those who are specializing in English Studies or have English as their Majors/Honors subject in the first year of their undergraduate curriculum. Poetry as a genre itself can be used a starting point to discuss linguistic diversity in the classroom. This isa mandatory subject for the focus group and most often, it becomes difficult for the students toconnect the text with the context. The job of the instructor is to not only ensure the comprehension as well as the analysis of the text but to also connect the 'doing of the poem' to the learning objectives of the said syllabus. One of the most important and recurrent outcomes across poetry syllabi of English Honors in the country is – teaching the said course helps students recognize the sound devices, meter, rhythm, and rhyme in poetry. The focus group thus, must be convinced to learn these elements of poetry as an aid to improving their linguistic abilities. The teacher too must leverage the target groups' tech savvy attitude to design certain pronunciation tasks that can be taught using digital tools.

Victor Carreao (2024) in his webinartoo highlights the fact that poems share a similar structure to music and songs mainly becauseof lyrical quality of rhymes and therefore, it should interest the learners more to learn the waysounds are pronounced with rhythm. The general perception of a good speaker is someone who can speak clearly and use intelligible pronunciation. The speaker of this webinar trusts that

poetry, first raises students' awareness of different types of sounds and the way they can be combined for having a lyrical effect. Second, the appropriate conduction of poetry class can make learners self-assess their pronunciation by banking on the syllables and sound articulation used in poetry. The speaker also makes a reference to research scholars viz. Kristi et. al. (2018) who have proven that students who worked with poetry perceived the difference between long and short vowels faster.
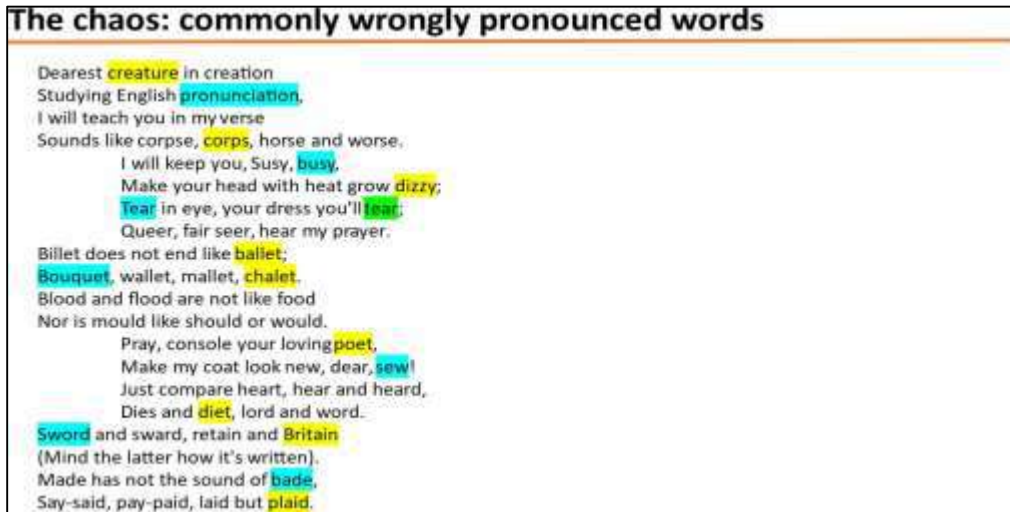
As far as the current study in concerned, the researcher plans to start her poetry classes with a pre-teaching activity. This activity can be related to identifying silent letters in selected words. For instance, the words leopard, salmon, ballet, debris, almond, handsome, moisten, solemn, receipt, autumn, and muscle can be written on the board. First, the focus group can be randomly asked to pronounce these words loudly one by one and the teacher can record their pronunciations. Later, the teacher can display a slide showing the transcriptions of the words and highlight the silent letters in the given words. The slide can be designed in the following manner:

Figure 1: Words with Transcripts

Silent letters

Identify a silent letter in each of the following words:

1. Leopard :   silent: /o/   pronounced: /ˈlɛpəd/
2. Salmon :   silent: /l/   pronounced: /ˈsamən/
3. Ballet :   silent: /t/   pronounced: /ˈbaleɪ/
4. Debris :   silent: /s/   pronounced: /ˈdɛbriː/
5. Almond :   silent: /l/   pronounced: /ˈɑːmənd/
6. Handsome :   silent: /d/   pronounced: /ˈhans(ə)m/
7. Moisten :   silent: /t/   pronounced: /ˈmɔɪs(ə)n/
8. Solemn :   silent: /n/   pronounced: /ˈsɒləm/
9. Receipt :   silent: /p/   pronounced: /rɪˈsiːt
10. Autumn :   silent: /n/   pronounced: /ˈɔːtəm/
11. Muscle :   silent: /c/   pronounced: /ˈmʌs(ə)l/

Source: Created by the author

The above representation will give the focus group an idea of the exact diction to be applied in case of the selected words when used in different contexts. This activity will also stir their curiosity to know more about frequently mispronounced words and they will automatically ask for clarification of each and every word as these words are commonly used in daily parlance. The researcher then will send audio message in the official WhatsApp class group by sending the recording of the correct pronunciation of every word so that students may refer to the same whenever need be. Next, the researcher will do a poem in the class which is not just hilarious in nature but also tries to address the same issue of English language having a complex web of pronunciation practices. This too can be demonstrated on a slide as follows:

Figure 2: The Text as It will be Displayed to the Target Group

The chaos: commonly wrongly pronounced words

Dearest creature in creation
Studying English pronunciation,
I will teach you in my verse
Sounds like corpse, corps, horse and worse.
I will keep you, Susy, busy,
Make your head with heat grow dizzy;
Tear in eye, your dress you'll tear;
Queer, fair seer, hear my prayer.
Billet does not end like ballet;
Bouquet, wallet, mallet, chalet.
Blood and flood are not like food
Nor is mould like should or would.
Pray, console your loving poet,
Make my coat look new, dear, sew!
Just compare heart, hear and heard,
Dies and diet, lord and word.
Sword and sward, retain and Britain
(Mind the latter how it's written).
Made has not the sound of bade,
Say-said, pay-paid, laid but plaid.

Source: Created by the author

This poem by Gerard Nolst Trenite published in 1922 is a classic example of the confusion thatarises due to the variety in consonant, vowel as well as vowel glide sounds and, the diversity in world Englishes. The vocabulary highlighted in the text above is another set of words that experience pronunciation errors. The irony is that the word 'pronunciation' itself is mispronounced many a times. While teaching this text, which is replete with commonly confused words, the teacher can attract the attention of the focus group to the concept of ambiguity caused because of homonyms. Homonym stands for 'same name'.

For instance, the word 'bank' is an example of a homonym whereby depending on the contextual usage, the same word with the same pronunciation can mean 'river bank' in one situation and 'money bank' in another situation. Simply asking the learners to solve examples of these kind of sentences might be a dull and boring task. But, if the same set of words are put in the context of the poem, then it is easy to get learners interested in the process of comprehension. In the poem given above, the word 'fair' is an example of a homonym – the same word can be used as both, a noun and an adjective, to mean - a community gathering to celebrate, and beautiful or equitable respectively.

The teacher can also design post-teaching activities for reinforcing the understanding of the learnt concepts. The teacher can also convert the process by incorporating fun activities in the classroom which becomes an amalgamation of competition yet, cooperation amongst the students. The whole class can be divided into 4 or 5 columns and each column of students canbe considered as one group. The teacher can then ask the following questions to the students:

Figure 3: An Activity based on the Text for the Target Group

The chaos: rhyming words (post teaching)

Dearest creature in creation
Studying English pronunciation,
I will teach you in my verse
Sounds like corpse, corps, horse and worse.
  I will keep you, Susy, busy,
  Make your head with heat grow dizzy;
  Tear in eye, your dress you'll tear;
  Queer, fair seer, hear my prayer.
Billet does not end like ballet;
Bouquet, wallet, mallet, chalet.
Blood and flood are not like food
Nor is mould like should or would.
  Pray, console your loving poet,
  Make my coat look new, dear, sew!
  Just compare heart, hear and heard,
  Dies and diet, lord and word.
Sword and sward, retain and Britain
(Mind the latter how it's written).
Made has not the sound of bade,
Say-said, pay-paid, laid but plaid.

Type all answers in the chat box:
Q 1: Identify the word from the first stanza which rhymes with "door"?
>> corps

Q 2: Identify the word from the second stanza which rhymes with "bear"?
>> tear (2nd) or prayer

Q 3: Identify the word from the third stanza which rhymes with "fold"?
>> mould

Q 4: Identify the word from the fourth stanza which rhymes with "toe"?
>> sew

Q 5: Identify the word from the fifth stanza which rhymes with "glad"?
>> plaid

Source: Created by the author

The group that gives the maximum number of right answers in a stipulated period of time can be declared as the winner of this quiz game. Similar such tasks can be designed based on rhyme and rhythm of the text to check the comprehension of the focus group and also increase the level of awareness in them towards the minute differences in sound patterns, irrespective of the spellings of the words.

Multimedia also involves listening to the text on podcasts or via the audio files available online or watching it on YouTube. The next text to be discussed is the excerpt by John Keats 'A thing of beauty is a joy forever' composed in 1818 as part of the opening lines of the grand poem *Endymion*.

Figure 4: Reinforcement of the Sound Patterns from the Text

Let's discuss sounds in this poem…

noble natures → cooling covert → simple sheep* → **Alliteration**

shape – shady – sheep – short – shine | pall – daffodils – rills | band to bind | grow – green → **Consonance**

keep – sleep – sweet | infinite – light – die → **Assonance**
blooms – dooms – moon – boon
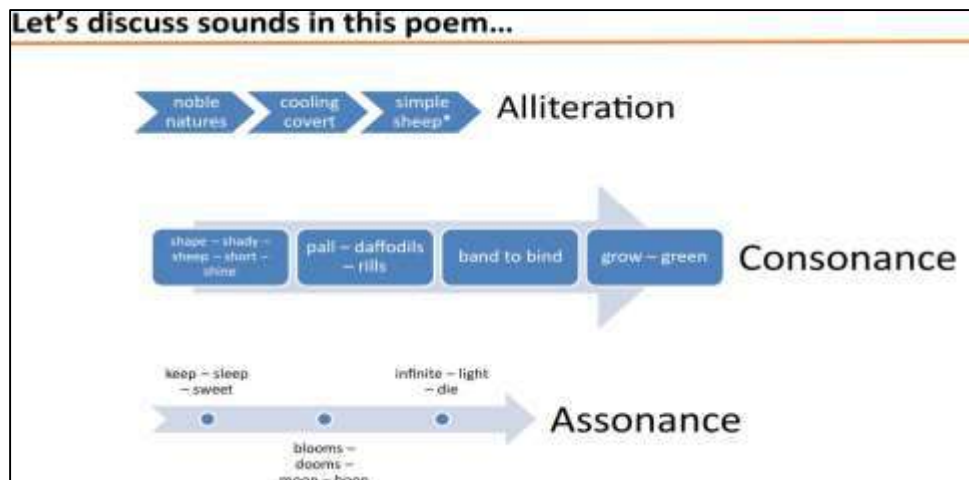
Source: Created by the author

Here, the class can watch as well as listen to the poem if the teacher plays the rendition of the text on YouTube. Else, the teacher herself can animate and recite in front of the class to make students feel the live recitation of poetry with emphatic use of the phonological aspect of the poem. The teacher, after discussing the meaning of the verse, can redirect the discussion towards the alliteration, consonance, and assonance in the poetic text. To explain what these terms are, s/he can use the following slide for the target group:

Herein, the students can be asked to sit in groups of three/four and identify the above-mentioned poetic devices in the given text. Through this kind of inductive mode of teaching, the learners can themselves be asked to create definitions of the above given 3 terminologies which play a significant role in literature. Next, the focus group can be asked to identify the homophones in the text. Homophones are words that have exactly the same sound but, the spelling and the meaning are completely different. The same text can be further displayed as shown below.

Figure 5: An Activity based on the Text for the Target Group
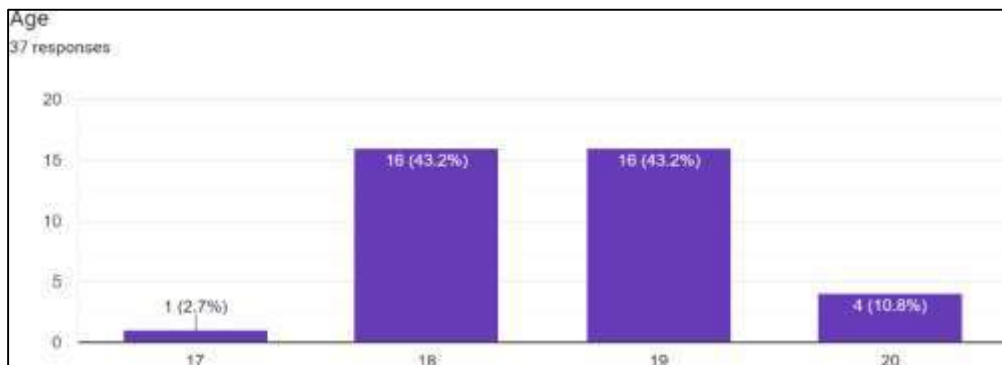

Source: Created by the author

In this way, tasks can be assigned to students testing their phonological and morphological competencies in the form of online quizzes designed on applications like Padlet, Quizlet, or Kahoot. The target group itself can be motivated to design such activities and share the same with their classmates which will automatically facilitate peer learning along with peer assessment. Besides this, the digital natives might further be asked to create their own poetry podcasts where they can recite the poems with correct pronunciation, intonation, and appropriate sound effects; in addition, share the same on social media to gain visibility.

5.0 Pedagogical Implications

Multimodal learning environment is the cocreation of a surrounding in which the teacher will make use of different styles of learning materials which are a

combination of visual images, audio lessons, speaking practice sessions, activities involving bodily kinesthetics, and many such tasks that stimulate all sense organs and help learners build a holistic perception. In this regard, the researcher conducted a short survey on the focus group which is currently pursuing the first year of English Honors undergraduate program. The same group was declared the 'COVID' batch due to the outbreak of the pandemic in 2020. Since the 10th and 12th classes of the said batch were conducted in the online mode, the researcher wanted to collect an honest review from the students regarding the way poetry was done in the online sessions.

Figure 6: Quantitative Analysis of the Survey Participants

Source: Created by the author

As per the above projection, most of the students in the survey group are between 18-19 years old. When enquired about the amount of emphasis laid on teaching sound patterns and pronunciation in English during their school days, majority have replied positively. But when enquired about the way poetry was taught in the high school, the results were not very different from what was expected. Both the projections are given below:

Figure 7: Quantitative Analysis of the Survey Question
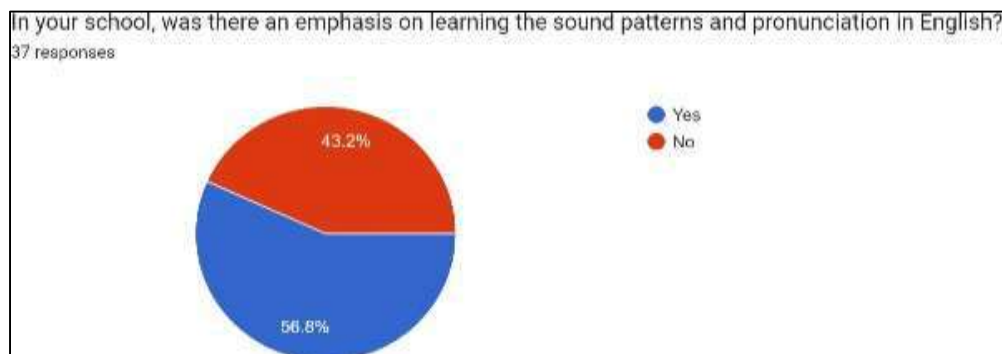
Source: Created by the author

In the second representation to the right, it can be deciphered from the responses that in majority of the cases, poetry was taught as a combination of two styles viz. online lecture (59.5% of students selected this option) and the teacher reciting or singing the poem aloud (62.2% of students selected this option). The second most used style of teaching the poem was either using the YouTube video in the online class through the screenshare option or concentrating on the text alone. Although the use of AV aids for teaching poetry in online classes is evident, there is unfortunately very scanty use of the contemporary multimedia like podcast, poetry jamming sessions, sharing content on WhatsApp, or even social media for doing poems at school and high school levels. This shows that most of the instructors made use of the traditional practices even in classes conducted in the online or hybrid mode and refrained from using digital tools to teach the genre in an innovative manner.

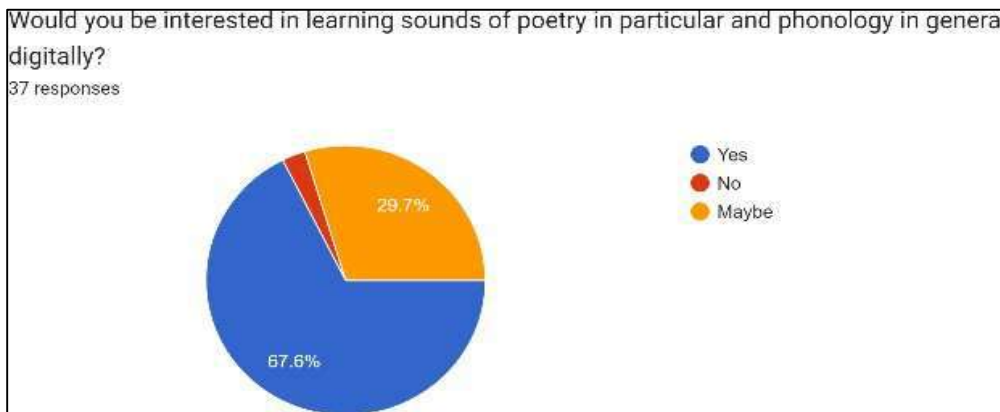### Figure 8: Quantitative Analysis of the Survey Question
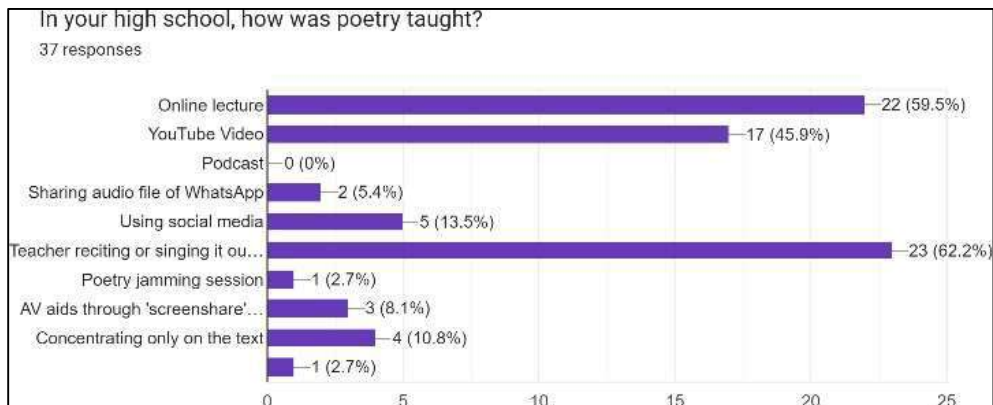
Source: Created by the author

Poetry is an art that needs a special kind of attention and if poetry seems to be elusive and unpredictably tough, then it is because of the faulty instructional practices from the side of the facilitator that amounts to high school students' contempt or distaste towards the genre per se. Emert (2015) mentions in his article that most of the instructors feel the least comfortable with the teaching of poetry. His observation is that the dread for the genre can be reduced by exploring poetry through the digital media tools, by integrating it within the classrooms and matching it with the objectives set for student learning. He further states, "introducing digital technologies to students is not instructionally sufficient…poetry, however, relying as it often does on imagistic and emotionally resonant language, invites us to consider the use of available multimedia technologies to deepen students' understanding and appreciation". Therefore, the researcher of the current study, in her survey, asked the students whether or not they would be interested in doing sounds of poetry in particular and phonology in general digitally. Majority, as expected answered 'yes'

(67.6%) and some said 'no' (2.7%). Well, it is a known fact that one cannot amuse and fulfil every student's expectation but there can at least be an effort to identify their likes and dislikes in the classroom practices. Similarly, the researcher also asked the target groups' opinion on teaching of poetry digitally, especially through multimedia leading to improved understanding of sounds and pronunciation. Even here, majority of the students have agreed to the given premise (35.1% have strongly agreed and 45.9% have agreed). The representation of both the questions' responses are given below.

Figure 9: Quantitative Analysis of the Survey Question

Source: Created by the author

Figure 10: Quantitative Analysis of the Survey Question
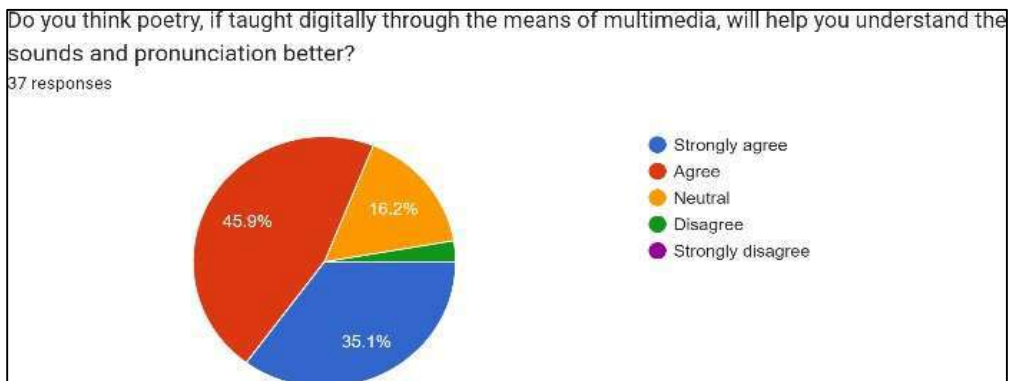
Source: Created by the author

Through the survey results as depicted above, the researcher would like to suggest that there should not be any kind of misconception or misunderstanding in the mind of the students and even the teachers regarding the conduction of poetry class. Even if the teacher feels not so confident to talk about the poetic text and start

the discussion, s/he must make the students feel fully equipped to enter into the world of poetry. This is possible only when the instructor gets rid of the mental block that poetry is just a body of information to be imparted. The teacher will have to find or even curate her/his own models to effectively 'do the poem' in the classroom which will involve students' active participation in doing the poem. This could be a group of students actually making short films out of the prescribed poems using digital tools or some other group of students themselves negotiating the meaning-making process with the poetic text in the form of literary activities like building puzzles, riddles, haikus, etc. online for their classmates as part of poetry projects assigned to the digital natives. It is not mandatory for the teacher to have the technical expertise as s/he is not a digital native but a digital migrant.

Nevertheless, the teacher can ensure the inclusion of such activities in the classroom that make a massive difference in the way the students approach the text. Pairing poetry with technology does augment the students' interaction with the text thereby improving their analytical skills and sharpening linguistic qualities over and above their phonological competence.

6.0 Conclusion

The researcher thus, strongly recommends the application of the above stated methodology not only in the English Honors undergraduate classrooms but even in the English or Soft Skills courses of other disciplines by introducing week-long activity sessions dedicated to listening-speaking-reading-writing of poems in order to develop the linguistic capacities of the target group. It is indeed, an intelligible choice to infuse the poetic text with digital media and allow the digital natives to work with the same text using digital tools as the students then push themselves to remarkable limits by either working in pairs/groups or individually and engage with the text in a significant manner. This whole process in turn, helps the focus group to imbibe the sounds and phonological aspects of the language in the right way whilst they are engaged with the poetic text.

The researcher would thereby conclude by remarking that classroom management is a science in itself. There are ample of trial-and-error sessions to reach to the 'hence, proved' point which, ideally should work in the benefit of all the stakeholders involved in the teaching-learning process. Some view this process to be a kind of juggling with the odds whereas others consider it to be a healthy multitasking of sorts. Irrespective of the multiple perceptions, the researcher here, would like to use an analogy of cooking for the notion of classroom management. The fact is, in cooking – the more time and effort one puts in making food, the better the preparation it is; and on the contrary, packed food or ready to eat/premix food is never considered a healthy choice. Similarly, if the teacher wants to just finish the syllabus and complete the text using shortcut methods, learner autonomy and fruitful understanding can never be guaranteed; on the contrary, if the teacher manages the classroom sessions

with complete dedication and makes students relive the text by invoking multiple voices from the class itself, then each classroom hour will bear a testament to the power of learning-by-doing technique. The struggle involved in the whole process will then automatically get elevated to the level of heightened pleasure that the learners will seek from proving themselves capable and committed towards the completion of the learning tasks assigned to them.

The present research has certain limitations though. This study was limited to only the undergraduate students having English Honors as the specialization in their first year of the program. The target group was well-defined right at the outset and the study revolved around the focus group that fell between eighteen years old students to twenty years old students. The survey conducted too, was limited to a particular geographical location (the state of Odisha in this case); and based on the technique of generalization; the results inferred were considered tobe applicable to the whole of India. However, there is immense scope for furthering this research. In the long run, the same study can be carried out for a greater mass of target group by extending the limits of the age group. The methodology charted out in the current research can be incorporated in the context of students from humanities and non-humanities background and the results can be compared and contrasted. The postgraduate classrooms too can be observed and considered as fertile ground for carrying out action research with regard to the study of teaching sounds through poetry to the digital natives.

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CHAPTER 15

Exploring Real-Time Facial Recognition for Attendance Management: A Systematic Review

Sarika Jadhav* and Meghna Soni**

ABSTRACT

In the modern era of digital education, the manual tracking attendance systems for students present significant challenges for teachers where strength matters. An automatic attendance system that controls and addresses this difficulty, has been implemented. The proposed attendance system effectively eliminates problems such as substitute attendance and students are marked as present if they are not physically present in class. It achieves this by understanding live video streams and using OpenCV to extract frames from the video, pre-trained on 100 image samples of each student. This database is used to match images and m1a1rk students as present. The main steps in this process are the face detection Haar Cascade Algorithm for training positive and negative images, recognition using dlib, facial marker recognition, and adding known faces to the student images database together to accurately record a person's location in an Excel sheet for further consistency. Image preprocessing was accomplished using openCV, including image resizing, noise reduction, and normalization, to improve image quality. This new system is proving to be a successful and effective way to manage student attendance.

Keywords: Check-in process, Attendance automation, Face recognition, Object matching, The face of the sight.

1.0 Introduction

1.1 Problem statement

In educational institutions, manual attendance management leads to issues such as missing records, dishonesty, inefficiency, and high error rates. This traditional approach is time-consuming, involves significant paperwork, and places a burden on faculty members. An automated access system is needed as a solution to these problems.

1.2 Objectives

- The core objective of the proposed study is to help teachers improve and systemize the management of student attendance and absenteeism.

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- Reduce errors associated with hands-on attendance through reliable processing classification models built on facial recognition technology.
- To ensure privacy as well as security by restraining students as to others as they arrive.
- To provide flexibility by having teachers prepare attendance records as necessary.

1.3 Significance of study

This technology offers advantages in terms of accessibility, non-involvement and ability to operate under different facial expressions. As facial recognition continues to gain popularity, this study contributes to more attendance management with new strategies.

2.0 Literature Survey

In the 'Attendance System based on Face Recognition,' it was suggested that we capture images through a web browser or an external camera. To facilitate this, the statistical office provides MATLAB drivers corresponding pertaining to the type of camera in use. Subsequently, a minimum of 500 to 1000 captures per person are employed. To enhance accuracy, a small HD camera is utilized to yield results. Face differentiation is achieved through article classification and the b-box technique. Gallery pictures will be posted for reference. All isolated HOG points are cataloged as a display list, returning a symbol indicative of data matching or relating to a composite.[1]

The general operational guideline outlined by the author in the research entails converting captured video data into images for identification and processing. A Convolutional Neural Network (CNN) algorithm is leveraged to recognize faces. The CNN utilizes a multilayered perceptron framework designed to expedite priority solutions. Following face differentiation and preprocessing, student attendance is cross-referenced with existing face images to refresh the post-preparation component, which includes updating student names on the Excel sheet. These Excel sheets can be archived on a weekly or monthly basis.[2]

In the research paper titled "Sharing System Using Facial Recognition", a pre-editing step is incorporated into the previous preparation phase. This involves histogram layering of the extracted face image, which is then resized to 100x100 pixels. Following this, in the system, after capturing the essential aspect of the students' faces, their names are updated once again in the new requirement sheet. The Excel document is generated by the business machine within the database profile. Moreover, the database can produce reports on students' attendance records on a monthly and weekly basis. To apprehend the students' pictures, face identification algorithms are exploited to recognize and extract the faces' regions of interest within rectangular bounding boxes. These regions are subsequently converted to grayscale,

undergo histogram transformation, and are resized to 100x100 pixels. For example, pre-processing is employed during the enrollment stage, wherein the data points are stored in the database; otherwise, PCA/LDA/LBPH algorithms are utilized. [3].

In the paper titled "Face Recognition Based Attendance System using Machine Learning Algorithms," the author defines facial recognition as the process of identifying individuals based on their facial expressions. Facial features serve as key elements for computer-based vision systems, including applications such as facial recognition, emotion recognition, and multi-camera surveillance. Facial recognition systems have garnered significant attention from scholars.

The paper explores various approaches such as Support Vector Machine (SVM), Multilayer Perceptron (MLP), and Convolutional architecture ie ConvNet (CNN), also referred to as Deep Neural Network (DNN). These methods are utilized to recognize faces. In the SVM and MLP approaches, the images undergo preprocessing prior to inputting into the CNN Module as a reactive component. The CNN-based method reveals high accuracy in detection, highlighting its effectiveness for face recognition tasks. SVM, MLP, and CNN attain test accuracies of 87% and 86%, respectively, while achieving 98% accuracy in automated databases. [4]

In the research on Class Attendance using the Face Recognition framework, histogram equalization of the images is crucial for intuitive differentiation. The image undergoes processing to identify the individual's face. Among these steps, the Ada-Boost algorithm proves beneficial in learning concepts. Each student's face is isolated, and key features such as eyes, nose, and facial structure are extracted. Utilizing Eigenfaces, the student's face is compared against a facial database, and their attendance record is updated accordingly. The overarching aim of the research experiment is to establish a complete database. [5]

The system design incorporated algorithms with classifiers. The authors accounted for several real-time parameters including scaling, illumination, occlusion, and pose. Quantitative analysis relied on peak signal-to-noise ratio (PSNR) values assessed through a MATLAB GUI. An adversarial approach was adopted to implement collision attendance and response strategies. This paper leverages machine learning to appraise the mechanics of both student attendance and response processes. The system itself gauges student performance and monitors records such as attendance and feedback.[6] The facial recognition-based attendance system relies on facial recognition symbols, signifying its foundation on facial recognition technology. A recognition algorithm is employed to identify actual faces when students enter the classroom, enabling the system to detect and mark their presence. These algorithms encompass face detection using a cascade classifier and feature selection through PCA algorithm, alongside SVM for further feature selection. [7]

Utilization of Facial Recognition Algorithm for Biometric-Based Time-of-Arrival System – This analysis is best obtained by face recognition grid (Eigen face and Fisher face). Comparing the ROC (Receiver OperatingCharacteristics) curve of Open CV2.4.8. attendance policy. [8]

The paper titled "Personal Static Space: An Approach to Acceptance in Uncontrollable Circumstances" by Xin Geng discusses how most facial recognition methods necessitate specific conditions for accurate operation. These conditions typically include controlled lighting, a fixed viewpoint, and unobstructed faces, defining them as facial recognition under controlled conditions. However, such stringent requirements limit the applicability of facial recognition in many real-time scenarios where these conditions cannot be guaranteed. Real-time applications demand flexible solutions that do not rely on strict environmental control. Therefore, the paper proposes a system designed to operate effectively in uncontrollable situations, relaxing the necessity for precise environmental conditions. This system includes error-handling mechanisms and guidelines for real-time deployment, particularly in services such as attendance programs. [9]

In "Anti-Cheating Presence System Based 3WPCA-Dual View Face Recognition", Eddie could predict facial deception visually based systems such as image processing similar to authorized image person. The images obtained were used quasi-coincidence A method of combining the left half of the image with the right half image in a person's image that he can Extraction is then performed using the 3WPCA method.[10]

The author formulated and explained the hypothesis that the changeover to a chart-based admission system is gaining popularity among more students and could represent the next generation of biometric devices. While various biometric devices dominate the market, the human face presents a distinct and significant trend, necessitating quick and accurate facial structure recognition for student identification. The system involves students participating in photo shoots and registration, after which their facial features are captured to establish attendance. Continuous registration is essential for upholding high precision and accuracy precision in the platform. This document outlines the plan and presents the final results, providing evidence to support the proposed policy. Furthermore, the system's functionality extends to use in online certification exams. [11]

Various systems, among which traditional methods of data generation, which are often complex and prone to drawbacks such as errors in biometric attendance, particularly with fingerprint scans. Issues arise when individuals have dirty, wet, or damaged fingers. To address these challenges, the author advocates for the inclusion of a mobile-forward attendance system with NFC security features. This system utilizes Raspberry Pi for data storage and review. The paper reviews relevant works in areas such as NFC, conversational interfaces, microcomputers, and cloud computing. It then proposes a new method and organizational design aimed at reducing paper usage and waste through the implementation of a mobile-based attendance system.[12]

The paper compares three well-known algorithms—Eigenfaces, Fisherfaces, and LBPH— the existence of various environmental circumstances. LBPH, according to the test results, demonstrated the highest accuracy, particularly in

handling external factors like reflected light, noise, and video resolution. However, this algorithm is constrained by poor luminosity reflection and high noise levels compared to alternative methods. Recognition accuracy was further evaluated across three video formats—720p, 480p, and 360p. The conclusions specify that LBPH achieved the highest accuracy at 720p resolution, while the others performed best at 360p resolution. LBPH's superior visual reliability is ascribed to its use of histogram similarity, albeit with sensitivity in certain scenarios. [13]

This paper aims to present an innovative method for identifying students employing a specific strategy within a college setting, for instance, the creation of 3D facial models. The study endeavors to develop a functional attendance system utilizing facial recognition technology from image or video streams. This system is intended to accurately record and assess student attendance during lectures or segments, thereby facilitating performance evaluation. [14]

This paper introduces an automated attendance tracking system that operates in real-time, leveraging facial recognition technology to maintain a database of student information. The system utilizes a Personal Component Analysis (PCA) algorithm for data processing. However, challenges persist in real-time background extraction from images and in managing multiple student databases. The implementation of this system involves three primary phases: face area detection, template extraction, and face recognition. Before the feature extraction process, the input image is converted from RGB to grayscale. [15]

This paper outlines the implementation of an automatic attendance system utilizing a Raspberry Pi camera module and Matlab R2014a version. The system employs Histograms of Oriented Gradients (HOG) and Local Binary Pattern (LBP) techniques for student face detection. Additionally, a Support Vector Machine (SVM) classifier is utilized to compare features extracted from the captured footage with those stored in the database. [16]

In this research, the Raspberry Pi module is employed for both facial detection and identification tasks. The camera connects to the Raspberry Pi module, facilitating these functions. Additionally, GSM technology is utilized to send notifications to the parents of prospective students, allowing them to monitor the system. The data for the students is monitored using OpenCV in conjunction with a Raspberry Pi module, which interfaces with the fingerprint machine.[17]

Discrete Cosine and Discrete Wavelet Transform ie DCT and DWT are combined to extract user characteristics, creating an angle representation. Subsequently, the Radial Basis Function (RBF) is employed to classify these features. Facial detection is accomplished with an image processing package, capturing pictures of students during lecture attendance for analysis. [18]

This plan utilizes Viola-Jones algorithm and face recognition to create a system enabling teachers or teaching assistants to track student attendance. The system captures two photos per session: one at the beginning and another at the termination of the lesson. Both pictures are crucial for accurately identifying and

recording the students' attendance. [19] Satyanarayana introduced facial recognition, showcasing algorithms such as Jones' purple algorithm and MSE (mean square error) face recognition. A discussed and detailed paper shows that the security and accuracy of the algorithm improve as the amount of training images increases. The device is also tested for unusual angles and alignment up to 60 degrees. It is noted that when the system detects six students with 70% performance well.[20]

3.0 Methodology

Method: The approach undertaken in developing the facial identification and attendance system initiated with comprehensive data collection, capturing facial images while accounting for variations in position, lighting, and facial expression. Throughout this process, strict adherence to ethical guidelines was maintained. Image preprocessing was conducted using OpenCV, which involved tasks such as image resizing, normalization, and noise reduction to enhance image quality. Materials utilized in this project include OpenCV for image processing and transformation, Haar cascade classifiers for precise facial location recognition, and dlib for marking the location of 68 facial landmarks such as eyes, nose, and lips. Conventional face recognition methods such as Eigenfaces are also employed. Advanced deep learning models like Convolutional Neural Networks (CNNs) are utilized for facial recognition modeling, with functionality implemented in Python and TensorFlow for simulation training, including hyperparameters tuning and structured dataset management. Real-time video feed capture enables live data input, while a database is utilized for maintaining records of unique facial recognition. Additionally, timekeeping of attendance records is facilitated within the system.

Procedures involved in this project includes data collection: Facial images are acquired, considering various environmental factors and adhering to ethical considerations.

Image preprocessing: OpenCV is utilized to resize, normalize, and reduce noise to enhance image quality.

Programming: Python and TensorFlow are used for simulation and training, employing well-defined hyperparameter datasets.

System implementation: Real-time video feed capture and facial recognition are integrated into the system.

4.0 Proposed System

Altogether students are required to register by providing necessary details, after which their pictures are seized and kept in the dataset. Throughout each sitting, faces are detected from the live video feed of the class. The recognized faces are subsequently compared with future images in the dataset. If a match is found, attendees are marked as present; otherwise, they are flagged as absent. After each

lesson, a list of absences is forwarded to the relevant faculty for review and control. Below is the organizational structure of the suggested system:

**Figure 1: User Interface of the Attendance Management System**

Source: Secondary data

Creating data types: Student photos are obtained through a web-based capture browser, employing various angles to capture different parts of the face. The images are subsequently cropped to acquire a region of interest (ROI), which would be utilized for further validation. The cropped images are adjusted to a specific pixel location. Subsequently, these images are converted from RGB to grayscale and saved with associated names.

Face recognition: In this stage, faces are recognized using the Haar Cascade algorithm implemented in OpenCV. The algorithm is trained to recognize faces prior to its usage in face recognition tasks. Training data, along with the XML file containing cascade classifiers (e.g., haarcascade_front_end), is used for feature extraction.

Figure 2: Capturing Still Frames from a Continuous Video Stream
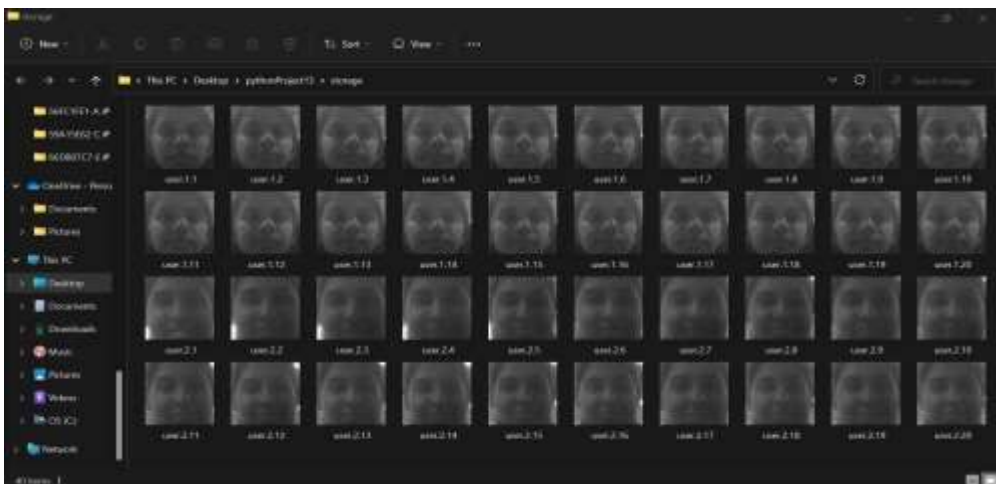
Source: Secondary data

As OpenCV provides a Multiscale module we utilize it for face discovery. This module is essential for creating a bounding triangle around the detected faces from an image.

5.0 Results

Users can engage with the system via a Graphical User Interface (GUI), which offers three main options: student and faculty enrollment and marking attendance. For student registration, students input all necessary information in the registration form. Upon clicking the registration option with the provided button on the form, the webcam automatically activates, displaying a window for facial detection. The system captures images more than 50 samples are gathered until CTRL+Q is pushed. These images are subsequently pre-processed and saved in the training image package.

Faculty members enroll with their individual course codes and email addresses. This information is crucial as the roster of absentees is emailed to the individual faculty member. After providing the course code details, the webcam starts automatically. If the faculty member is recognized, their name is displayed; otherwise, they are labeled as 'Unknown'. Pressing CTRL+Q closes the window.

Figure 3: Overview of Facial Recognition Technology

Source: Secondary data

If they were not enrolled, they would be indicated as 'Unknown'.
Pressing CTRL+Q closes the window

Figure 4: Face Detection Process

Source: Secondary data

Attendees' attendance records will be updated in an Excel sheet, and the names of absentees will be emailed to the respective faculty.

Figure 5: Attendance Marked

Source: Secondary data

6.0 Conclusion

In conclusion, the development and implementation of an effective classroom attendance system using real-time facial recognition methods presents a promising solution for improving attendance tracking in educational settings. By leveraging continuous video streams and robust facial recognition algorithms, the system goals to offer accurate and timely attendance records. This approach addresses the necessity for efficient attendance management while minimizing manual processes. Overall, the incorporation of facial recognition technology into attendance tracking systems has an excessive potential to significantly improve classroom efficiency and increase student engagement

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CHAPTER 16

Innovate To Elevate: Reliance's CSR Makeover with Vantara (The Star of the Forest Programme)

Shreya Bhardwaj*, Bhavika Chawla**, Kumkum Khatri*** and Deven Kumavat****

ABSTRACT

This study delves into public perceptions of the Vantara programme, a CSR initiative spearheaded by Reliance Industries and Reliance Foundation. The objective of the study is to analyse Reliance Industries' wider corporate social responsibility initiatives, evaluate the possible effects of the Vantara project on the community, and determine public perception regarding Vantara's initiative and engagements. Leveraging a descriptive research methodology with a case study approach, data collection was facilitated through a Google Form distributed via convenient sampling methods. The study garnered 57 responses, providing valuable insights into public perceptions of Vantara. Findings reveal widespread support for the programme, with participants acknowledging its potential to inspire similar CSR efforts and underscoring the importance of transparency, community engagement, and long-term sustainability. Moreover, the Vantara programme is perceived as aligned with Reliance's overarching CSR objectives, demonstrating its positive impact on the community. These findings highlight the significance of initiatives like Vantara in addressing societal and environmental challenges while emphasizing the role of public perception in shaping CSR effectiveness. In conclusion, the study underscores the importance of continued efforts to enhance transparency and community involvement in CSR initiatives, ultimately contributing to positive societal change.

Keywords: Corporate Social Responsibility, Reliance Industries, Vantara programme, Public perception.

1.0 Introduction

Reliance Industries Limited, one of India's largest multinational corporations, has undertaken an ambitious journey to redefine its corporate social

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responsibility (CSR) initiatives, leading to in a transformative era marked by innovation, sustainability, and a deep commitment to societal well-being. Through its collaboration with Vantara, the company's forestry initiative, Reliance has pioneered a groundbreaking programme called "The Star of The Forest," which promises to revolutionise the environment. (Hindustan Times, 2024)

1.1 Background of reliance corporation

Established in 1966 by the visionary Dhirubhai Ambani, Reliance Industries Limited has come a long way from its modest beginnings as a manufacturer of textiles. Over the last five decades, the corporation has expanded into a wide range of industries, including energy, petrochemicals, telecommunications, and retail, establishing itself as a major multinational with a global footprint. Reliance has been propelled by an unwavering quest of innovation, adaptation, and expansion since its founding. Backward integration was strategically prioritized in the company's early years, allowing it to gain control over the whole value chain, from raw materials to finished goods. This strategy not only secured cost savings, but also established the groundwork for Reliance's future expansion into a variety of industries. As the corporation developed, it welcomed new technologies and ventured into uncharted sectors, constantly pushing the limits of what was possible. Its entry into the energy sector, for example, transformed the Indian petrochemicals industry, establishing Reliance as a key participant in the global energy market.

Reliance's success may be attributed to its constant commitment to quality, ethical business practices, and a constant desire to innovate. The company has constantly invested in research and development, fostering a culture of continuous improvement and adaptability to changing market conditions. Reliance Industries Limited is a living example of the strength of vision, determination, and an everlasting commitment to generating wealth for all of its stakeholders. It has established a reputation as one of the most respected and significant businesses in India and worldwide thanks to its incredible development from a small textile company to a diverse multinational enterprise. (Jha, 2020)

1.2 Importance of Corporate Social Responsibility

Corporate Social Responsibility (CSR) has become an essential requirement for businesses all over the world, exceeding simple adherence to legal and regulatory requirements. Corporate Social Responsibility (CSR) represents a comprehensive dedication to generating shared value for all stakeholders, such as staff, clients, communities, and the environment, while concurrently promoting long-term financial success. At its core, corporate social responsibility (CSR) recognizes that businesses do not exist in a vacuum but rather have an inextricable link to the communities and environments in which they operate. Businesses that embrace corporate social responsibility (CSR) understand that it is their responsibility to mitigate negative

impacts and actively advance the interests of their stakeholders and the environment. CSR is significant in many different ways. From a social standpoint, CSR programs can tackle urgent problems including community development, healthcare, education, and poverty reduction, promoting a more just and sustainable society. Concerning the environment, CSR initiatives support prudent use of natural resources, lessen damage to the environment, and aid in the battle against climate change.

Furthermore, CSR has shown to be an effective strategy for building client loyalty, attracting and keeping top talent, and improving business reputation. Employees are more drawn to organizations that reflect their values and have a positive social impact, and customers are more likely to support companies that demonstrate a genuine commitment to ethical and sustainable operations. The introduction of environmentally friendly practices, including as energy conservation, waste reduction, and sustainable resource management, can also result in operational efficiencies and cost savings through CSR activities. Proactively addressing social and environmental issues is another way that firms can lower possible liabilities and ensure long-term business continuity. In the current interconnected and rapidly evolving economic landscape, corporate social responsibility (CSR) has become an indispensable strategic prerequisite for companies seeking to maintain their competitive edge and secure their long-term viability. Businesses that follow CSR principles can create new opportunities for growth and innovation while also helping society as a whole. (Tilt, 2016)

1.3 Evolution of Reliance's CSR Practices with Vantara

Over a period of time, Reliance Industries Limited has acknowledged the significance of corporate social responsibility (CSR) and has consistently modified its strategy to conform to the dynamic demands of both the environment and society. The company's CSR journey has been characterized by a constant commitment to making a significant and long-lasting effect, which culminated in the introduction of its ground-breaking forestry initiative, Vantara. During its initial years, Reliance's corporate social responsibility endeavours were principally concentrated on charitable endeavours, including endorsing educational establishments, medical facilities, and community development activities. But as the business developed and broadened its activities, it realized that a more thorough and long- term strategy to CSR was required.

Through the establishment of Vantara—a name inspired by the Sanskrit word "Vana," which means forest—Reliance's corporate social responsibility approach underwent a radical change. Vantara is a symbol of the company's steadfast commitment to community development and environmental preservation, representing the idea that economic prosperity and social welfare are closely intertwined. Reliance introduced The Star of The Forest Programme under the auspices of Vantara, an extensive and diverse program that attempts to address the urgent issues of deforestation, biodiversity loss, and climate change while

concurrently fostering sustainable livelihoods for local communities. The Star of The Forest Programme combines state-of-the-art technology, scientific investigation, and community-led initiatives to provide a complete and all-encompassing approach to forest conservation and regeneration. Reliance has embraced innovative forestry practises, encouraged ecologically friendly farming practises, and enhanced the ability of nearby populations through skill development. One of the key principles of The Star of the Forest Programme is the application of contemporary technology, such as data analytics, geographic information systems (GIS), and remote sensing, to monitor and manage forest resources more effectively. Using these cutting-edge methods, Reliance intends to gain a deeper understanding of the intricate dynamics of forest ecosystems. This will enable targeted interventions and better-informed decision-making.

Furthermore, the program places a strong emphasis on teamwork and community involvement since it recognizes that the backing and active involvement of regional stakeholders are essential to the accomplishment of any conservation endeavour. Reliance forms alliances with governmental organizations, non-governmental organizations, and indigenous communities in an effort to empower and uplift them. The group safeguards the cultural legacy of the communities while also promoting sustainable practices. Through Vantara and The Star of the Forest Programme, Reliance has modified its approach to corporate social responsibility (CSR) and established new benchmarks for CSR in the fields of environmental protection and community development. Through the smooth integration of innovation, sustainability, and social impact, the organization has exhibited its resolute dedication to building a more promising future for everybody. Vantara is evidence of Reliance's capacity to adjust and react to the constantly shifting demands of the environment and society as it continues to develop its CSR policies. Reliance's corporate social responsibility journey is an inspiration and a path toward a more sustainable and just society because of its unwavering commitment on bringing about significant change and generating shared benefit. (INDIA CSR, 2024).

2.0 Literature Review

Rakshit Shrivastava (2021) – "CSR: A Study of Reliance Industries Ltd". Through a case study, this paper demonstrates how CSR has changed over the centuries and how it contributed to Reliance Industries Limited in making a positive impact on India's growth. One of the richest companies in the world, Reliance has been investing money in CSR initiatives for many years. The research in this report assesses RIL's CSR contributions and examines the company's approaches for becoming well-known in the CSR industry. The company's dedication to national socioeconomic issues and its response to corporate social responsibility are highlighted in this paper.(Shrivastava, 2021)

Dr. Navindra Kumar Totala & Ashutosh Kumar Jha (2020) – "A Study of Corporate Social Responsibility initiative taken by Reliance Industries Limited". This document outlines Reliance Industries Limited's CSR fund expenditures, the primary priority areas for project growth, the strategic approach RIL takes to allocating CSR funds, and the social welfare initiative RIL has launched. The Ministry of Corporate Affairs, Government of India, the RIL annual report, and the National CSR Data Portal provided the secondary data for the study. (Totala & Jha, 2020)

Richa Gautam and Anju Singh (2010) – "Corporate Social Responsibility Practices in India: A Study of Top 500 Companies". This study aims to investigate the diverse interpretations and depictions of Corporate Social Responsibility (CSR), expound on the evolution of CSR in India, examine the theoretical ideas presented by multiple scholars, and examine the implementation of contemporary CSR practices in India. This study defines important CSR practices, compares them to Global Reporting Initiative criteria, and looks at how India's top 500 corporations' approach and carry out their CSR. (Gautam & Singh, 2010)

Rabina Rayan Samantara and Shivangi Dhawan (2020) - Corporate Social Responsibility in India: Issues and challenges. The study focuses on a number of topics related to Corporate Social Responsibility (CSR), such as the theoretical basis of it, Indian rules, Indian businesses' adoption of CSR, related challenges, and strategies to implement changes. This section of content includes information on corporate social responsibility (CSR), its importance, regulatory frameworks, business practices, issues including fake news, and suggestions for improving CSR in India. The foundation for appreciating the CSR environment and its implications for Indian enterprises is set in this analysis. (Samantara & Dhawan, 2020)

Dariusz Tworzydło, Sławomir Gawronski & Przemysław Szuba (2020) – "Importance and role of CSR and stakeholder engagement strategy in polish companies in the context of activities of experts handling public relations". This article examines the potential for corporate social responsibility (CSR) in light of the activities of other PR specialists and professionals in Poland. While taking into account the particular practical issues of the Polish setting, this article gives different perspectives on social responsibility and public relations (PR), including stakeholder participation, relationships, and practical elements between them. The argument presented in the article contends that although CSR efforts are just one of many PR activities offered in Poland, PR consultants undervalue their importance in fostering a favorable public image and do not consider them to be within the purview of a PR company. (Tworzydlo, Gawronski, & Szuba, 2020)

Dhammika Dharmapala & Vikramaditya Khanna (2018) - "The impact of mandated Corporate Social Responsibility evidence from India's Companies Act of 2013". According to the report, CSR activity significantly increased as a result of India's Companies Act of 2013, which required businesses to devote 2% of their profits to the cause, particularly for those businesses that were new to the practise. The study examined an unforeseen result of the regulation: large

corporations that had previously spent more than 2% on CSR decreased their spending following it. (Dharmapala & Khanna, 2018)

S. Prakash Sethi, Janet L. Rovenpor & Mert Demir (2017). "Enhancing the quality of reporting in corporate social responsibility guidance documents: The roles of ISO 26000, Global reporting initiative and CSR sustainability monitor" The purpose of this report is to examine the remarkable rise in the number of CSR reports that big businesses worldwide are releasing. Companies can use the reports as a means of educating broad societal sectors on how their operations affect environmental, socio-political, and governmental (regulatory) aspects of society. In order to enhance the Calibre and coherence of these reports, we evaluate and analyse three institutional strategies in this study. Corporate Social Responsibility (CSR)-Sustainability Monitor, Global Reporting Initiative (GRI), and ISO 26000 are the organizations participating. We plan to demonstrate their various methods for directing CSR reporting and evaluate the advantages and disadvantages of each. (Sethi, Rovenpor, & Demir, 2017)

Vidhi Chaudhari (2016) – "Corporate social responsibility and the communication imperative perspective from CSR manager". The study looks at how crucial communication is for corporate social responsibility, or CSR. The study contributes to the body of research that identifies communication as a critical component in the application of socially responsible behaviour. It is based on in-depth interviews with CSR managers in significant domestic and global firms in India. The research additionally considers the points of convergence and divergence between academic research and CSR communication practice. (Chaudhari, 2016)

Rishika Shivkumar Sangolli (2020) - "Impact of Corporate Social Responsibility on the Financial Performance of Indian Companies". Evaluating the impact of corporate social responsibility (CSR) on the financial performance of different Indian enterprises is the main goal of this study. CSR is frequently viewed as a proactive business strategy that should be implemented in conjunction with marketing techniques in order to get a competitive edge. The sample size for this study consists of twenty Indian companies that are listed on the Indian stock exchange. (Sangolli, 2020)

Dr. Monica Singhania Dr. Neha Saini (2021). "System approach to environment social and governance ESG case of Reliance" Industry Through the actions and initiatives of corporates considering ESG initiatives, the paper aims to study how professional acculturation and appropriate capital are leading to the advance agenda of sustainability. It also measures the effectiveness of the resulting responsible actions by all social actors through an assessment based on national ranking systems for ESG disclosures and sustainability in the Indian context. The reason Reliance Industries Limited (RIL) was selected to explore the system approach is that the company has been coordinating its initiatives with ESG rules. These investments draw in socially conscious investors and provide value to their

portfolios. The systems approach has been used to showcase the socially and environmentally conscious projects that the major Indian multinational Reliance Industries has undertaken. Through a case study, we have attempted to suggest how an initiative (input) might be transformed into an outcome (output) to benefit society as a whole, taking into account the ESG structure as a processing framework. (Singhania & Saini, 2021)

3.0 Research Methodology

3.1 Objective of the study
1. To analyse Reliance Industries' wider corporate social responsibility initiatives.
2. To evaluate the possible effects of the Vantara project on the community.
3. To determine public perception regarding Vantara's initiative and engagements.
Here is an even more detailed and formal version of the research methodology:

A thorough and in-depth evaluation of the Vantara program was conducted by carefully crafting and implementing a descriptive research methodology based on a case study approach. Because this methodological approach allowed for a complete assessment of the program's complicated aims, several implementation strategies, and overall impression on the community, it was determined that it was very appropriate. The use of a case study methodology allowed for a thorough examination of the Vantara program's operational environment and yielded valuable insights into the program's practical implications and the intricate web of public opinion surrounding its objectives.

3.2 Data collection
3.2.1 Primary data
Leveraging the robust Google Forms system, an online survey instrument that was carefully designed was used to gather the core data for this study. In order to reach a representative and diverse sample of respondents, the survey was distributed using careful convenient sampling techniques, making strategic use of social media platforms as well as appropriate online groups. By ensuring an expanded representation of public opinion, this method reduced the possibility of partiality caused by conventional sampling methods and improved the reliability and applicability of the results.

With great care and attention to detail, the survey instrument itself was created, carefully combining quantitative and qualitative questions to enable a thorough and nuanced assessment of public perception and sentiments about the Vantara initiative. In addition to rating scales and multiple-choice answers, the questionnaire included a thoughtful combination of open-ended and closed-ended questions, giving respondents the chance to offer in-depth analysis, remarks, and complex viewpoints.

The following were the survey's main focus areas:

1. Evaluating the respondents' awareness of and comprehension of the Vantara program and its overall goals.
2. Measuring how the program is perceived in relation to important areas including community development, environmental preservation, and animal welfare.
3. Assessing the effectiveness of Reliance's more extensive CSR programs and how well they complement the Vantara effort.
4. Examining the program's long-term sustainability goals, community engagement tactics, and openness via the prism of public opinion.
5. Asking perceptive ideas and recommendations from participants to improve the Vantara program's efficacy, outreach, and societal impact.
6. To ensure the validity and reliability of the survey instrument, a thorough pilot study was conducted with a limited sample of respondents. This pilot research contributed to ensuring the validity, applicability, and clarity of the questions posed by identifying and resolving any potential issues, ambiguities, or shortcomings in the questionnaire.

3.2.2 Secondary data

Apart from the primary data obtained via the online survey, a wide range of secondary data sources was carefully selected and employed to offer contextual reinforcement and validate the research outcomes. These sources included:

1. Annual reports, sustainability reports, and CSR publications from Reliance Industries, which offered details about the company's goals and strategies.
2. Scholarly works with peer review that provide theoretical and empirical underpinnings for CSR activities, animal welfare, and environmental protection. Public commentary and contemporaneous accounts of the Vantara program and Reliance's CSR initiatives can be found in media publications, news articles, and pertinent web resources.
3. Publications and industry reports on developing trends and best practices in corporate social responsibility that help to benchmark and contextualize the results.

3.3 Data analysis

The gathered information was subjected to a thorough and methodical investigation in order to produce insightful findings and solid conclusions. A full variety of descriptive statistical analyses, including measures of dispersion (standard deviation, range) and central tendency (mean, median, and mode), were applied to the survey's quantitative data. A detailed grasp of the answer distribution was given by these statistical studies, which also emphasized any notable patterns, trends, or outliers. A thorough thematic analysis—a well-known and reliable method in qualitative research— was applied to the qualitative data gathered via open-ended

questions and comments. Through a methodical and iterative approach, this procedure involved finding, evaluating, and reporting patterns or themes within the gathered data. Thematic analysis allowed for a thorough assessment of the viewpoints, experiences, and attitudes of the participants about the Vantara program, which provides insightful background and subtlety enhance the results.

In addition, a critical and rigorous analysis and synthesis process was applied to the secondary data sources in order to support or refute the findings of the main data, resulting in a well-rounded, multifaceted, and thorough grasp of the research issue.

Age Distribution: The majority of respondents (66.7%) fall within the 18-30 age group, indicating a strong representation of younger individuals in the survey. A smaller proportion of respondents are in the 31-40 age group (24.6%), while only 8.8% are aged 40 and above. This distribution suggests that the survey captured the perspectives of a predominantly younger demographic, which may influence the overall perception and attitudes towards initiatives like Vantara. Table 1 gives the data of age of respondents and frequency collected from the survey.

Table 1: Age Distribution

AGE	Frequency	Percentage
18 – 30	38	66.70%
31 – 40	14	24.60%
40 above	5	8.80%
Total	57	

Source: Survey data

The large percentage of respondents who were between the ages of 18 and 30 indicates that younger people are more inclined to use online resources and take part in surveys, which could skew the results in favour of their viewpoints. In comparison to older age groups, younger people could have different expectations, attitudes, and priorities with regard to corporate social responsibility programs like Vantara. Comprehending their viewpoints is imperative in evaluating the efficacy and pertinence of said endeavours in involving future generations.

Educational Qualification: At 42.1% of the total, those with undergraduate degrees make up the largest group. Respondents with post-graduate degrees, who made up 31.6% of the sample, come next. Only 3.5% of respondents have less education than a high school diploma, whereas a lower percentage of respondents (22.8%) have finished their HSC. Based on the distribution, the survey sample appears to be reasonably well-educated, with a sizable share having completed at least an undergraduate degree. The data on respondents' educational backgrounds and frequency, gathered from the survey, is shown in Table 2.

Table 2: Educational Qualification

Education	Frequency	Percentage
Less than high school/Diploma	2	3.50%
Higher Secondary Education	13	22.80%
Undergraduate	24	42.10%
Postgraduate	18	31.60%
Total	57	

Source: Survey data

A reasonably educated sample is shown by the predominance of respondents with undergraduate and doctoral degrees; this could point to a stronger awareness of and involvement with social concerns, including CSR projects. Higher educated people might have easier access to tools and information, which would allow them to assess CSR projects like Vantara more critically and provide insightful responses to the poll. In general, the distribution of respondents' ages and educational backgrounds provide crucial context for understanding the poll results on respondents' opinions of Vantara. Engagement of people in activities related to animal welfare (e.g., Volunteering at shelters, donating to animal charities):

Table 3: Participation in Animal Welfare Initiatives

Particulars	Frequency	Percentage
Frequently	11	19.3
Occasionally	15	26.3
Rarely	23	40.4
Never	8	14

Source: Survey data

The mean and median scores of 14.25 and 13, respectively, suggest that respondents reported engaging in activities related to animal welfare at a moderate frequency overall. The mean score, slightly above the midpoint of the response scale, indicates that on average, respondents reported engaging in these activities occasionally or rarely. This suggests that while there is some level of participation in animal welfare activities among respondents, it is not extremely frequent.

The median score of 13 indicates that roughly half of the respondents reported engaging in these activities occasionally or rarely, while the other half reported engaging in them rarely or never. This suggests a fairly even distribution of responses across the frequency categories.

Overall, the examination of the answers to this question shows that although respondents do participate in some animal welfare-related activities, they do not do so very frequently. For programs and organizations like Vantara, this data can offer

insightful information that can help shape outreach and engagement tactics aimed at promoting more involvement in animal welfare initiatives.

3.4 Ethial Considerations

Throughout the research process, ethical considerations were prioritized above all else to ensure the integrity, dependability, and ethical soundness of the study. Every survey participant gave their informed consent, and their anonymity and privacy were fully protected in accordance with established ethical guidelines and practices. Additionally, as indicated by relevant ethical frameworks and best practices, the study complies with the core ethical precepts of beneficence, fairness, and respect for individuals.

3.5 Limitations

Even though every effort was made to ensure the validity and rigor of this study, it is important to identify and address any potential flaws. The convenience sample approach may have introduced selection bias even though it was well-planned and executed, which may have restricted how widely the findings could be applied. Moreover, the opinions and viewpoints of the respondents can have been shaped by a range of elements, such as individual encounters, media exposure, ingrained prejudices, and sociocultural settings. In order to address these limitations, a concentrated effort was made to contact a representative and diverse sample of respondents. Additionally, data was triangulated from several sources to increase the reliability and validity of the conclusions.

4.0 Findings

The majority of respondents, according to the study project's findings, believe that Reliance Industries' CSR initiatives—including Vantara—are real. Moreover, there is broad consensus among participants that the Vantara program was introduced more as a public relations campaign than as a legitimate corporate social responsibility project. Respondents nonetheless showed confidence in the ability of big businesses like as Reliance Industries to positively influence environmental and wildlife conservation efforts through programs like Vantara, even in spite of this impression.

With respect to the Vantara program's start date, a sizeable segment of participants thought it was purposefully timed to maximize favourable public perception, although a smaller segment disagreed. Furthermore, the majority of participants said that the Vantara program matched their personal interests and values for animal welfare and environmental conservation.

Despite this perception, respondents displayed confidence in the effectiveness of large corporations like Reliance Industries in making a positive impact on environmental and wildlife conservation efforts through initiatives like Vantara. This suggests a level of trust in the capabilities of corporations to drive

meaningful change in these areas. Through proactive communication and genuine commitment to CSR objectives, Reliance Industries can mitigate scepticism and reinforce the credibility of the Vantara programme as a genuine vehicle for positive social and environmental change

Figure 1: Reliance Industries' Overall Sincerity in CSR Initiatives
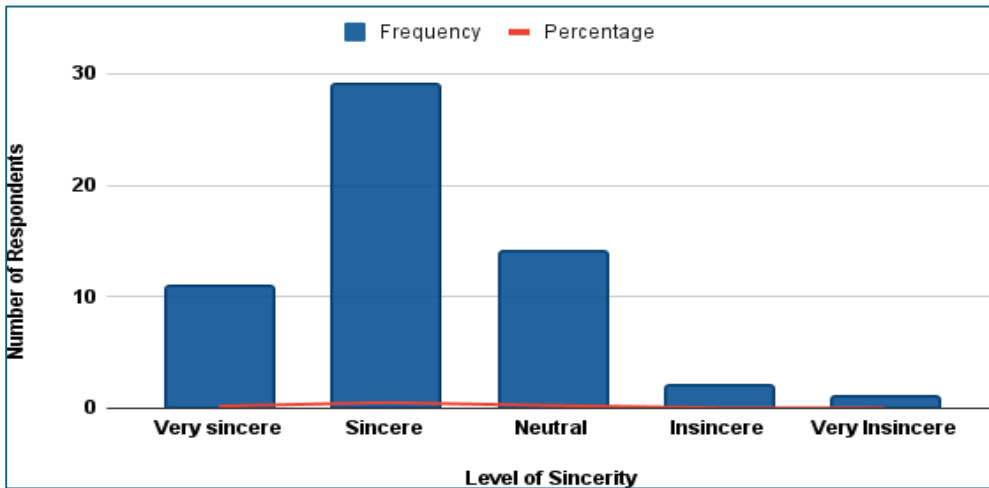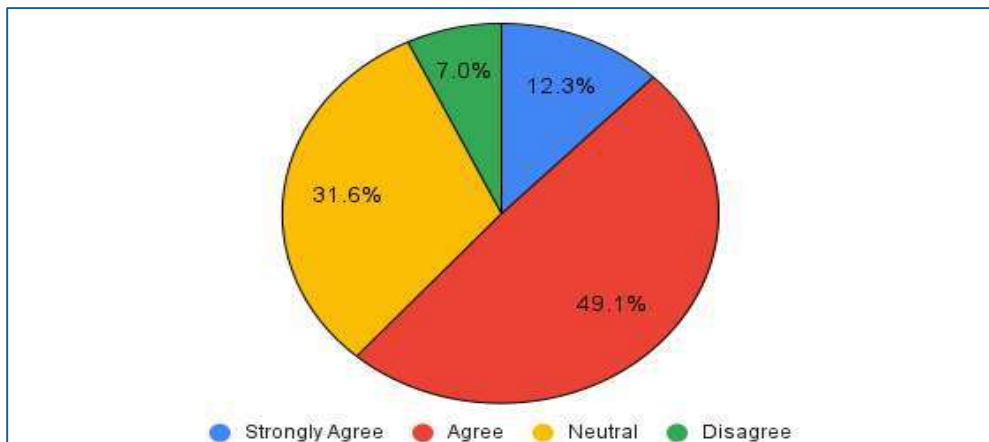

Source: Survey data

The mean and median scores for respondents' ratings of Reliance Industries' overall sincerity in their CSR efforts, including initiatives like Vantara, were 11.4 and 11, respectively. This indicates a predominantly positive perception among respondents, with the majority rating Reliance Industries' sincerity as either "Sincere" or "Very sincere." The high mean and median scores suggest a consensus among respondents that Reliance Industries demonstrates a high level of sincerity in its CSR endeavours. This positive perception could be attributed to various factors, including the visible impact of CSR initiatives on communities, transparent communication about CSR activities, and a genuine commitment to addressing societal and environmental challenges.

It's noteworthy that the responses skewed towards the higher end of the scale, with very few respondents indicating neutral or negative perceptions of Reliance Industries' sincerity in CSR efforts. This suggests a strong level of trust and confidence among respondents in the company's dedication to social responsibility. Therefore, on-going efforts to maintain transparency, engage stakeholders, and communicate the tangible impact of CSR initiatives will be crucial for sustaining this positive perception over time. Overall, the analysis suggests that Reliance Industries has been successful in cultivating a positive image of sincerity in its CSR efforts, as reflected in the favourable ratings

provided by survey respondents. This perception bodes well for the company's reputation and its ability to continue making a meaningful impact through CSR initiatives like Vantara.

**Figure 2: Vantara Programme as a Public Relations (PR) Effort rather than a Genuine CSR Initiative**

Source: Survey data

The majority of respondents seemed to incline toward agreeing that the Vantara program was primarily introduced as a PR effort rather than a legitimate CSR endeavor, based on the mean and median ratings of 11.4 and 7, respectively. The results show that participants' perceptions of the program's goals are mostly in agreement with one another.

A sizable percentage of respondents selected answers that indicated agreement with the statement, as evidenced by the comparatively high mean score. This indicates a general perception among participants that PR considerations, rather than real CSR objectives, may have been the driving force behind the Vantara program. The median score of 7 indicates that there is a range of responses, including some dissent, despite the high tendency towards agreement. This suggests that although a large number of respondents are adamant that the program was introduced for public relations goals, other respondents might have a different opinion or be less clear about the reasons for the introduction.

All things considered, the examination of the answers to this query reveals a common belief among the participants that the Vantara initiative might have been primarily motivated by public relations strategies. In order to address stakeholder concerns and preserve confidence in the company's intentions and actions, this finding emphasizes thesignificance of openness and communication in corporate CSR programs. Effectiveness of large corporations like Reliance Industries in making a positive impact on environmental and wildlife conservation.

Figure 3: Effectiveness of Reliance Industries in Making a Positive Impact on Environmental and Wildlife Conservation
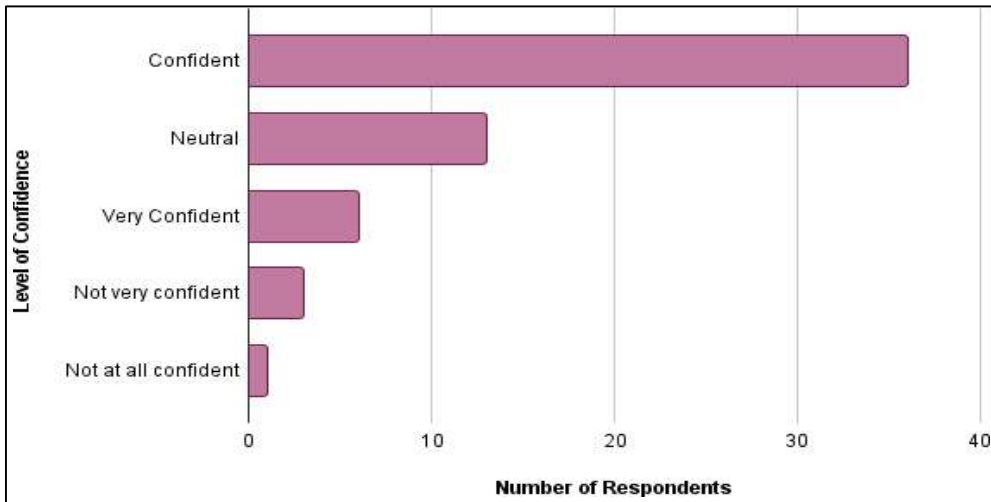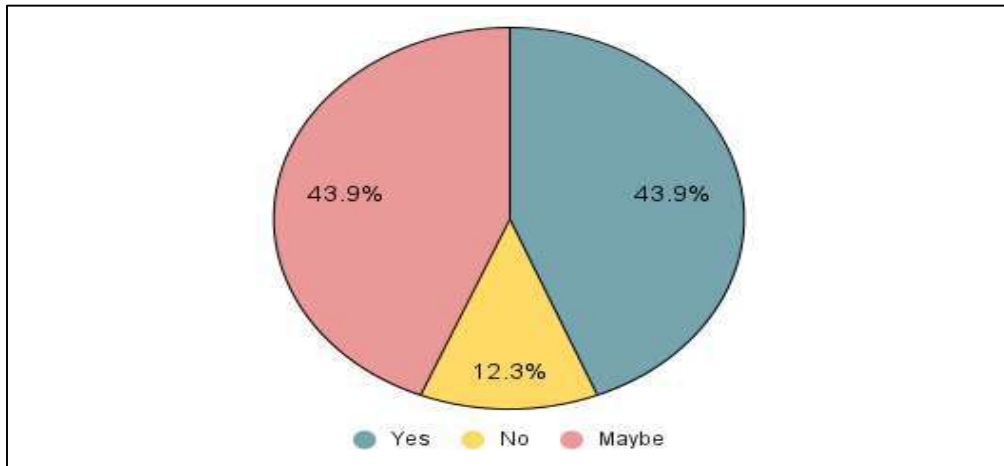

Source: Survey data

The majority of respondents appeared to believe that big businesses like Reliance Industries can effectively contribute to environmental and wildlife conservation efforts through programs like Vantara, as indicated by the mean and median scores of 11.4 and 7, respectively. With many respondents selecting answers indicating high levels of trust in the efficacy of business actions in this area, the comparatively high mean score reflects a large level of confidence among respondents. A range of responses is indicated by the median score of 7, which may indicate that some participants are unsure or ambivalent regarding the efficacy of business efforts in environmental and wildlife conservation.

According to the examination of the responses to this question, there is a general consensus that big businesses like Reliance Industries can effectively influence environmental and wildlife conservation through programs like Vantara. According to the study's respondents, this result highlights the potential for corporate entities to significantly contribute to addressing environmental concerns and promoting conservation activities. Thus, it is imperative that environmental conservation efforts continue to be transparent, accountable, and produce measurable results in order to preserve and strengthen public confidence in corporate social responsibility programs. The mean and median scores of 19 and 25, respectively, suggest a mixed perception among respondents regarding whether the timing of the Vantara programme's launch was strategically planned for maximum positive public perception. The relatively low mean score indicates a tendency towards responses indicating uncertainty or disagreement with the notion that the programme's timing was strategically planned for maximum positive public perception. This suggests a

significant proportion of respondents may not believe the timing was specifically orchestrated to garner positive public perception.

Figure 4: Strategic Timing of Vantara Programme Launch:
Maximizing Public Perception

Source: Survey data

However, the higher median score indicates a range of responses, including some participants who may lean towards agreeing that the timing was strategically planned for positive public perception. This suggests a diversity of perspectives among respondents, with some expressing uncertainty or neutrality while others may perceive strategic intentions behind the timing of the programme's launch.

Overall, the analysis of responses to this question suggests a nuanced perception among respondents regarding the strategic planning of the Vantara programme's launch for maximum positive public perception. While there is a notable level of uncertainty or disagreement, there is also acknowledgment of the possibility that strategic considerations may have influenced the timing of the programme's introduction.

The mean and median scores for respondents' perceptions of the impact of Vantara on the community provide insights into how Vantara is perceived in terms of its community impact. The mean score of 11.4 suggests that, on average, respondents perceive the impact of Vantara on the community as positive to very positive. This indicates an overall favorable perception of Vantara's community impact among respondents. The median score of 9 suggests that the middle respondent chose "positive" as their response. This indicates that a significant portion of respondents perceive Vantara's impact on the community as positive, with an equal number perceiving it as very positive or neutral.

The favorable perception of Vantara's impact underscores the importance of community engagement and support for the success of CSR initiatives like Vantara.It

suggests that Vantara's efforts resonate positively with community members, highlighting the effectiveness of its programs in addressing community needs and priorities. While the overall perception of Vantara's impact on the community is positive, there may still be opportunities for further enhancement and expansion of its initiatives to reach more community members and address emerging challenges in animal welfare and conservation. Overall, the analysis suggests that Vantara has made a positive impression on the community, with respondents perceiving its impact as beneficial and valuable. This favorable perception bodes well for Vantara's continued efforts to make a meaningful difference in promoting animal welfare and environmental conservation within the community.

Figure 5: Impact of Vantara on Community
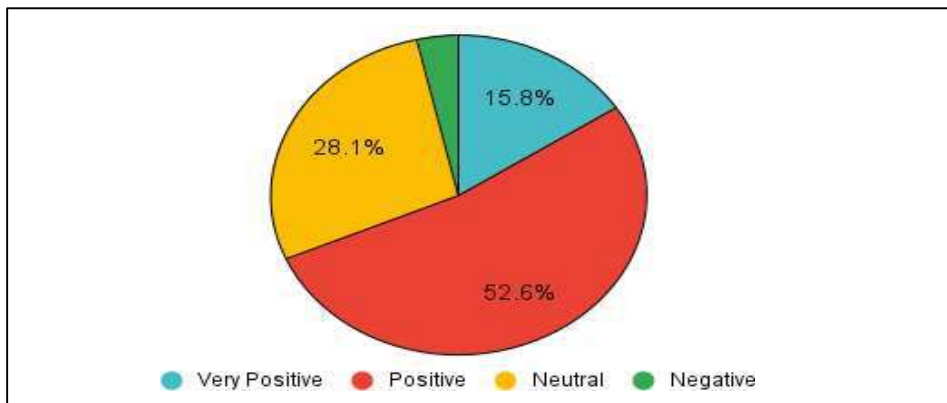
Source: Survey data

4.1 Elaborated results

1. *Sincerity in CSR Efforts:* The majority of respondents perceived Reliance Industries' CSR efforts, including initiatives like Vantara, as sincere. This positive perception suggests that Reliance Industries has effectively conveyed its commitment to corporate social responsibility, instilling confidence among the public regarding the authenticity of its CSR endeavours.
2. *PR vs. CSR:* Despite the overall perception of sincerity in CSR efforts, a noteworthy proportion of respondents viewed the Vantara programme as primarily launched for PR purposes rather than genuine CSR. This indicates a level of skepticism or critical scrutiny among respondents, possibly influenced by factors such as corporate reputation or perceived motives behind the programme.
3. *Confidence in Effectiveness:* Respondents demonstrated confidence in the effectiveness of large corporations like Reliance Industries in driving positive environmental and wildlife conservation efforts through initiatives like Vantara. This confidence reflects a belief in the potential impact of corporate-led initiatives on addressing complex societal and environmental challenges.

4. *Timing and Strategic Perception:* The mixed responses regarding the timing of the Vantara programme's launch suggest varying perceptions among respondents. While a slight majority indicated that the timing may have been strategically planned for positive public perception, a significant proportion remained uncertain or disagreed. This highlights the complexity of public perception and the potential influence of strategic considerations on CSR initiatives.

5. *Alignment with Personal Values:* The majority of respondents believed that the Vantara programme aligns with their personal values and priorities regarding environmental conservation and animal welfare. This strong resonance indicates that the programme effectively resonates with the values and concerns of the general public, enhancing its perceived relevance and significance.

5.0 Conclusion

The findings of this research project offer valuable insights into public perceptions of the Vantara programme, a CSR initiative launched by Reliance Industries and Reliance Foundation. Overall, respondents expressed a positive perception of Reliance Industries' sincerity in their CSR efforts, with many believing in the company's genuine commitment to making a positive impact on environmental and wildlife conservation through initiatives like Vantara. However, there were also indications of scepticism and uncertainty surrounding certain aspects of the programme. The mixed responses regarding the motives behind the launch of the Vantara programme, as well as uncertainties regarding the timing of its launch, underscore the importance of transparency and communication in corporate CSR initiatives. Reliance Industries can address these concerns by enhancing transparency surrounding the programme's objectives, activities, and outcomes, and by actively engaging with stakeholders to address their questions and uncertainties. Despite these challenges, the majority of respondents expressed confidence in the effectiveness of large corporations like Reliance Industries in contributing positively to environmental and wildlife conservation efforts. This confidence presents an opportunity for Reliance Industries to continue investing in and expanding initiatives like Vantara, while prioritizing transparency, accountability, and stakeholder engagement to maximize their impact.

In conclusion, while there may be varying perceptions and uncertainties surrounding the Vantara programme, the findings of this research project underscore the importance of on- going dialogue, transparency, and collaboration in corporate CSR initiatives. By addressing stakeholder concerns and actively involving them in the process, Reliance Industries can further strengthen their commitment to social and environmental responsibility and make a meaningful difference in the communities they serve.

6.0 Recommendations

- Reliance should give top priority to the development of inclusive community advisory committees which involve a variety of stakeholders, including local committees, tribes, women's associations, youth clubs, ecological non-governmental organizations, and other appropriate local groups. These committees will improve the way decisions are made, building community trust and a sense of ownership.
- The company should work with educational institutions to plan outreach events, field trips, and demonstrations that introduce environmental ideas and highlight program accomplishments. Future generations will be taught environmental responsibility if these activities are incorporated into the curriculum.
- To give communities an opportunity for achieving environmental goals, Reliance should establish training programs in sustainable agriculture, ecotourism, and agroforestry. In addition to providing business knowledge and entrepreneurship training, these programs ought also to include hands-on training in pest management, organic farming, and ethical travel, enabling local people to establish sustainable companies that support the preservation of forests.

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Appendics

https://images.app.goo.gl/EAiCcpJppiQyANNw8

https://images.app.goo.gl/vZ2FXSN8iaBHWN8Y6

https://timesofindia.indiatimes.com/travel/travel-news/all-about-vantara-the-3000-acre- animal-shelter-launched-by-anant-ambani-in-jamnagar/articleshow/108098838.cms

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CHAPTER 17

The Impact of Generative AI on Contemporary Art Market

Surabhi Gulwelkar*

ABSTRACT

This research paper illuminates the profound influence of Generative AI on the Art Market. Through the analysis of the current scenario, this research explores how Artificial Intelligence has impacted on traditional art concepts and methods as well as practicing and beginner artists who explore advanced ways of creativity. In addition, the research paper analyses the economic impacts of Artificial Intelligence on today's art market. Studying the data of well-known art galleries, online art selling platforms, auction houses and their market trends, it reveals how AI-generated art is being accepted by art buyers and investors. At the same time, this study also analyses the challenges that AI-generated art creators & collectors have to face in the near future. The earlier studies and empirical evidences are analysed and presented critically in this research. Ultimately, this research paper attempts to highlight the transformative impacts of the new age technology on the traditional art practice and marketing. The research paper is concluded with insightful findings and suggesting the scope for future researchers.

Keywords: Generative AI, Art, Art market, Artworks.

1.0 Introduction

1.1 Overview of generative AI

Generative AI is a well-known tool among today's content creators for producing images, text, artwork, and other creations. It is a kind of artificial intelligence technology. AI is motorized by developing algorithms and it has achieved the ability to create appealing content. Therefore, the boundary between human and machine creativity is somehow blurred today. For generating the content from AI, it is necessary to provide a 'prompt' to the software. It could be in the text, image, design, or voice form. The uniqueness of the generated content is generally depending on the creative and smart prompts. Hence, Prompt engineering has also developed as a distinguished profession at present. After getting the expected outcome through the prompts, the artist or creator needs to evaluate it and edit it according to the requirement. The algorithms of artificial intelligence can scrutinize the existing references, artworks, and styles and generate original content.

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In this way, it has become easier to get the desired outcome in a more superior form and in very little time. This new technology highly impacted the Art field. The artists acquired an efficient way to quickly generate art & ideas, and at the same time art market started developing new forums for purchasing AI-based art as well as digital or mixed art.

1.2 The statement of the problem

Generative AI & algorithms are highly influencing the creative process. Many artists have started accepting this new technology to continue their art process. To cope up with the new age technology, it is necessary to analyse the implications of AI-based art on conventional art-making and buying processes. How the contemporary art market is reshaping with the new trend, what are the economic implications, ethical issues, and challenges associated with the authentication of art these are the prime questions and challenges today. Addressing these problems is essential for understanding the deep impact of Generative AI on the entire art field.

1.3 Significance of the study

The significance of this research is multifaceted for various stakeholders which include, artists, art collectors, art buyers and investors. AI technologies are profoundly changing the method of art-making. The integration of Artificial Intelligence into the art field raises many probes regarding the key factors of the art creation and art sales. This study satisfies the quest of these fundamental dynamics. To sustain and grow with the new technology, both, the artists as well as art buyers have to upgrade themselves with the upcoming technology i. e. Generative AI which is on the threshold of the new era. With the study of its impact on art market, one can gain deeper insights about the contribution of technology to the art industry.

1.4 Research objectives

Generative AI is changing the horizon of the art field. The machine learning algorithms are highly impacting on conventional practices of art industry. The prime objective of this research is to investigate the implication of technological interference into human creativity and its impact on economics. Secondly, to highlight the challenges and opportunities for those who are incorporating generative AI in their practices, including the artists, designers, art buyers, art collectors and other stakeholders. Artificial Intelligence in art raises profound ethical questions regarding the originality of the artwork, copyrights and intellectual property right. To provide ethical guidelines for AI driven art practices is another motive of this study.

2.0 Review of Literature

2.1 Overview of previous literature

The contribution of Artificial intelligence is largely growing in the various

fields and it is challenging the conventional practices. The rise of generative AI has brought a revolutionary change in the art industry. This review of the literature aims to provide a broad overview of existing studies exploring the impact of generative AI on traditional as well as contemporary art practices. Generative AI is majorly depending on the set of instructions which we provide with the 'prompts'. The machine algorithm works on it and provides the desired outcome quickly. According to the research of Alexander Leiser et. al. (2023), "for the application in the art field, AI is useful to stimulate the human painting process e.g. about location, shape, colour etc. areas being painted in each step. Such applications are like a robot paints a picture or a program teaches humans to paint." AI is working smartly in modern business models. The attractive graphics and visuals for advertising has become more efficient.

Though generative AI prominently came into the spotlight since last few years, it has a long history. In 1973, the famous scientist as well as an artist, Harold Cohen innovated the first ever Artificial Intelligence generative program of art. It was named as AARON. After four decades, Generative Adversarial Networks were created. In a short form it is known as GANs. GAN has huge contribution in today's creative process. Later, around in 2015, the machines were started to train in a way, that they can understand and utilize the text prompts to create images in the result. Earlier the process was reverse. Same like the cell-phones, just image to text. In 2021 the software DALL-E was developed. It was the first software, which started working in text to image format. It was created by Open AI. There is an interesting relation to art with its name. The name DALL-E is a combination of artist Salvador Dali and Wall-E by Pixar. As soon as DALL- E came into the use, It brought a new revolution in Artificial intelligence. It started work in the form of text to images format. It enabled the creators to generate art or images with the help of the prompts provided in the form of text. In 2022, open source developers started developing AI Art Generators. Sooner, Midjourney software was developed. The rise of innovative software provided new dimensions to the creative process through generative AI.

The research by Denna Mclean (2024) explores how Generative AI exactly works. She states, "Generative AI uses deep machine learning to produce text from images. At first, the computer takes a guess at what your text prompt is looking for, then continues to run it repeatedly until it gets it right. The program is given variables to consider to look for metrics to match the text prompt to generate an image. For example, use the prompt *a pink garden gnome*. The AI will begin processing the information considering different variables such as examples of gnomes, shapes, pink images, gardens and other variables. It makes its best guess what it thinks a pink garden gnome is."

A well-known futurist, Bernard Marr (2023) states, "among the transformative forces in the art world, generative AI has emerged as a tool of extraordinary potentials. At the intersection of technology and creativity, generative AI algorithms function as virtual collaborators, assisting artists in creating artworks

of unique aesthetic Value. In the process, artists design algorithms or rules that AI follows to generate art pieces, leading to an exciting blend of human creativity and machine efficiency. The resulting artwork, inherently unpredictable due to the nature of algorithms, often possesses unique dynamism, complexity, and scale that could not be achieved by human hand alone."

Mr. Nitin Mittal et. al. (2023) gives an example to explore the market application of AI generated art that, "Stich Fix Clothing Company uses AI, DALL-E 2 software to create the visuals inclosing various styles, colours, fabrics as per the customers' requests and preferences. Even, Mattel Company is using the technology to create the images for toy design and marketing." Earlier this job used to be done by the applied artist, but now artists are replaced by AI. This is an alarming situation for art creators. If artists adopt this new technology or they can combine their conventional art skills with AI, then their opportunities will increase largely in the future.

While discussing about human's credit and ownership issues of AI- based art, Zip Epstein (2020) states in his research that "No AI acts alone, completely divorced from the influence of humans. Even the artwork Edmond de Belamy, which was claimed to be ''entirely realised by an algorithm,'' was the result of the creativity, hard work, and decisions of numerous human contributors." In the research of Jo Lawson-Tancred (2024), it is stated that "AI and the art market is the increasingly hot topic. One should consider the benefits of AI, but never underestimate its ethical complications and practical limitations."

It has been noticed that many of the studies are emphasizing the positive sides of generative AI in the future of the work, but still few researchers are raising the question about the prime role of the human's creativity in the such kind of generated art as well as creative content. Even they predict that in the upcoming techno-savvy era the art created by human interference, will get more value than the artificial creation.

David De Cremer et. al. (2023) critically analyzes the implications of Generative AI. He remarks that, "we could see develop is one where the "techlash" resumes with a focus against algorithmically generated content. One plausible effect of being inundated with synthetic creative outputs is that people will begin to value authentic creativity more again and may be willing to pay a premium for it. While generative models demonstrate remarkable and sometimes emergent capabilities, they suffer from problems with accuracy, frequently producing text that sounds legitimate but it is riddled with factual errors and erroneous logic. For obvious reasons, humans might demand greater accuracy from their content providers, and therefore may start to rely more on trusted human sources rather than machine-generated information.

The literature reviewed validates the multi-layered impact of AI on current art world, from art creation to its application as well as authentication of generated art.

2.2 The research gap

Generative AI is one of the trending topics today. Existing research offers valuable information about AI and its creativity process. But for gaining deeper insights about generative AI and understanding its impact on the contemporary art market, few research gaps need to be investigated. The long term effects of the interference of artificial creativity into the various segments of traditional art system, e.g. the impact on artists, art galleries, art oriented business has to be analyzed. Secondly the originality and authenticity of AI-generated art is need to be investigated with empirical evidences.

3.0 Methodology

3.1 Research design

This is a descriptive research and it comprises the qualitative approach. This research approach helped to study the multi-dimensional characteristics of the research topic in depth.

3.2 Data collection method

Interviews and observation method are the key methods for primary data collection of this research. Conducting the interviews of practicing artists, art buyers and curators provided profound insights about the research topic. Unstructured interviews with open ended questions helped to collect the required data. Similarly, observing the AI- generated art and its application, creative process offered qualitative aspects for this study. Furthermore, the scholarly articles, statistics and sales record of the online art platforms helped to investigate on this research topic.

3.3 Data analysis techniques

Comparative and content analysis techniques are used for data analysis of this qualitative research. The collected data from the interviews and the empirical evidences documented from the observations are analysed to discover the facts about the application of AI generated Art in the market.

4.0 Result and Findings

4.1 Impact on art practice

The intense use of generative AI by the artists and illustrators can be seen in the last couple of years. Even it is being used for the studio work by the traditional artists. Though it is not as a complete replacement to conventional set up, but it is profoundly used as an assistant. The world is changing very fast. There is a vast competition. The field of art is also not an exception. Today, the AI users are finding innovative ways and means to swift the activities and hence traditional artists should not lag behind compared to their achievements. The traditional artists had to spend

their time to create key sketch with different perspectives and select the suitable one. This process is very time consuming. Whereas AI can directly create various options of the sketch in multi modal view and the user can opt the best suitable option out of these within no time. The versatile tools of AI are allowing the artists to pre-visualize their final output and rapidly generate the key sketches of the innovative ideas. New algorithms are developed in generative AI. They can imitate the signature styles of renowned artists. This is allowing the creators to generate the artwork in a specific aesthetical pattern or from the particular era, without any training. Many tools can transform an average artwork into the style of Picasso, Rembrandt or Van Gogh. The abilities and efficiency of the artists are upgraded with this new technology.

4.2 Acceptance of artificial intelligence by the art buyers

Online art galleries, crypto currency and NFT based art markets these are the trending forums for selling the Artificial Intelligence generated art. Saatchi Art Gallery, Artsy Gallery etc. world famous galleries have started offering the platform for artists and art collectors to purchase and trade the AI-based art. Artists can individually also sale their AI generated artworks through their own websites. Many art galleries have opened a separate section for displaying & selling the digital art. As the AI-based art does not require conventional art material, which is really expensive, the production cost of these artworks are comparatively less. However, the selling price is quite similar to the traditional art. It directly benefits the artists. Additionally, AI- based art generates in very less time. Hence, the art created by this new media and technique, is being popular among the artists and art collectors. Artist or art seller just need to mention the genre of art, thought process behind the artwork and target audience. The artwork gets massive reach by executing this process appropriately.

The most valuable AI-generated art till date is made by the Paris based collective. The title of this artwork is 'Portrait of Edmond de Belamy". This digital artwork sold at $432,500 in the prestigious Christie's Auction House, New York, in 2018. This artwork is a blurred portrait of a man with no clear facial features.

Figure 1: Portrait of Edmond de Belamy

*Source- https://www.deltecbank.com/2023/04/24/the-future-of-ai-based-art/*

This is the first massive sale of AI generated art. It built the connection between AI and the art market. Even in September 2022, AI generated artwork won the first prize in Colorado State Fair, in digital art category. Such moments boosted the artist to create art with AI and promoted the art collectors to invest in AI-based Art.

4.3 The Lookout of Art Galleries on AI –based Art

Just like a third party independent thinker, the AI provides an out-of-the-box imagination. The intermediaries between an artists & the art lovers are attracted towards this technology due to its unique feature of finding a golden mean between man-made art and the machine-made creativity. Chances of increasing the quantum of the proposed buyers are more - this is exactly the art galleries think while looking at the AI with this angle. In earlier days, the stake holders were very limited, like an artist, the art gallery and the final buyer. With an introduction of AI, the AI developers are also added in this group. Consultation with them and their views are also important for the other three members to arrive at a final conclusion to meet the buyer's need of satisfaction. It is leading towards a new collaboration that creates interest of the galleries.

As far as the cost analysis is concerned, AI generated art requires only the initial investments. But at a later stage it requires very negligible cost. Ultimately the final cost of the product, here an artwork, reduces to a great extent. There is no need to use a canvas or variety of brushes, expensive colours and media. Also the man-hours involved in this process are very less. Ultimately the cost of an artwork reduces. Hence the customers are leading towards buying decision. In some cases, the galleries have an option to earn a considerable commission without passing on this cost benefits to the wealthy customers. These interpretations of the art galleries are elaborated briefly in the below diagram.

Figure 2: Outlook of the Art Galleries on AI-genrated Art
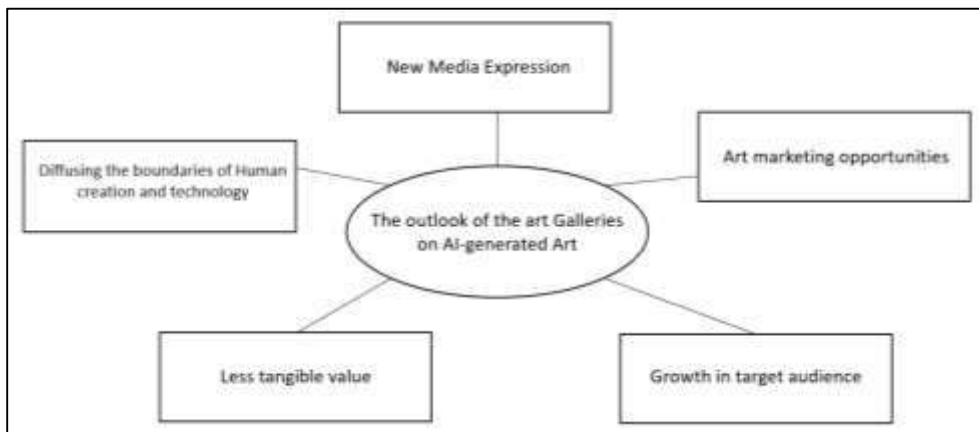
Source: Created by the researcher

4.4 The Application of AI-based Art in Market and Industry

After an entry on the global platform by Indian economy, especially after 1991 and the electronic revolution accelerated in & around this era, the Indian artists had options to use electronic devices in their different fields of career. One of the steps in this direction was the use of generative AI. The artists have started using the generative AI more or less from the second decade of the century. The swift of the development is so high that today almost all the industries can be covered through the generative AI. With the creative mind, an artist can now apply the generative AI and achieve their growth rapidly and simultaneously open the doors through an innovative tool.

Advertising, animation, gaming, textile, design etc. industries majorly function on application of art, which is also called as applied arts. These industry oriented streams have started implementing AI algorithms for increasing their efficiency. AI can not only produce the new pictures, but also improves old pictures. It provides versatile visual effects as well as pre visuals for advertising campaigns. The advertisement of Heinz Ketchup went viral in 2022 which is completely AI-based. Earlier, for the same process was tremendously time consuming for both, the artist and industries.

Figure 3: AI Application in Heinz Ketchup Advertising

Source: https://www.creativebloq.com/news/heinz-ai-draw-ketchup

The Famous artwork of Dutch Artist, John Vermeer's painting 'The Milkmaid" was recreated for the advertising camping of Nestle for promoting the yogurt. The advertising team developed the art work by using DALL-E 2's new 'Outpainting function'.

Figure 4: Vermeer J. (1658). The Milkmaid [Painting]

Source: https://musebycl.io/art/nestle-and-ogilvy-used-ai-expand-vermeers-milkmaid

This is the original artwork, which is Oil on Canvas medium.

Figure 5: AI Generated Version of 'The Milkmaid' Painting

Source: https://musebycl.io/art/nestle-and-ogilvy-used-ai-expand-vermeers-milkmaid

This is the AI generated version of the same Art work. Creators have added plenty of people and background elements but this addition is merging in the same style of Vermeer. It is not at all disturbing the mood of original artwork.

Figure 6: The Application of AI in Nestle Campaign

Source: https://indianexpress.com/article/technology/artificialintelligence/using-ai-in-advertising-8899323/

This can be the best example of the enhancing role of AI-generated art in advertising. Furthermore, AI can build the backgrounds for animated movies and gaming. It is allowing the photographs to create mood board very quickly. AI can generate new designs for fashion industry. In a nutshell, as per the empirical evidences, it is proven that all the art oriented sectors are captured by generative AI. Worldwide, AI-driven business models are saving 10 to 20 times more. As per the art market statistics, the contribution of Generative AI was USD. 200 Million in 2022. It went on USD 298 Million till the end of 2023. As per the Compound Annual Growth Rate, it is estimated that the market will reach at USD 5840 Million by 2032. The rising graph describes the tremendous growth in the use of generative AI in the coming years.

Figure 7: Use of Generative AI in Art Market
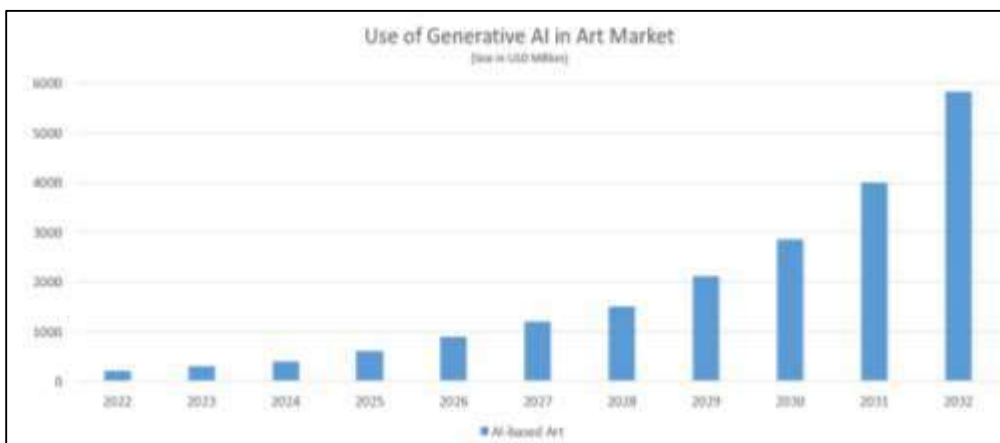
Source: Created by researcher

4.5 The challenges and limitations

Though there are tremendous advantageous of AI, there are certain challenges allied with AI generated Art. There is no legal outline for the creativity generated through artificial intelligence. There is no specific consent system or ownership rights for the AI generated art. This ambiguity can be the cause of dispute over the copyright policy of the creation.

Another challenge associated with AI generated art is deciding the quality measures of the created content. In conventional art practices, the value of the artwork is considered on the basis of skills, talent, and thought process of the artist. But AI-based art, is majorly associated with technology. The invested time in the AI created art is also lesser than traditional art making. This increases the challenges in setting up the actual value of AI-based artwork and creates conflicts in pricing and sales. The use of generative AI is significantly increased within the last three to four years and is going to increase more & more in the upcoming era. One more risk related to AI-based art is repetition and uniformity in the art style and techniques of the generated artwork. It can hamper the uniqueness of the artwork. In case, two creators are providing the same prompt to the AI algorithms, the resulting outputs will be almost similar in style and genre, but it never occurs in conventional art creation as it is completely associated with human expressions, feelings, and mind.

AI-based art is always facing the dilemma about the ownership of the creation. Though the system providers claim that the creation belongs to their prompt creators, it cannot be neglected that every result of the prompt is generated with the set of instructions provided in the text and image form by the trained models.

For the application of AI, basically it is needed to have a computer device with proper configuration. It also requires software to be uploaded on the computer system. Also the artist should have the basic knowledge of operating as well as technical know-how regarding the AI software as such. If one has to survive in the upcoming technology based era, one should adopt this technology, for which there is no any other option. Secondly output of AI remains primarily in the soft copy mode. If an artist desires to exhibit the output of AI, it will definitely require a surface like a paper or a canvas etc. Again, printer to printer the quality of printing differs and obviously the output. It is also applicable for soft copy too, since every computer display has different resolutions and RGB settings. Hence the observer will never get the uniform presentation. It may create an obstacle in visualizing the actual artwork generated by the artist.

Despite these limitations, it cannot be denied that there are number of opportunities in AI-based art in the coming years.

4.6 Comparative Analysis of AI based Art & Traditional Art

To create the art through generative AI, algorithms are required. To become a master in AI generative Art, one should learn the technology, machine learning techniques and prompt engineering. If a person is not having the core knowledge of

art, then also he or she can create to the some extent through the AI technology. Whereas, the traditional art is created with absolute human interference. It needs professional skills and artistic understanding. That's why, traditional art seems more expressive and attached to the human mind. In traditional art, the artists have to start from the scratch. The development of the artwork includes several steps, like thought process, rough scribbles, final drawing, first layer of painting, final layer of painting, varnishing, framing and so on. At every step of painting, artist has full control on his work. He represents his expression with proper process. But, in AI generated art, the artist's role ends with providing the appropriate prompts and algorithm. After this, the creator has no control over the resulting output. These ungovernable outcomes can result in a both positive and negative way. The comparative analysis of Al Generated art and conventional art provides an insightful understanding about the creative process, opportunities, and limitations. The fact based data is presented in the table below to compare the pros and cons of both the art practices.

Table 1: Comparative Analysis of AI-Based Art & Traditional Art

Variables	AI based Art	Traditional Art
Required time for creation	less time consuming	More time taking
Cost	Comparatively affordable as it requires less production cost	More expensive as it requires high production cost and time.
Ethical concerns	There is no specific copyrights and ownership policy	Clear ownership policy
Superiority & fineness	The outcome is more superfine and created more efficiently.	The outcome is comparatively not much superior as it is handmade.
Opportunities & possibilities	As it is a growing technology, there are ample of new opportunities	Limited opportunities, as it comprises the conventional approach.
Uniqueness of the creation	Though the generated artwork is innovative, there is always the chance of homogenization	As it is created by the human touch, the created artwork is always unique
Acceptance by art buyers	Art buyers and investors are gradually shifting their focus on AI-generated art.	Conventional buyers are continuing their investments, but modern investors are not much interested in traditional art, as it is more expensive.

Source: Created by the researcher

The comparative analysis describes that though the conventional art has a long tradition and created with the human touch, the expansion in the technology cannot be ignored. Many new opportunities and possibilities are offered by Generative AI.

5.0 Conclusion

This research paper illuminates the implications of generative AI on the contemporary art market and practices. The impact of generative AI on the art field is a trending topic today. The continuous expansion has been seen in the recent years, in the development and the use of AI. AI-based art is providing broader range of avenues for creators and consumers. As the production cost of AI based art is comparatively less, it is affordable for more art buyers. Hence, the investment in AI-generated art is significantly boosted in the last few years. AI generated art is offering numerous opportunities for artists. This new technology is reshaping the entire art industry. But still, traditional art creators and consumers believe in human creation and they are concerned about the increased use of AI, as it may degrade the value of the original handmade work. While one appreciates significance of the AI interference in the world of art, it is very important to consider the basic skills used by an artist while applying a penny from the AI purse. It is preferable that a user of generative AI should know the fundamentals of the art like color theory & terminology, color charts, grey scale & values. That is to say that the user must have an artist's eye while using the AI application. Since generative AI software is commonly available, anyone can use it but guarantee of the perfectly expected output remains questionable if the user does not have the inherent qualities of an artist. Human creativity pours liveliness in any fine art. Hence, its importance is always acceptable. But at the same time, it cannot be ignored that the new creative process is more efficient and superior. After all, it is today's need for sustaining in the field. Rather than completely relying on the final output generated by AI, artists and art collectors have to consider AI as a tool for making the creative process smoother. AI is amplifying the creativity, but only if it is used in a meaningful way. Otherwise, there is a possibility of losing the uniqueness of the generated AI-based art.

There is no structured framework constituted for the legal concerns and copyrights of AI generated art. It leads to the conflicts on the ownership and originality of the artwork. There is a scope for further researchers to investigate in this concern and set an ethical standard for AI-generated art. Furthermore, it is quite challenging today to avoid the homogenisation in the generated design. The future studies should focus on maintaining diversity in the generated art. This will magnify the impact of AI in creativity process.

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CHAPTER 18

A Comparative Analysis on Marketing Strategies Adopted by Britannia and Nestle with Respect to the State Maharashtra

Suraj Kamble*, Siddique Tamboli** and Warisha Khan***

ABSTRACT

This comparative analysis delves into the marketing strategies of two FMCG giants, Nestle and Britannia, operating in Maharashtra, India. The study aims to comprehensively understand the adaptation of these companies to the preferences of Maharashtrian consumers. It scrutinizes various aspects of their marketing approaches, including product portfolio adjustments, which encompass regional variations and dietary considerations. Furthermore, the research investigates the pricing strategies employed by Nestle and Britannia, targeting diverse consumer segments across the spectrum, from premium urban markets to value-conscious rural areas. The analysis extends to promotional channels, encompassing digital tools such as social media alongside traditional media like print and television. Additionally, it examines on-ground activations tailored to local preferences, providing a holistic view of their marketing endeavors. Utilizing secondary data from market research studies and corporate reports, the paper delves into consumer brand preferences and purchase behaviors. By synthesizing this information, the study aims to offer valuable insights into how Nestle and Britannia navigate the highly competitive FMCG landscape in Maharashtra. Ultimately, it seeks to elucidate how these companies effectively address the unique needs and preferences of a broad customer base in the region.

Keywords: Fast Moving Consumer Goods, Market Strategies, Consumer Behaviour, Product Mix, Promotional Mix, Value Pricing, Consumer Segments, Brand Preference.

1.0 Introduction

The Fast-Moving Consumer Goods (FMCG) sector, particularly within the realm of food and beverages, stands as a cornerstone of the global consumer economy.

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This industry is characterized by its rapid production, distribution, and consumption cycles, reflecting the constant and essential nature of consumer demand. In households worldwide, FMCG food and beverage products have become indispensable components of daily life, addressing fundamental needs such as nutrition, refreshment, and culinary enjoyment.

1.1 Framework

This study aims to evaluate the significant role played by the Nestle and Britannia sectors in fostering India's economic growth, covering diverse segments such as Food & Beverages, Personal Care, Household Care, among others. Nestle India Ltd. and Britannia Industries Ltd., recognized as major players in the food processing industry, are the primary subjects under investigation.

In Maharashtra, the food and beverage industry is characterized by the influential presence of industry giants like Nestlé and Britannia. Nestlé, a global leader in nutrition, health, and wellness, and Britannia, renowned for its wide range of bakery and dairy products, contribute substantially to the dynamic landscape of this sector in the state.

Nestlé, with its extensive heritage and commitment to improving quality of life through its products, has established a strong foothold in Maharashtra. The company's product portfolio, which includes popular brands like Maggi, Nescafé, and KitKat, caters to the diverse preferences of Maharashtra's consumers. Nestlé's involvement in sustainable practices and community initiatives further underscores its holistic approach to business in the region.

Similarly, Britannia Industries, a key player in the Indian sector, has made a significant impact on Maharashtra's food and beverage industry. Known for its iconic biscuits, bread, and dairy products, Britannia is synonymous with trust and quality. The company's strategic emphasis on innovation and adaptation to changing consumer trends aligns well with the dynamic market conditions prevalent in Maharashtra. Together, Nestlé and Britannia demonstrate the resilience and adaptability necessary to thrive in Maharashtra's food and beverage industry. As we explore their contributions and strategies, a deeper insight into the factors shaping this vibrant sector in the state becomes apparent.

The research aims to examine how Nestlé and Britannia have strategically positioned themselves in the minds of consumers, elucidating the innovative strategies they have employed. This investigation delves into the factors and initiatives that have contributed to the establishment of a distinct brand image for each company in the consumer psyche. The study seeks to uncover the intricacies of the marketing strategies implemented by Nestlé and Britannia, highlighting the innovative approaches that have played a pivotal role in shaping their perceived value and resonance with consumers. Through an analysis of these strategies, a comprehensive understanding of the dynamic interplay between consumer perception and the creative endeavors of these companies will be achieved.

1.2 Conceptual framework of the Study

Figure 1: Conceptual Research Model
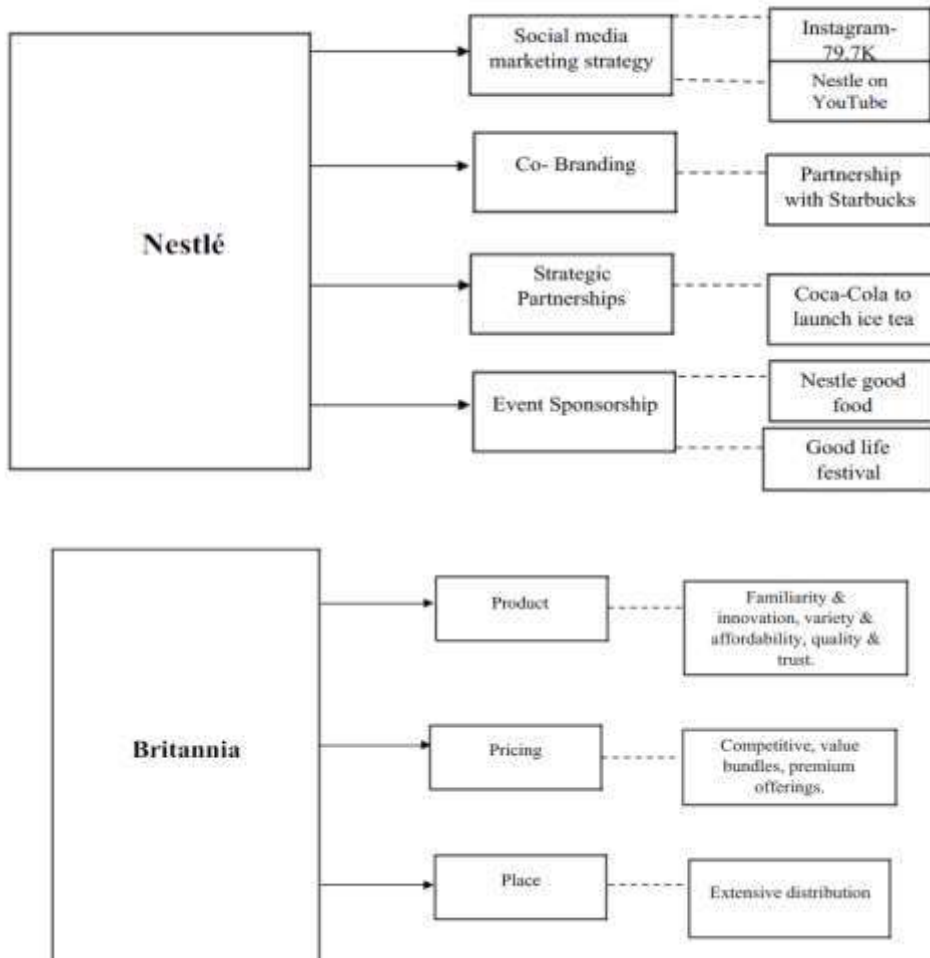
Source: Primary data

2.0 Literature Review

In the vast and ever-evolving landscape of global business, organizations continuously strive to retain a reasonable edge by understanding and leveraging key strategies. This narrative journey begins with a comprehensive exploration of financial performance and operational efficiency within the Fast-Moving Consumer Goods (FMCG) sector. Yasodha, Priyadharshini, Priyanka, and Rethanya (2016) undertake a rigorous comparative financial statement analysis of two FMCG giants, Nestle India Limited and Britannia Industries Limited. Their study delves into methodologies and indicators crucial for assessing operation, providing constructive insights into the financial dynamics of the FMCG industry.

Simultaneously, Chavan Sachin and Khaladkar Manisha (2019) delve into the complexities of the operating cycle within manufacturing companies, unearthing insights essential for optimizing resource allocation and operational efficiency. Their research offers understanding of the operational intricacies that underpin successful FMCG operations. Shifting focus, Chandok and Hari Sundar (2007) explore survival strategies for Indian FMCG companies, proposing robust approaches to navigate challenges and sustain growth amidst evolving market dynamics. Their study provides valuable strategic insights that can inform decision-making processes within the FMCG sector, ensuring long-term viability and resilience.

In a parallel narrative, Kakkar and Bhatt (2022) employ the balanced scorecard approach to analyze FMCG giants Britannia and Nestle India Ltd., offering a comprehensive framework to evaluate organizational performance and drive strategic enhancements. Through their research, they provide organizations with actionable insights to strengthen their competitive position and drive sustainable growth. Simultaneously, Ladia's (2019) dissertation unfolds as an exploration of investing opportunities within the FMCG industry, financing investors with comprehensions into financial health, competitive landscapes, and growth potential. Their research equips investors with the knowledge needed to make informed investment decisions in the dynamic FMCG sector.

Venturing into rural markets, Laxman (2020) investigates the impact of marketing strategies on branded FMCGs, uncovering effective approaches tailored for rural demographics. His research sheds light on the unique challenges and opportunities present in rural markets, providing organizations with actionable insights to enhance their market penetration strategies. Delving deeper, Ozegovic's (2011) thesis uncovers the potential of marketing to the Bottom of the Pyramid (BOP) segment, offering insights into inclusive and impactful marketing practices. His research emphasizes the importance of addressing the needs of underserved market segments, driving sustainable growth and social impact. Meanwhile, Sethi and Chaudhary (2021) dissect consumer behavior and preferences within the FMCG sector, providing a theoretical framework for understanding market dynamics and segmentation, respectively. Their research offers valuable insights into consumer behavior trends, enabling organizations to tailor their marketing strategies to effectively target key consumer segments.

As the narrative unfolds, Sathyan and Jagadeesha (2021) unravel the growth trajectory of Nestle India within the FMCG industry, providing insights into historical milestones and business strategies. Their research offers valuable insights into the factors driving the success of FMCG companies, providing organizations with actionable insights to enhance their competitive position. On a different trajectory, Sreedevi and Sulaipher (2016) explore dimensions of rural marketing strategies, shedding light on effective approaches for reaching rural markets. Their research offers valuable insights into the unique dynamics of rural markets, enabling organizations to develop tailored marketing strategies that resonate with rural

consumers. In addition, Titus, Sengupta, and Garg (2007) examine the strategic significance of distribution networks in FMCG channel management, examining distribution strategies and performance evaluation methods. Their research provides organizations with valuable insights into optimizing distribution networks, enabling them to enhance operational efficiency and drive competitive advantage. Together, these narrative threads weave a tapestry of insights, strategies, and methodologies essential for navigating the dynamic landscape of the FMCG industry and driving sustainable growth.

3.0 Research Gap

Current research on marketing strategies in Maharashtra often lacks a comprehensive approach, exhibiting limited regional focus by primarily analysing national strategies. Furthermore, studies rarely undertake direct brand comparisons between Britannia and Nestle in this market, overlooking distinct tactics employed by each. There is also a gap in exploring variations in distribution channels, pricing, and promotion within Maharashtra. Moreover, consumer insights specific to this market are lacking, failing to capture preferences, buying behaviors, and cultural influences. Emerging trends and innovations in marketing by Britannia and Nestle within Maharashtra are frequently ignored, along with the impact of regional strategies on sales and market share, representing an underexplored area in current research.

4.0 Problem Statement

Despite the significant presence of Britannia and Nestle in the Maharashtra market, existing research exhibits a limited regional focus, neglecting to comprehensively analyze the distinct marketing strategies employed by these brands within the state. The lack of direct brand comparisons, exploration of distribution channel variations, pricing dynamics, promotional strategies, and consumer insights specific to Maharashtra impedes a thorough understanding of the market dynamics. Additionally, the oversight of emerging trends and innovations in marketing, along with the unexplored impact of regional strategies on sales and market share, underscores the pressing need for comprehensive research in this area.

5.0 Objectives of the Study

1. Analyse and compare marketing strategies of Britannia and Nestle in Maharashtra for valuable insights.
2. Evaluate product effectiveness, pricing, and distribution strategies in the unique Maharashtra market conditions.
3. Assess consumer perceptions and preferences toward Britannia and Nestle brands, identifying key factors influencing purchases.

4. Examine how well Britannia and Nestle adapted strategies to align with socio-cultural nuances in Maharashtra.
5. Offer actionable recommendations based on findings to optimize marketing for increased competitiveness in Maharashtra.

6.0 Scope of the Study

The study will specifically concentrate on the state of Maharashtra, examining how Britannia and Nestle design and implement their marketing strategies in this region.

This study wants to understand how people in Maharashtra behave when they buy things. It will look at what they like, how they decide to buy, and if they stick to certain brands.

The goal is to figure out how these things affect whether the marketing strategies used by Britannia and Nestle work well in this region. In simpler terms, we want to know why people in Maharashtra choose the products they do and if the marketing of Britannia and Nestle plays a big role in those choices.

The research will conclude by assessing the overall effectiveness of the marketing strategies adopted by Britannia and Nestle in Maharashtra, offering insights that may be valuable for these companies and other businesses operating in similar regional contexts.

7.0 Methodology

Research Design: The food and beverage industry, particularly in the state of Maharashtra, is witnessing dynamic changes in marketing strategies adopted by key players like Britannia and Nestle. This study aims to explore and describe the marketing strategies employed by these companies.

Primary Data: Conducted interviews with key marketing executives or managers from Britannia and Nestle. Distribute surveys/questionnaires to gather quantitative data on consumer perceptions and preferences.

Secondary Data: The secondary data collection was done through indirect collection of the data. So, the data was collected from the-

- Other publication report.
- Journal articles.
- Websites.
- Public viewpoint.
- Surveys.

Sampling: Customers with an interest in Maharashtra's food and beverage sector will make up the sample for this study.

Sample Size: The research objective of analysing marketing strategies employed by Britannia and Nestle in Maharashtra food and beverage industry, a

survey was conducted among 111 respondents. The purpose of the survey was to assess respondents' interest in products offered by Britannia and Nestle and to determine the impact of various marketing strategies on their purchasing decisions within the state of Maharashtra.

8.0 Limitations of the Study

- The study focus solely on Maharashtra restricts the applicability of its findings to other Indian states or areas.
- Lack of direct comparison between Britannia and Nestle may limit insights into their relative marketing effectiveness.
- Variation in distribution methods, pricing schemes, and marketing initiatives within Maharashtra may not be fully explored.
- Recent trends and innovation adopted by the Nestle and Britannia sales and market share in Maharashtra may not be adequately examined in this study.
- Sampling bias could be present of the sample does not adequately represent the diversity of consumers in Maharashtra.

9.0 Descriptive Analysis and Interpretation of the study

Ha1: There is a significant difference in the perceived product offerings between Nestle and Britannia in Maharashtra.

Figure 1: Number of Respondents from Various Consumers
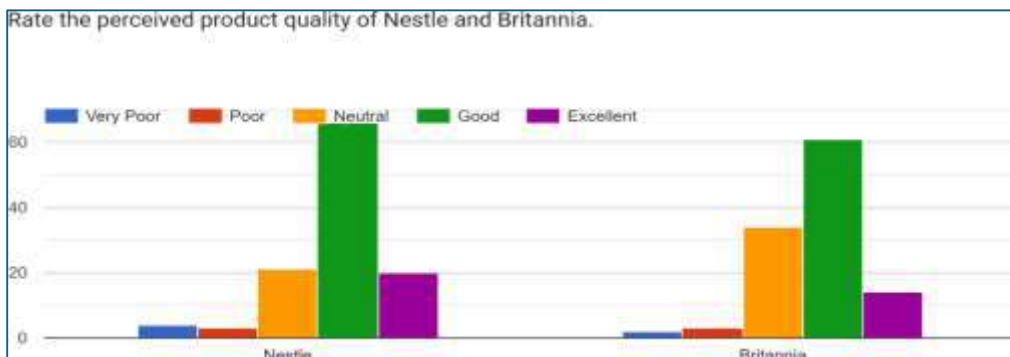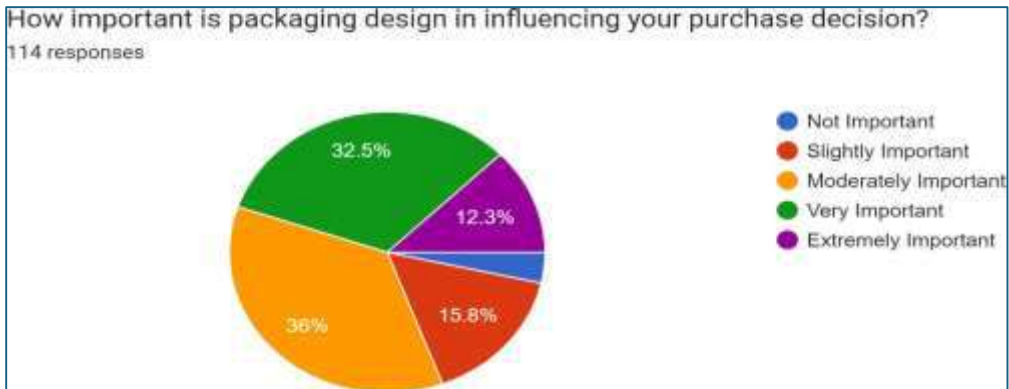

Source: Primary data

The results of the Chi-square test indicate a statistically significant difference in the perceived product offerings between Nestle and Britannia in Maharashtra (Pearson Chi-Square = 27.016, df = 9, p = .001). Since the p-value (.001) is less than the significance level (e.g., 0.05), we reject the null hypothesis.

The Chi-square test results provide evidence to reject the null hypothesis,

indicating a significant difference in the perceived product offerings between Nestle and Britannia in Maharashtra. This means that consumers in Maharashtra perceive Nestle and Britannia as offering different ranges of products.

Ha2: Packaging design significantly influences purchase decisions.

Figure 2: Pie Chart Representing How Packaging Influences the Purchasing Decision
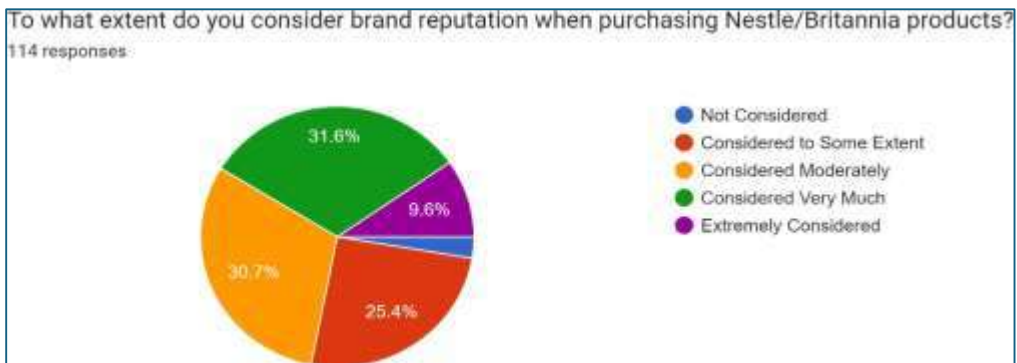

Source: Primary data

The regression analysis supported the alternative hypothesis (Ha2), indicating that the perceived importance of packaging design significantly influences purchase decisions based on promotional offers. The model was statistically significant (F = 13.588, p = 0.001), with the perceived importance of packaging design explaining approximately 53.1% of the variance in purchase decisions (R Square = 0.531). Specifically, a higher level of importance attributed to packaging design demonstrated a positive association with more frequent purchases based on promotional offers (p < 0.001), reinforcing Ha3.

Ha3: Brand reputation significantly influences brand preference for Nestle and Britannia products.

Figure 3: Pie Chart Representing How Brand reputation Influences Preference
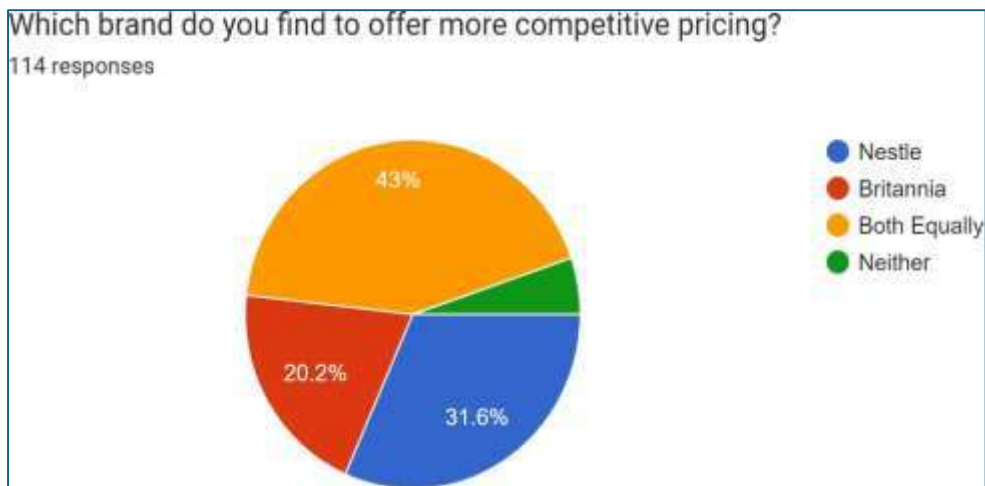

Source: Primary data

The chi-square test yielded a Pearson Chi-Square value of 11.974 with 4 degrees of freedom, resulting in a p-value of 0.043. This p-value indicates that there is a significant association between perception of brand reputation and brand preference for Nestle and Britannia products at the 0.05 significance level. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (Ha3), suggesting that brand reputation significantly influences brand preference for Nestle and Britannia products. In other words, respondents' perceptions of brand reputation play a role in shaping their preferences for these brands.

Ha4: There is a significant difference in the perception of competitive pricing between Nestle and Britannia.

Figure 4: Pie Chart Represents Which Brand Offers more Competitive Pricing
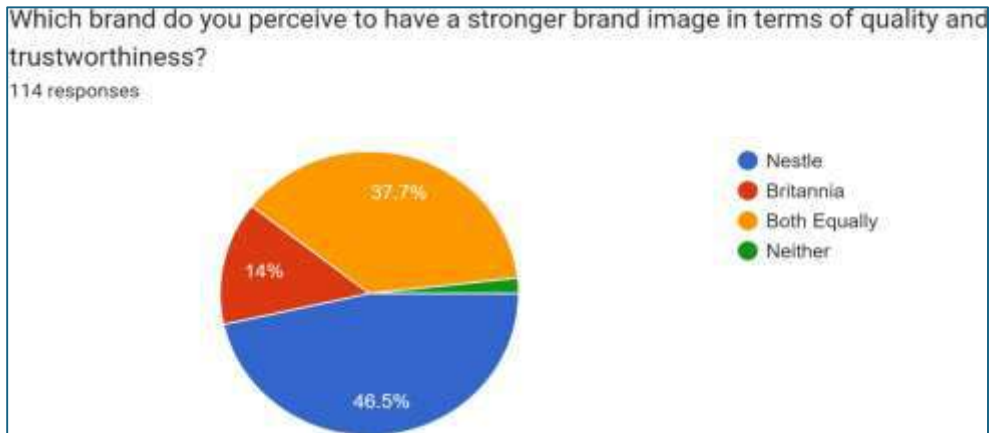

Source: Primary data

The independent samples t-test was conducted to compare the perception of competitive pricing between respondents familiar with Nestle and Britannia products. Levene's test for equality of variances revealed a non-significant result (F = 0.353, p = 0.554), indicating that the assumption of equal variances was met. Subsequently, the t-test for equality of means was performed, yielding non-significant results under both equal (t = -0.571, df = 111, p = 0.569) and unequal (t = -0.572, df = 110.243, p = 0.568) variances assumptions. Therefore, we do not accept the null hypothesis, suggesting that there is no significant difference in the perception of competitive pricing between respondents familiar with Nestle and Britannia products. These findings imply that both groups perceive competitive pricing similarly, regardless of brand familiarity.

Ha5: There is a significant difference in brand image in terms of quality and trustworthiness between Nestle and Britannia

Figure 5: Pie Chart Represents Brand Image in Terms of quality and Trust between the Brands

Source: Primary data

The independent samples t-test was conducted to compare the perception of brand image in terms of quality and trustworthiness between respondents familiar with Nestle and Britannia products. Levene's test for equality of variances indicated a non-significant result (F = 0.014, p = 0.907), indicating that the assumption of equal variances was met. Subsequently, the t-test for equality of means was performed, revealing a significant difference in perceptions between the Nestle and Britannia groups under the assumption of equal variances (t = -2.119, df = 111, p = 0.036). However, under the assumption of unequal variances, the result remained significant (t = -2.119, df = 110.994, p = 0.036). Thus, we reject the null hypothesis, suggesting that there is a significant difference in the perception of brand image in terms of quality and trustworthiness between respondents familiar with Nestle and Britannia products. These findings indicate that one brand is perceived to have a stronger brand image in terms of quality and trustworthiness compared to the other.

10.0 Results and Discussion

The study provides key insights into consumer behaviour and brand perception within Maharashtra's food industry, focusing on Nestle and Britannia products. Firstly, significant differences in perceived product offerings emphasize the importance of product diversification and brand differentiation to meet diverse consumer preferences. Secondly, packaging design significantly influences purchase decisions, highlighting the need for attractive and functional packaging strategies. Thirdly, the association between brand reputation and preference underscores the importance of building and maintaining a positive brand image. However, the non-significant difference in pricing perception suggests that other factors like quality and promotion may play a bigger role in consumer decision-making. Lastly, the

significant difference in brand image highlights the importance of effective brand positioning and communication strategies for shaping consumer perceptions. Overall, marketers should leverage these findings to enhance brand competitiveness and meet consumer needs effectively.

11.0 Implications

These findings have several implications for marketers in the food industry. Firstly, marketers should focus on product diversification and differentiation strategies to meet the diverse needs and preferences of consumers. This may involve introducing new product variants, Flavors, or packaging formats to appeal to different consumer segments. Secondly, marketers should invest in packaging design that not only enhances product visibility but also communicates brand values and benefits effectively. Creative and attractive packaging can capture consumer attention and drive purchase decisions, especially in competitive retail environments.

Moreover, building and maintaining a positive brand reputation should be a priority for marketers. This may involve engaging in corporate social responsibility initiatives, ensuring product quality and safety, and transparent communication with consumers. Furthermore, while pricing may not be a significant differentiating factor, marketers should ensure that their pricing strategies are competitive and aligned with consumer perceptions of value. This may involve offering promotional discounts or value-added bundles to attract price- sensitive consumers.

Lastly, marketers should leverage their brand strengths and unique selling propositions to enhance brand image and differentiation. This may involve highlighting product quality, innovation, and trustworthiness through marketing communications and brand messaging. Overall, these findings provide actionable insights for marketers to develop effective marketing strategies and enhance brand competitiveness in the dynamic and competitive food industry landscape.

12.0 Finding of the Study

1. *Perceived Product Offerings:* There is a significant difference in perceived product offerings between Nestle and Britannia in Maharashtra. Consumers perceive these brands as offering distinct ranges of products, indicating the importance of product diversification and brand differentiation to cater to diverse consumer preferences.
2. *Packaging Design Influence:* Packaging design plays a crucial role in purchase decisions. Consumers are influenced by packaging aesthetics and functionality, highlighting the need for marketers to prioritize packaging strategies that enhance product visibility, attractiveness, and effectively communicate product benefits.
3. *Brand Reputation and Preference:* Brand reputation significantly influences brand preference. Building and maintaining a positive brand image are essential

for fostering consumer trust and loyalty. Marketers should invest in brand-building initiatives to enhance brand reputation and credibility.

4. *Competitive Pricing Perception:* There is a non-significant difference in the perception of competitive pricing between Nestle and Britannia. Consumers perceive both brands as offering similar pricing strategies. Pricing may not be a significant differentiating factor, implying that other factors such as product quality and brand reputation play a more crucial role in consumer decision-making.

5. *Brand Image:* There is a significant difference in brand image between Nestle and Britannia in terms of quality and trustworthiness. Brand positioning and communication strategies are crucial in shaping consumer perceptions. Marketers should leverage brand strengths and unique selling propositions to enhance brand image and differentiate themselves from competitors.

13.0 Recommendations

1. *Product Diversification and Brand Differentiation:* Marketers should focus on expanding product ranges and offering variety to cater to the diverse preferences of consumers in Maharashtra. This could involve introducing new flavors, packaging sizes, or product formats to meet evolving consumer demands.

2. *Packaging Design Strategies:* Prioritize packaging design strategies that not only enhance product visibility and attractiveness but also effectively communicate product benefits and value propositions to consumers. Consider incorporating elements that resonate with local preferences and cultural nuances.

3. *Brand Reputation Building:* Invest in brand-building initiatives aimed at enhancing brand reputation and credibility. This could involve showcasing commitment to quality, sustainability, and social responsibility through transparent communication and engagement with consumers.

4. *Competitive Pricing Consideration:* While pricing may not be a significant differentiating factor between Nestle and Britannia products in Maharashtra, marketers should still ensure competitive pricing strategies. However, they should also focus on highlighting other factors such as product quality and unique value propositions to gain a competitive edge.

5. *Brand Positioning and Communication:* Leverage brand strengths and unique selling propositions to enhance brand image and differentiate from competitors. Develop clear and consistent brand messaging that emphasizes quality, trustworthiness, and relevance to consumer needs and aspirations.

6. *Consumer Engagement and Feedback:* Continuously engage with consumers through various channels to gather feedback and insights. Use this feedback to refine marketing strategies, product offerings, and brand communication to better resonate with consumer preferences in Maharashtra.

7. *Monitoring and Adaptation:* Regularly monitor market trends, competitor

activities, and consumer preferences to stay agile and adapt marketing strategies accordingly. Flexibility and responsiveness to changing consumer dynamics will be key to maintaining relevance and competitiveness in the Maharashtra market.

14.0 Conclusion

This study provides valuable insights into consumer behaviour and brand perception within the food industry, specifically examining Nestle and Britannia products in Maharashtra. Key findings underscore the significance of product diversification, packaging design, brand reputation, and positioning in influencing consumer choices. While pricing may not be a primary differentiator, marketers should prioritize factors such as product quality and unique value propositions to enhance competitiveness. By leveraging these insights, marketers can better understand consumer preferences and refine their marketing strategies to maintain a strong position in the market.

Indeed, the findings of this study emphasize the significance of strategic decisions in the highly competitive landscape of the food industry. Brands like Nestle and Britannia operate within a dynamic environment where consumer preferences, perceptions, and market trends continually evolve. By focusing on product diversification, packaging design, brand reputation, and positioning, companies can effectively differentiate themselves and strengthen their market presence. Furthermore, understanding the nuances of consumer behavior and brand perception is paramount for developing targeted marketing strategies that resonate with the diverse needs and preferences of consumers. In essence, in the vast realm of the food industry, strategic insights gleaned from studies like this one serve as crucial guideposts for brands seeking to thrive and succeed in the market.

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CHAPTER 19

Comparative Analysis of Algorithmic Trading & Traditional Trading in the Fintech Era

Swarali Naikare* and Suresh Kadam**

ABSTRACT

This research investigates the comparative performance of algorithmic trading and traditional trading methods in the context of financial technology (fintech). It aims to assess the speed, adaptability, efficiency, and cost-effectiveness of both approaches, considering their implications for market stability and accessibility. The research methodology employed a primary, quantitative approach through a questionnaire-based survey, facilitating the collection of actual data from participants. The sample size comprised 67 respondents, selected through a convenient sampling method. Preliminary findings suggest that algorithmic trading demonstrates superior speed and efficiency, although with concerns regarding market volatility and fairness. These findings highlight the need for regulatory frameworks to adapt to the complexities of algorithmic trading while ensuring market integrity. Ultimately, the research seeks to inform investment decisions, shape regulatory policies, and drive innovations in modern financial markets. By elucidating the impact of technological advancements on trading strategies, this study contributes to a deeper understanding of the intersection between technology and finance, facilitating informed decision-making in an increasingly digitized trading environment.

Keywords: Algorithmic trading, Traditional methods, Fintech, Market stability, Regulatory implications.

1.0 Introduction

In today's financial environment, the intersection of technology and finance has led to a paradigm shift in business. Traditional trading practices that rely heavily on human judgment and manual execution have been augmented, if not replaced, by algorithmic trading systems. This shift is particularly evident in the context of the rapidly changing fintech era, where advances in computing power, data analytics, and connectivity are fueling the growth of algorithmic trading strategies. The emergence of algorithmic trading represents a major revolution.

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Unlike traditional business, it is characterized by the automation of business processes through predefined algorithms and computational models. These algorithms are designed to analyze business data, identify trading opportunities, and execute trades with minimal human intervention, often quickly and often beyond the capabilities of humans. As a result, algorithmic trading has become synonymous with efficiency, speed, and efficiency, allowing market participants to exploit the market without profit and arbitrage opportunities.

In contrast, traditional trading methods are rooted in human judgment and intuition, which have long underpinned financial transactions. However, traditional trading methods have limitations such as uncertainties, emotions, and behaviors that can affect decisions. Additionally, manual processes can cause delays, errors, and inefficiencies in processes, especially in fast work pace and competition. Therefore, traditional traders need to constantly improve their skills, adapt to changes in the market, and develop risk management strategies to reduce losses. Historically, traders have relied on values and analysis, market sentiment, and personal relationships when making business and trading decisions. While traditional trading systems continue to play an important role in financial markets, they are increasingly challenged by the rise of algorithmic trading, leading to a re-evaluation of their relevance and effectiveness in today's fintech environment.

The convergence of algorithmic trading and traditional trading methods has sparked debate among market participants, regulators, and experts about the benefits, risks, and consequences of each approach. Proponents of algorithmic trading argue that algorithmic trading provides superior efficiency, liquidity provision, and risk management capabilities, thereby increasing business efficiency and encouraging innovation. Critics, on the other hand, have expressed concerns that algorithmic trading could weaken the market and increase the risk to business and market integrity, highlighting the need for regulation and risk management. In this context, this research paper aims to make a comparative analysis of algorithmic trading and traditional trading methods in the age of financial technology. By analyzing the key features, advantages, problems, and effects of the two methods, the study attempts to clarify their strengths and weaknesses, as well as their impact on financial markets, market participants, and policymakers. Through a detailed examination of these topics, this study aims to gain a deeper understanding of business practices in today's economy.

2.0 Literature Review

Algorithmic trading has come a long way since its inception in the early 1990s. The development of algorithmic trading has had a huge impact on financial markets, enabling business decisions to be faster, more efficient, and more accurate. This article explores the evolution of algorithmic trading from its early days to its current state and discusses future trends affecting its growth.

2.1 The early days of algorithmic trading

The birth of algorithmic trading can be traced back to the early 1990s when the first algorithmic trading system was created. These early systems were designed to streamline the process of buying and selling stocks and other financial instruments. The main purpose is to minimize human intervention and reduce the risk of errors that may occur in the book business. One of the leading companies in the algorithmic trading field is Island ECN, founded in 1997. Island ECN develops algorithms for trading on the Electronic Communications Network (ECN), allowing participants to trade directly with each other without the need for traditional investors. The Early Days of Algorithmic Trading

2.2 Evolution of algorithmic trading: past, present, and future trends

The Development of Machine Learning and Artificial Intelligence in Algorithmic Trading. In recent years, the field of algorithmic trading has seen the integration of machine learning and artificial intelligence (AI) techniques. These advanced technologies have allowed for the development of more sophisticated trading algorithms that can adapt to changing market conditions and learn from historical data. For example, some AI-driven trading algorithms can analyze vast amounts of data to identify patterns and trends that are not visible to humans. This enables them to make more informed trading decisions and minimize the risks associated with market fluctuations. The use of AI and machine learning in algorithmic trading has opened up new opportunities for market participants, particularly in areas such as quantitative trading, portfolio management, and risk management. (Medium, 2024)

2.3 Future trends in algorithmic trading

As technology continues to advance, the future of algorithmic trading is expected to be shaped by several key trends:

The integration of blockchain technology: The use of blockchain-based platforms for trading could provide a more secure, transparent, and efficient trading environment.

The rise of decentralized finance (DeFi): Algorithmic trading is expected to play a significant role in the growth of DeFi, as decentralized platforms provide an alternative to traditional financial markets.

The increasing role of AI and machine learning: The continued development of AI-driven algorithms will likely lead to even more sophisticated and adaptive trading strategies, allowing for greater accuracy and efficiency in trading decisions.

The adoption of quantum computing: Quantum computing has the potential to revolutionize algorithmic trading by providing vastly increased computational power and the ability to solve complex problems more quickly.

Regulatory changes: As algorithmic trading continues to evolve, regulatory authorities will likely impose new rules and guidelines to ensure the stability and fairness of financial markets. (Medium, 2024)

2.4 Algorithmic trading and traditional trading comparative approach

The Indian market has gone through many changes over the years. The convergence of technology and rapid digitalization has led to shorter negotiation times, faster transactions, and the emergence of new business opportunities. Although traditional trading has been around for centuries, technology-enabled algorithmic trading is taking over the market at a rapid pace due to its many advantages. In this article, we will take a closer look at the comparison between these two types of business and find out which method is best for investors. On the other hand, algorithmic trading involves the use of complex algorithms and computer programs to speed up the trading process. Over time, no human intervention is required as algorithms can be developed to make decisions based on historical data, pre-existing conditions, and market indicators. (Sood, 2023) According to this difference, comparative features can be made from the following three factors: speed, flexibility, and risk management.

2.5 Speed and accuracy

It is undeniable that algorithmic trading is faster and more accurate than traditional trading. These algorithms automate the entire process of automating quantitative analysis of a stock, then identify the stock and take advantage of various trading opportunities. This allows traders to execute hundreds of orders simultaneously, which is not possible in traditional trading.

2.6 Flexibility and customization

Algorithmic trading allows strategies to be adjusted at the beginning of the session and later to allow for specific handling of the business. It provides proprietary algorithms that give traders the option to change their strategies. Traditional trading, on the other hand, is much slower and investors can monitor each trade and adjust it according to their trading strategies and investment goals.

2.7 Risk management

Automation is the hallmark of algorithmic trading, allowing traders to make multiple trading decisions with minimal human intervention. It also reduces the risk of errors by allowing complex business and risk management strategies to be implemented quickly. Additionally, algorithmic trading can control the investor's losses through automatic stop-loss. In this case, the business may always have difficulty making decisions and experience greed and fear. Choosing between new-age algorithmic trading and traditional trading depends on many factors. But it can come down to business knowledge, capital, or capital and risk tolerance.

If someone is just starting, he should start with traditional trading to understand the intricacies of the market and once he acquires the knowledge, he should move on to algorithmic trading to get better. It is important to know that both methods have their advantages and limitations. Therefore, you should choose the

method that best suits your trading goals and style because it will help you make more profits in the stock market. (Sood, 2023)

2.8 Algo trading's future in India

Algorithmic trading has changed the way global trade is done. While it provides many benefits to investors, it sometimes causes losses. Although it frees investors from many complex tasks, the high-performance process completely limits the investor's interaction with other people when making investment decisions. Therefore, algorithmic trading is a trading strategy rather than a trading driver. It will become a standard in today's industry and is expected to last for a long time. (Voices, 2022)

3.0 Research Methodology

3.1 Objectives

1. To compare how algorithmic trading and traditional trading perform in the Fintech era.
2. To explore how technology has influenced trading practices in the Fintech era.
3. To assess the cost-effectiveness of algorithmic trading versus traditional trading approaches.
4. To evaluate the scalability and adaptability of algorithmic trading systems compared to traditional trading systems.

3.2 Research methodology / approach

1. Research Approach The research adopts a mixed-methods approach to conduct a comprehensive comparative analysis of algorithmic trading and traditional trading in the fintech era. This approach enables the collection of numerical data that can be statistically analyzed to conclude.
2. *Research Design:* The research design is exploratory and explanatory, aiming to explore the characteristics, advantages, challenges, and impacts of algorithmic trading and traditional trading methodologies. By employing a comparative analysis framework, the study seeks to explain the differences and similarities between the two approaches and their implications for financial markets.
3. *Sampling Technique:* Convenience sampling is employed to collect data from respondents (Traders). This method involves selecting individuals who are readily available and accessible.
4. *Sample Size:* The target sample size for this study is 67 respondents. While convenience sampling may introduce some bias, this sample size is deemed adequate to provide meaningful insights into the inclusion of diverse perspectives from industry experts, ensuring a comprehensive analysis of the topic.

5. *Data Collection:* Data is collected by using a structured questionnaire distributed to respondents online. The questionnaire consists of closed-ended questions designed to measure traders' attitudes, perceptions, and factors influencing their adoption of Algo or traditional trading Methods.

4.0 Data Analysis and Interpretation
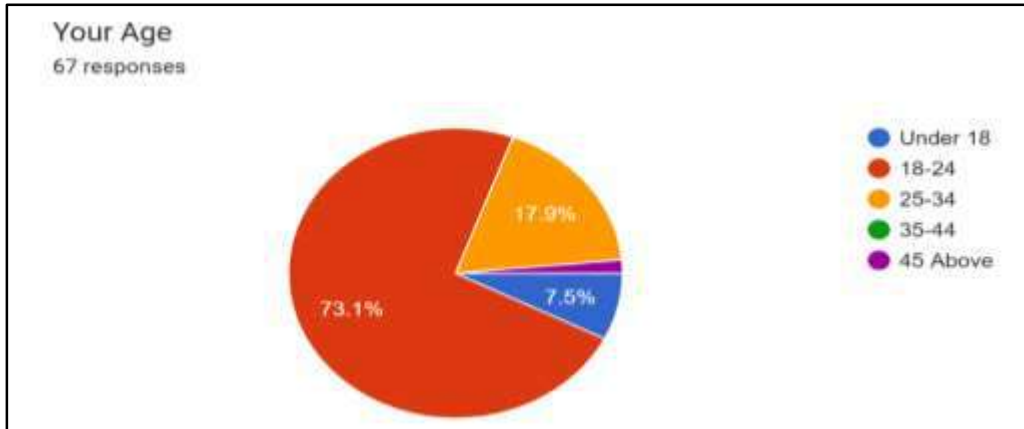
4.1 Demographics Analysis
4.1.1 Age group of respondents

Table 1: Age of Respondent

Age	No. of Respondents	Percentage
>18	5	7.5
18-24	49	73.1
25-34	12	17.9
35-44	0	0
45-above	1	1.5
Total	**67**	**100%**

Source: Primary data

Figure 1: Age of Respondent

Source: Primary data

Interpretation: The data reveals that the majority of respondents, constituting 73.1% of the total sample size of 67 respondents, fall within the 18-24 age group. This indicates a strong interest among younger individuals in the comparative analysis of algorithmic trading and traditional trading in the fintech era. Additionally, 7.5% of respondents are over 18, 17.9% are aged 25-34, and 1.5% are aged 45 or above. While younger age groups show higher participation, older age groups' limited representation may suggest challenges in engaging them with these trading methodologies.
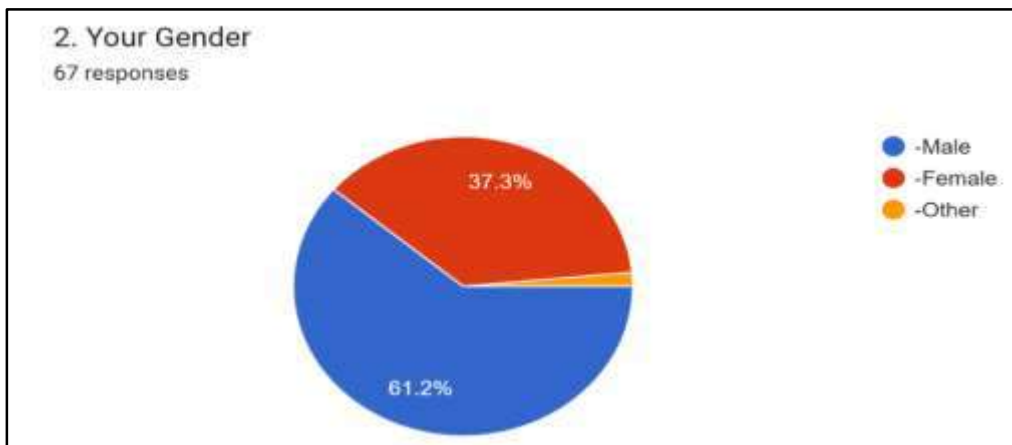
4.1.2 Gender of respondent

Table 2: Gender of Respondent

Gender	No. of respondents	Percentage
Male	41	61.2%
Female	25	38.8%
Total	67	100%

Source: Primary data

Figure 2: Gender of Respondent

Source: Primary data

Interpretation: The data shows a gender imbalance among respondents, with 61.2% identifying as male and 38.8% as female. This suggests a higher representation of males in the study. These findings underscore the importance of considering gender dynamics in discussions about algorithmic trading and traditional trading.
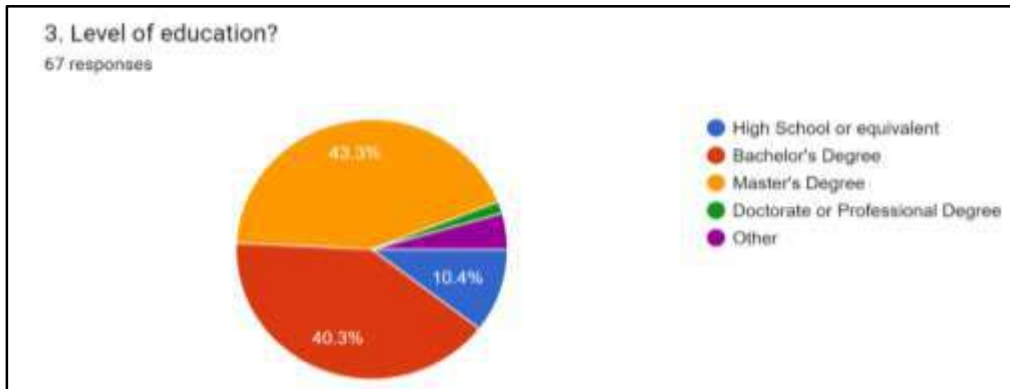
4.1.3 Education Level of Respondents

Table 3: Education Level of Respondents

Education	No. of Respondents	Percentage
High School or equivalent	7	10.4
Bachelor's Degree	27	40.3
Master's Degree	29	43.3
Doctorate or Professional Degree	1	1.5
Total	67	4.5

Source: Primary data

Figure 3: Education Level of Respondents

Source: Primary data

Interpretation: The data shows that the majority of respondents have attained higher education qualifications, with 40.3% holding Bachelor's Degrees and 43.3% having Master's Degrees. Only a small percentage have High School diplomas (10.4%) or Doctorate/Professional Degrees (1.5%). This suggests a strong representation of individuals with advanced education levels in the study, possibly indicating a higher interest or expertise in the topic of algorithmic trading and traditional trading in the fintech era.

## 4.2 Investor Profile

4.2.1 Annual income of investor

Table 4: Annual Income of Investor

Income	No. of Respondents	Percentage
Less than 25,000	13	19.4
25000 Above	23	34.3
prefer not to disclose	31	46.3
Total	67	100%

Source: Primary data

Interpretation: The data provides insights into the annual income of investors, revealing that 19.4% of respondents earn less than 25,000, while 34.3% earn 25,000 or above. Interestingly, 46.3% prefer not to disclose their income. This suggests a significant portion of respondents value privacy regarding their financial details. It's noteworthy that a considerable proportion choose not to disclose, potentially impacting the representativeness of income data.

Figure 4: Annual Income of Investor
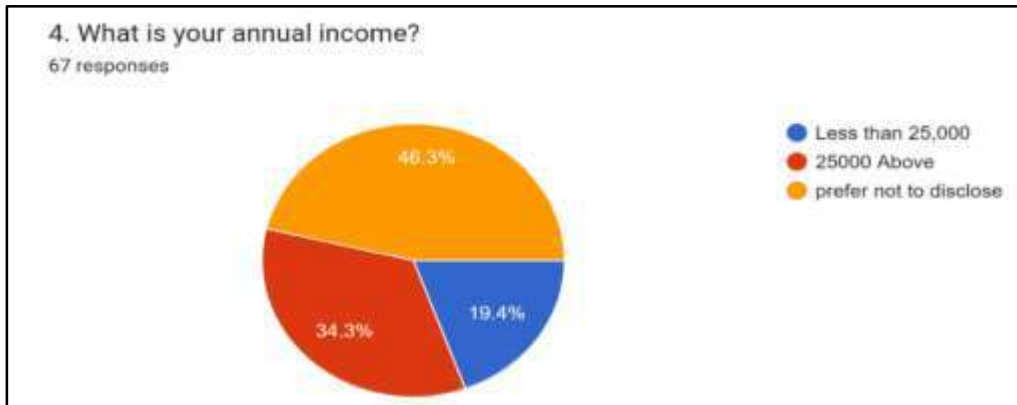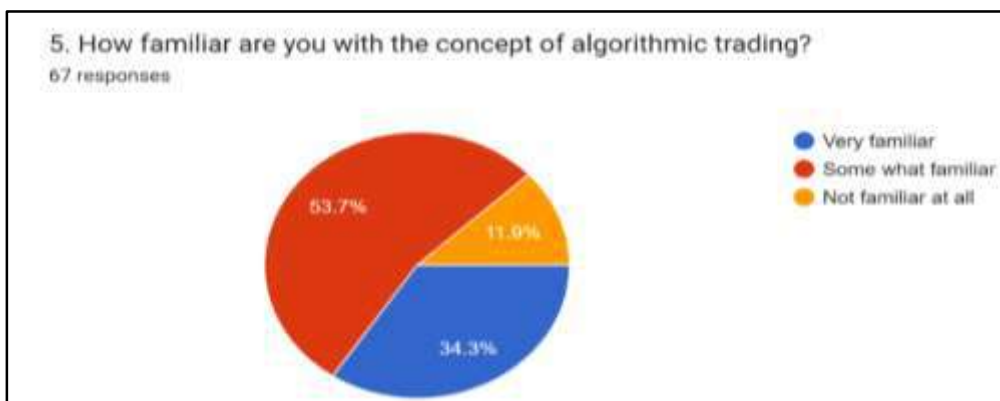

Source: Primary data

4.2.2 How familiar are you familiar with the concept of algorithmic trading?

Table 5: Familiarity with the Concept of Algorithmic Trading

Familiarity	No. of Respondents	Percentage
Very familiar	23	34.3
Somewhat familiar	36	53.7
I am not familiar at all	8	11.9
Total	67	100

Source: Primary data

**Figure 5: Familiarity with the Concept of Algorithmic Trading**

Source: Primary data

Interpretation data indicates the level of familiarity respondents have with algorithmic trading. Specifically, 34.3% report being "Very familiar," 53.7% are

"Somewhat familiar," and 11.9% claim to be "Not familiar at all" with the concept. These findings suggest that a majority of respondents possess at least some degree of familiarity with algorithmic trading, with a significant portion indicating moderate to high levels of familiarity.

4.2.3 View based on speed

**Figure 6: View Based on Speed**
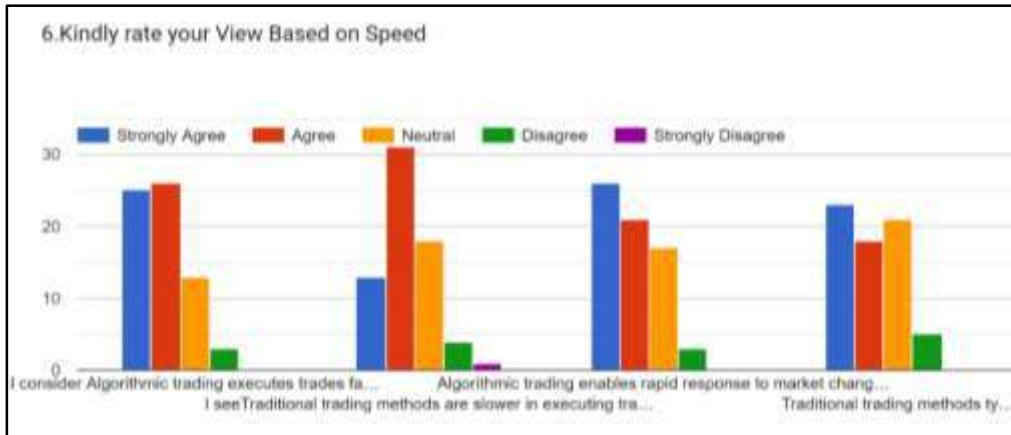
Source: Primary data

Interpretation analysis suggests respondents see algorithmic trading's strength in speed. They likely reported faster trade execution (compared to traditional methods) and quicker reactions to market changes. This aligns with the idea that algorithms capitalize on fleeting opportunities through rapid analysis and decision-making. They likely reported experiencing or witnessing significantly faster trade execution compared to traditional methods. This speed translates to quicker reactions to market fluctuations, potentially allowing them to capitalize on fleeting opportunities.

4.2.4 View based on adaptability

Interpretation: Among the 67 traders surveyed, a significant segment—29 individuals—strongly agrees that algorithmic trading exhibits remarkable adaptability to the ever-evolving dynamics of the market. Additionally, 22 respondents concur that traditional trading methods are comparatively less nimble in adapting to swift market changes. Moreover, an equal number of participants, 29, expressed strong agreement regarding algorithmic trading's prowess in adjusting to unpredictable market shifts. The data suggests a growing recognition among traders of the distinct advantages offered by algorithmic trading, particularly in its ability to swiftly react to market uncertainties and capitalize on emerging opportunities. This perception aligns

with the broader trend towards the adoption of algorithmic trading strategies, reflecting a shift in trader preferences toward more technologically driven and adaptive approaches to trading in the modern financial landscape.
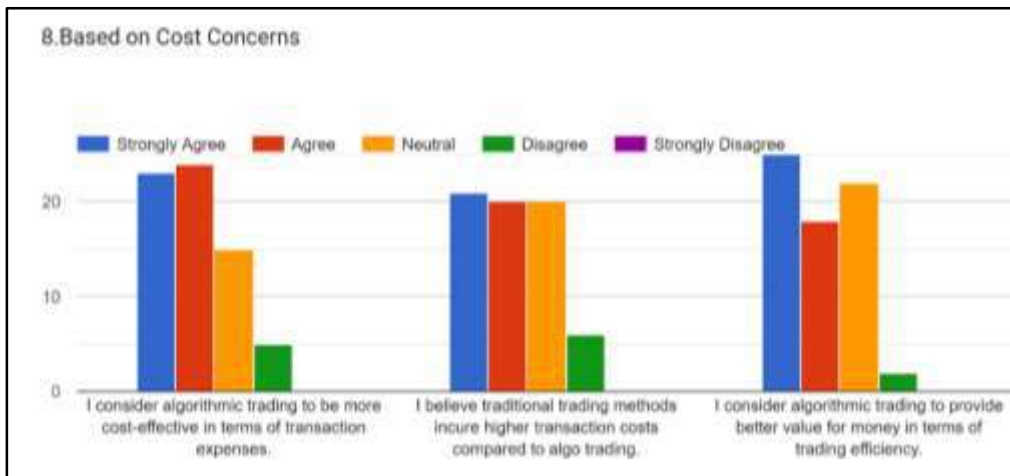
Figure 7: View Based on Adaptability
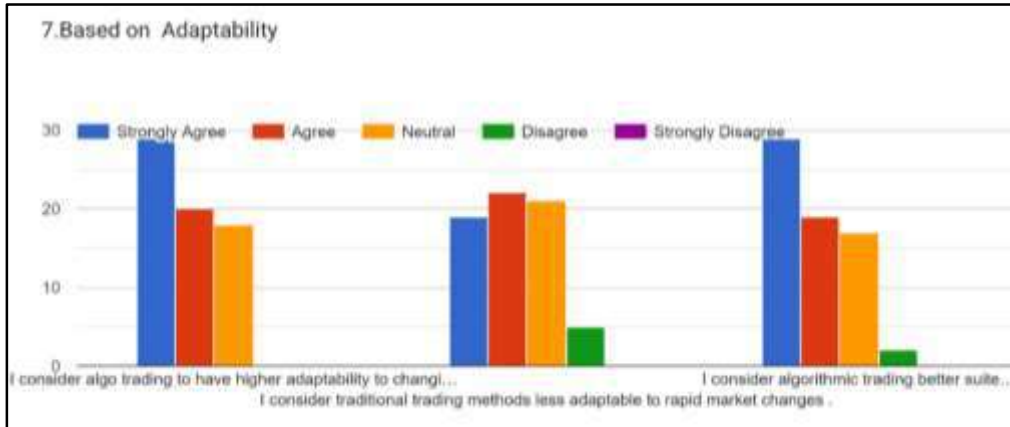
Source: Primary data

4.2.5 Based on cost concerns

Figure 8: Based on Cost Concerns

Source: Primary data

Interpretation of 67 respondents, the data shows that, on average, there is a tendency towards agreement regarding the cost-effectiveness of algorithmic trading. Of the 45 respondents who provided an opinion (agree, disagree, or neutral), the majority (23) agreed, indicating a perception that algorithmic trading is more cost-

effective in terms of transaction expenses. However, there is a minority of 7 respondents who disagree, suggesting some divergence in opinions. Additionally, 15 respondents remain neutral, indicating a lack of strong conviction either way. This average response suggests a mixed perspective among traders regarding the cost efficiency of algorithmic trading compared to traditional methods, with a slight inclination towards perceiving algorithmic trading as more cost-effective.

4.2.6 Based on efficiency

Figure 9: Based on the Efficiency
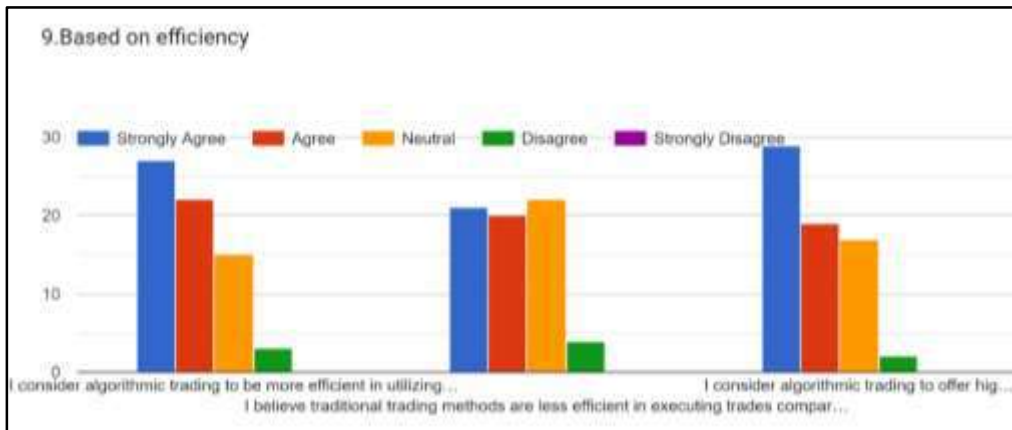
Source: Primary data

Interpretation of 67 respondents, a majority agree that algorithmic trading is more efficient in utilizing resources (27 respondents) and offers higher efficiency in trade execution speed and accuracy (29 respondents). Additionally, a significant portion agrees that traditional trading methods are less efficient due to manual intervention (21 respondents). With only a few disagreements recorded across all statements (ranging from 2 to 4 respondents), the data reflects a prevailing consensus among traders favoring algorithmic trading for its perceived resource utilization, trade execution speed, and accuracy, highlighting its growing prominence in financial markets as a more efficient trading approach. The minimal disagreements suggest a strong consensus among traders regarding the superior efficiency of algorithmic trading compared to traditional methods. These insights highlight the evolving landscape of financial markets, where technology plays an increasingly pivotal role in shaping trading practices and strategies.

4.3 Traders perception about algorithmic trading compared to traditional trading methods
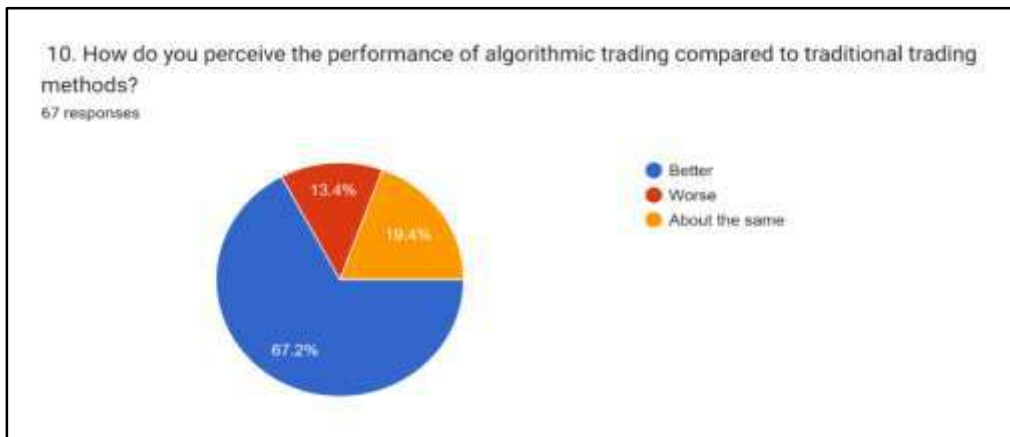
How do you perceive the performance of algorithmic trading compared to traditional trading methods?

Table 6: The Performance of Algorithmic Trading Compared to Traditional Trading Methods

Perseverance	No. of Respondents	Percentage
Better	45	67.2
Worse	13	13.4
About the same	9	19.4
Total	67	100

Source: Primary data

Figure 10: The Performance of Algorithmic Trading Compared to Traditional Trading Methods
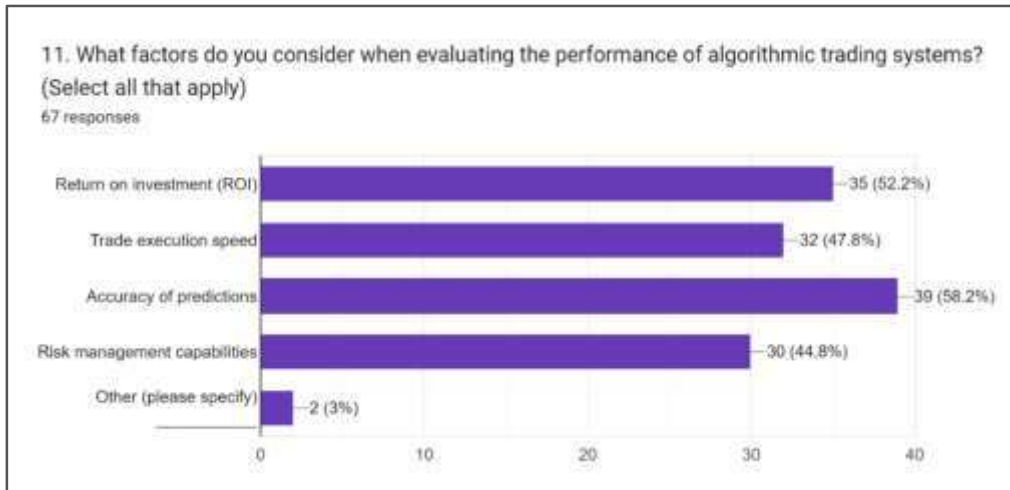

Source: Primary data

Interpretation: The data reveals a strong perception among respondents regarding the performance of algorithmic trading compared to traditional methods. A significant majority, comprising 67.2% of respondents, believe that algorithmic trading performs better than traditional methods. Conversely, a smaller proportion of respondents, accounting for 13.4%, perceive algorithmic trading to be worse. Additionally, 19.4% of respondents view the performance of algorithmic trading as about the same as traditional methods.

4.3.1 What factors do you consider when evaluating the performance of algorithmic trading systems? (Select all that apply)

Interpretation: Out of 67 responses, the most commonly considered factors when evaluating the performance of algorithmic trading systems are "Return on investment (ROI)" and "Trade execution speed," each selected by 52.2% of respondents. Additionally, "Accuracy of predictions" and "Risk management capabilities" are considered important by 47.8% of respondents. Notably, "Other"

factors, which respondents could specify, were selected by 58.2%. These findings suggest a multifaceted approach to evaluating algorithmic trading systems, with a focus on factors such as ROI, speed, accuracy, risk management, and other unspecified considerations, reflecting the complexity of assessing the performance of these systems in financial markets.

Figure 11: Evaluating the Performance of Algorithmic Trading Systems

Source: Primary data

**4.3.2 Do you believe algorithmic trading systems contribute to market fairness?**

Table 7: Algorithmic Trading Systems Contributing to Market Fairness

Views	No. of Respondents	Percentage
Yes	24	35.8
No	7	10.4
Not Sure	19	28.4
Maybe	17	25.4
Total	67	100

Source: Primary data

Interpretation: Out of 67 respondents, perceptions regarding whether algorithmic trading systems contribute to market fairness vary. 35.8% believe they do, while 10.4% disagree. Meanwhile, 28.4% are uncertain, and 25.4% express a neutral stance. These responses reflect a mixed sentiment among traders regarding the impact of algorithmic trading systems on market fairness. While a significant portion is unsure or neutral, a notable number perceive algorithmic trading systems as positively contributing to market fairness, suggesting differing perspectives on the role of technology in shaping fair and equitable market environments.

Figure 12: Algorithmic Trading Systems Contributing to Market Fairness
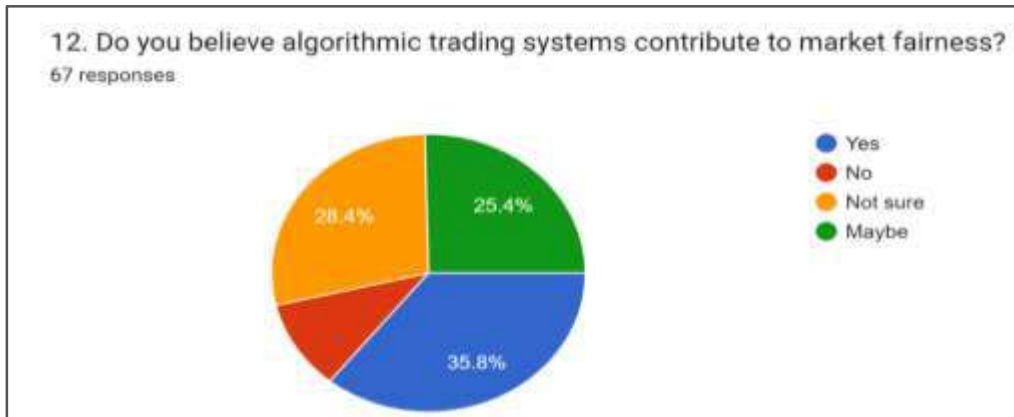
Source: Primary data

5.0 Findings, Suggestions and Conclusion

5.1 Findings

- Familiarity with Algorithmic Trading: Traders demonstrate a high level of familiarity with algorithmic trading, with 87.7% reporting some level of awareness. This widespread familiarity suggests that algorithmic trading has become ingrained in the consciousness of market participants, reflecting its growing importance in modern trading practices.
- Efficiency Advantages: Investors believe that algorithmic trading is very efficient, especially in terms of capital usage and trading speed. Automation of trading processes and the use of complex algorithms can improve trading performance and profitability of trading participants by helping algorithmic trading systems trade quickly and accurately.
- Cost-effectiveness: A significant majority of traders, amounting to 84.6%, perceive algorithmic trading as more cost-effective compared to traditional methods. This perception is driven by lower transaction costs associated with algorithmic trading, as highlighted by 52.2% of respondents.
- Contribution to Market Objectivity: Traders hold mixed views on whether algorithmic trading systems contribute to market fairness. While 35.8% believe they do, 10.4% disagree, and 28.4% remain uncertain. This diversity of perspectives reflects differing opinions among traders regarding the impact of algorithmic trading on market fairness.
- Adaptability to Market Conditions: Traders acknowledge the adaptability of algorithmic trading to changing market conditions, with 52.2% considering it more adaptable compared to traditional methods. This adaptability is seen as a key advantage, enabling algorithmic trading systems to respond quickly and effectively to evolving market dynamics.

- Factors Influencing Algorithmic Trading Performance: Traders consider various factors when evaluating the performance of algorithmic trading systems, including return on investment (ROI), trade execution speed, accuracy of predictions, and risk management capabilities. These factors play a crucial role in determining the effectiveness and efficiency of algorithmic trading strategies in achieving trading objectives.

- Views on Algorithmic Trading's Performance vs. Traditional Methods: Traders overwhelmingly perceive algorithmic trading as outperforming traditional methods, with 67.2% expressing a belief in its superior performance. This sentiment underscores the growing preference for algorithmic trading strategies among market participants.

- Perceptions of Algorithmic Trading Efficiency: Traders view algorithmic trading as highly efficient, particularly in terms of resource utilization and trade execution speed. This efficiency is seen as a key advantage, enabling algorithmic trading systems to execute trades rapidly and accurately, potentially leading to enhanced trading performance and profitability.

- Considerations When Evaluating Algorithmic Trading Performance: Traders consider various factors when evaluating the performance of algorithmic trading systems, including return on investment (ROI), trade execution speed, accuracy of predictions, and risk management capabilities. These factors play a crucial role in determining the effectiveness and efficiency of algorithmic trading strategies in achieving trading objectives.

5.2 Suggestions

1. *Educational and awareness campaign:* Launching an educational initiative to increase awareness and understanding of algorithmic trading among traders. By providing resources and educational programs, traders can make informed decisions and effectively use algorithmic trading.

2. *Cost transparency and access:* Improve transparency of algorithmic trading fees and ensure traders understand their fee structure and potential savings. Additionally, algorithmic trading platforms make it more accessible to a wider range of traders, including those with different levels of financial resources.

3. *Supervisory supervision and impartiality guarantee:* It increased regulatory oversight to ensure the fairness and integrity of algorithmic trading practices. Take steps to address concerns about market manipulation, unjust enrichment, and systematic risks associated with algorithmic

4. *Innovation and continuous adaptation:* We should encourage continuous innovation and adaptation in algorithmic trading technology to improve efficiency, consistency, and performance. Working together, industry stakeholders and technology experts can create progress that benefits traders and the entire market ecosystem.

5. *Risk management strategy:* Facilitate the development and implementation of robust risk management strategies tailored to algorithmic trading. Educate traders on risk mitigation techniques such as diversification, position sizing, and automatic stop-loss mechanisms to avoid potential losses.

6. *Ethical considerations and social responsibility:* Promoting debate on the ethical implications of algorithmic trading and promoting responsible trading practices. We emphasize the importance of ethical decision-making, transparency, and accountability to maintain market integrity and public trust.

5.3 Conclusion

Algorithmic trading has revolutionized the financial industry and given investors unprecedented opportunities to become profitable and profitable. Our analysis comparing algorithmic trading and traditional methods shows that investors prefer the former; 67.2% believe that algorithmic trading is the best method in terms of trading efficiency, effectiveness, and cost-effectiveness.

Extensive experience in algorithmic trading demonstrates the important role of quality in today's business practices. Investors are aware of its benefits, especially in terms of business speed and efficiency enabled by lower costs. However, concerns remain over its impact on fair trade, with mixed views on whether this will improve the economy or cause further chaos.

Many proposals have emerged to address these concerns and improve the efficiency of algorithmic trading. Continuous learning and experience are essential to equip investors with the necessary knowledge and skills. Improved transparency, accessibility, and regulatory oversight can ensure fairness, justice, and investor protection. Additionally, encouraging innovation, collaboration, and research initiatives can lead to progress that benefits all stakeholders and supports the role of business.

In summary, algorithmic trading represents a breakthrough in financial markets and offers investors an unparalleled level of success. By embracing innovation, collaboration, and responsible leadership, we can use transformation to create a more efficient, inclusive, and sustainable society.

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CHAPTER 20

A Study on the Expansion of Cashless Transactions in India Following Demonetization

Tanmay Arora*, Ayushi Maheshwari** and Tarun Kumar***

ABSTRACT

Demonetization is every Indian's haunting experience and is going to be one of the economic events of our time. Its impact is felt by every Indian citizen. Demonetization affects the economy through the liquidity side. Demonetizing is Progressive shift to a cashless economy with a greater focus on electronic transactions. The study probe into the profound transformation of India's financial ecosystem in the reverberation of the 2016 demonetization drive. This research pursued the expansion of cashless transactions as a resulting outcome of the government's bold move to demonetize high-denomination currency notes. By employing a multi-faceted approach, the study aims to dissect the key factors contributing to the surge in digital transactions and their long-term implications on the Indian economy. Employing a mixed-methods approach, the study utilizes quantitative data on digital transaction volumes alongside qualitative interviews with stakeholders across diverse demographics and sectors. The analysis delves into various aspects like: Pre-demonetization landscape, Immediate impact, Long-term trends, Stakeholder perspectives. In conclusion, this study sheds light on the dynamic landscape of cashless transactions in post-demonetization India. By providing a nuanced understanding of the driving forces, challenges, and potential solutions, it contributes valuable insights to the ongoing discourse surrounding the country's journey towards a more digitally inclusive financial future.

Keywords: Demonetisation, Economy, Denomination, Cashless transactions, Digital.

1.0 Introduction and Background

India started a risky economic experiment in November 2016 when it abruptly announced the demonetization of high-value banknotes, removing them from circulation.

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Although the declared goals included stopping the funding of terrorism, black money, and counterfeiting, the actual result was a nationwide cash constraint that severely impacted day-to-day living. Notwithstanding the preliminary obstacles, an inadvertent outcome surfaced: a swift surge in the acceptance of cashless transactions. This study examines this phenomenon and how demonetization has affected the growth of cashless transactions in India.

1.1 Background: Cash dominance and the push for digitalization

The cash-based economy of India posed obstacles to financial inclusion and transparency before demonetization. Cash transactions were frequently unrecorded, prone to corruption and tax evasion, and informal. Initiatives for digital payments were in place, but adoption was constrained by things like a lack of financial literacy, insufficient infrastructure, and restricted access to smartphones and internet connectivity. The demonetization policy presented a unique chance to expedite the shift towards a cashless society, despite its intricacies and early setbacks. People and companies were compelled to look into alternate payment options when significant sums of high-denomination banknotes were unexpectedly declared illegitimate. As a result, the use of mobile banking, point-of-sale (PoS) terminals, and digital wallets increased dramatically.

The Indian economy was dominated by cash before demonetization. Almost 90% of payments were made using cash, which is indicative of a largely unorganized sector and low levels of financial inclusion. Although there was a slow pace of improvement, programmes such as the Pradhan Mantri Jan Dhan Yojana (PMJDY) attempted to increase the number of bank accounts and digital infrastructure.

Nonetheless, the government acknowledged that a cashless economy could have advantages such as better financial inclusion, decreased tax evasion, and enhanced transparency. Digital transactions were made easier with the introduction of programmes like the Unified Payments Interface (UPI) and the Bharat Interface for Money (BHIM). Pre-demonetization uptake of digital payments was slow in spite of these attempts.

1.2 Demonetization: A catalyst for change

Many were scrambling to find other ways to pay after the abrupt pullout of high-value notes. People had to look into digital choices like UPI-based apps, mobile wallets, and debit cards because they had less cash on hand. Through programmes like cashbacks, incentives, and merchant onboarding, the government further encouraged digital payments. A perfect storm for the cashless revolution was produced by these variables coming together.

1.3 Initial surge and early hurdles

Cashless transaction volume increased dramatically in the first few months after demonetization. Platforms such as UPI registered a startling surge in

transactions, indicating an exponential expansion in the amount of digital payments. Nonetheless, difficulties continued. Adoption was impeded in large parts, especially in rural countries, by low digital literacy, poor infrastructure, and worries about security and accessibility.

1.4 Beyond the initial spike: Examining sustainability and trends

The impact of demonetization on cashless transactions proved to be more than a passing trend, even as the initial surge receded. Even though it was growing more slowly, digital payments were nevertheless growing steadily. As a result of hygienic concerns, contactless payments became more popular during the epidemic. Nonetheless, concerns about the long-term viability of the cashless movement still exist. It is imperative that the digital divide be addressed, infrastructure be improved, and data security be guaranteed. To ensure inclusive growth, it is also critical to comprehend the unique requirements and preferences of various user categories, especially those in rural areas and the informal economy.

2.0 Significance of the Study

This research adds to the continuing discussion about the effects of demonetization and the prospects for cashless transactions in India. Policymakers, organizations, and consumers can benefit from the research's insightful analysis of the factors influencing the adoption of various payment methods and comprehension of long-term patterns. To ensure long-term success in this industry, it is critical to comprehend how demonetization works to encourage cashless transactions and to pinpoint the issues that need to be resolved. The research will also add to the worldwide conversation about digital payments' significance in developing economies and financial inclusion.

3.0 Literature Review

3.1 Scope of the study

The cashless economy concept gained momentum and is famous around the world. In the last 20 periods for years the economy has been largely free of money Expanded and included a few questions about it. From financial books a deep, widespread and diversified economy, full book review required literature searches for removal will be towards capacity to explore in depth without cash Economics Topics covered in this text periods between 1995-2021(including one study) from 1967) were revised.

3.2 Research gap

Sufficient growth in a cashless economy requires looking at the books. Understand the transition from a cash economy to a cashless economy. Various

studies have been published on free but inexpensive studies. It is still evolving. There is a great need for research that addresses the general problems and issues of the cashless economy. To our knowledge, none of the research designed to address these issues is based on the cashless economy.

3.3 Classification of cash economy literature

The literature on cash economy is quite extensive and is divided into six parts:

1. Cash economy is also economic development – This topic includes: The article discusses the impact of cash economy. from a cashless economy to an economy National economic growth with gross domestic product and related economic growth to reduce crime and improve quality of life.
2. Cashless Economy and Cash Freedom - These comments show how demonetisation will help the country achieve its cashless goals. This topic had many merits which attracted attention after the Indian government took the decision of demonetization on November 8, 2016.
3. Monetary Economy and Banking Sector - This topic has advantages and disadvantages of transition from cash economy to cash economy. Impact at the bank level.
4. Effects of the cashless economy on the business sector - Confirmation of the payment system Business units belong to this topic.
5. The role of ICT in the cashless economy - Information Technology (ICT) is emphasized through subtopics and topics. to achieve a cashless economy.

3.4 Cashless economy, concepts and challenges

This section contains articles on countries moving towards a cashless economy and a critical assessment of the cashless economy. Therefore, it is clear from Table III and Figure 1 that the concept and challenges of the cashless economy seem to be the most influential research topics. This was the subject of the majority of studies, with 29 out of 97 articles dealing with this aspect. Another influential research category is the cashless economy and the banking sector. No point results were found in the literature survey on the cashless economy. This shows the need for such research book reviews and other related cashless economy categories.

The cash economy and economic growth and development: Studies have shown a link between cashless payments and economic growth, suggesting that the transition to a cashless economy can have a positive impact on GDP (Humphrey et al., 2003; Bolt et al., 2008). Newstead, 2012; Hasan et al., 2016; Kumari and Khanna (2017) highlighted the role of the payment system as a catalyst for economic development in Read Land.

In addition, Tee and Ong (2016) conducted a cross-sectional correlation test in five European countries between 2000 and 2012 and found that the adoption of cash payments is associated with effective economic growth, although the effect

may not be immediately visible. Others et al. (2016) examined the impact of electronic payments on GDP in 70 countries between 2011 and 2015 and found that countries with higher levels of electronic payments tend to have higher GDP.

Research also shows that electronic payments reduce operational costs, increase consumer confidence and facilitate shopping (Warwick, 2004). In addition, a cashless economy can promote financial inclusion, reduce the shadow economy and reduce crimes such as drug trafficking, terrorism and human trafficking (Folarin, 2014; Rozkrut, 2016; Olusola et al., 2013; Saini, 2015).

The transition to a cashless economy can help reduce the movement of money between different social groups, improve governance systems and the general quality of life by eliminating common bacterial infections spread by banknotes and coins (Korenke et al., 2013; Gangopadhyay, 2012). Paul et al., (2012). These findings provide a compelling reason for countries to consider transitioning to a cashless economy.

3.5 Cashless economy and demonetization

The cashless economy is strongly integrated with demonetisation. Gupta (2017) published demonetization as a monetary policy. According to the authors, this step is a new digital product development and. Kaur (2017) argued that demonetization is a tool of cashless policy. Products delivered in cash, encouraged by demonetisation, buyers opt for the cashless option. Pasumarthy and Kumar (2017) and Singh (2018) analyzed monetization trends and found that online payments are increasing and decreasing respectively. launch the COD option (COD). Finally, e-commerce companies are bringing changes to the country's payment system.

Yadav and Shankar (2017) also said it was demonization. With technological work, we plan even more for the future and continue to increase electronic sales methods. Varma (2017) argued that demonetization of the cashless economy and mirroring of land ownership should and should raise the cash economy to 80% of GDP. This was done step by step by demonetizing notes of more than one denomination. Pattanaik (2017) points out that demonetization is a cashless Economy helps countries achieve financial prosperity, improve the living conditions of people, reduce the size and development of the shadow economy Social and cultural development in the society. Some studies do not support this claim about the benefits of making money.

Kohli and Ramakumar (2016) reviewed your government's requests and say that the head undermines personal freedom in the financial crisis and calls for tougher cyber security laws. Mitra et al. (2017) showing free traders in India between September 2016 and February 2017 and free tools for dissatisfaction. Again, people's choices and preferences are accepted. For this, an electronic payment method is needed to achieve the goal of a cashless economy in the long term. Most of the tutorials on this topic are made in India.

3.6 Cashless economy and banking sector

Changes in the banking sector can be seen in the transition from traditional banking methods to modern cashless systems. This transition has both positive and negative effects on the banking sector. Mustafa's review of electronic payment systems in Nigeria (2018) showed that increased usage has a positive impact on banking revenues and securities markets. Similarly, Kamboh and Leghari (2016) found a positive correlation between cashless transactions and increase in interest rates in Pakistani banks.

Studies comparing traditional and modern banking systems in countries such as England, Turkey, Spain and Iran have highlighted the long-term benefits of cashless banking (Holden and El-Bannany, 2004; Hernando and Nieto, 2007; Onay et al., 2008; Itah and Ene, 2014, Simpson (2002) analyzed the effects of online banking and found that many banks around the world have adopted it.

Application of technology in banking not only gives competitive advantage over competitors but also saves time and resources (Idowu et al., 2002; Qureshi et al., 2008). However, studies in countries such as India and Jordan contradict these results, suggesting that the Internet and e-banking present significant risks to the interests of banks and may not fully exploit competitive tools (Malhotra and Singh, 2009; AlSmadi and Al-Wabel, 2011). Maiyaki and others; Mukhtar, (2010).

Furthermore, there is concern that central banks will lose control over money distribution as the economy transitions to cashless systems (Claudia and De Gray, 2001; Al-laham and Altarawneh, 2009; Ezuwore-Obodoekwe et al., 2014). The proliferation of electronic money presents challenges to traditional banks and financial institutions, requiring changes in ATM maintenance and payment card transactions (GarciaSwartz et al., 2006).

3.7 Impact of cashless economy on business sector

Businesses play a key role in the economy and have a significant impact on GDP, employment and export earnings. Research is needed to understand the impact of the cashless economy on labor policy. Robberti highlights the benefits of switching from cash to electronic payments, including reduced accounting time and costs (Dave, 2016; Mukhopadhyay, 2016). Cashless stores offer convenience and encourage entrepreneurship which increases employment opportunities (Osunade, 2011). In addition, they increase the reach of sales, provide 24/7 access and a competitive advantage over cash payments (BCG and Google Scholar, 2016). Job creation in a cashless economy can attract foreign investment (Muyiwa et al., 2013). Cashless transactions also strengthen businesses by providing better control and facilitating deliveries, which increases their competitiveness (Shendge et al., 2017).

Ebeiyamba (2014) and Igbara et al. (2015) highlight the challenges of implementing tax-free policies especially for micro and small businesses. These companies, which often lack literacy and technical knowledge, struggle with issues such as money laundering and a lack of information. Adopting a cashless policy

without proper support can lead to unemployment and bankruptcy of small and medium enterprises. This highlights the importance of considering the nuances of a cashless economy.

Dissatisfied is an attractive option, but not without challenges and uncertainties. Skinner (2012) suggests that while the economy may evolve to a certain level of cash scarcity, a plateau may occur when cash payments continue. Jonker (2005) emphasizes consumer access to electronic payment systems as a quality service that can lead to cost differences. BCG and Google argue that difficulties in using digital products and established consumption habits prevent their widespread adoption (Purewal, 2013).

In addition, Drehmann et al. (2002) emphasize the preference for anonymous digital payments, although privacy and security concerns remain. Risks such as data breaches and phishing scams (Gillett et al., 2004; Oyewole et al., 2013) emphasize the importance of protecting personal and financial information. Confidentiality of government financial data is also a concern.

In addition, the benefits of money flows to countries can be reduced (Free, 2008; Rogoff, 2014), which can affect social welfare and services. The potential marginalization of individuals or families without digital payment methods (Bendell, 2015) raises concerns about financial inclusion and privacy. In addition, cybercrimes such as hacking and online fraud threaten both individuals and institutions.

The challenges are more pronounced in developing countries where technological infrastructure and connectivity are limited (Bendell, 2015). The situation is worsened by the high cost of internet use, especially in rural areas, and cash payments. Credit card use has been linked to bankruptcy, which has raised concerns among young people and researchers about its effects on the economy and employment.

In response, banks, financial institutions and other organizations can adapt their workforce and security measures to reduce risk and ensure universal access to financial services.

4.0 Research Objective

The purpose of this study is to examine how demonetization has affected the growth of cashless transactions in India. It will examine how this legislative change may affect consumer behavior and the uptake of digital payment systems in the near and long terms.

The main goals are:

- *To evaluate the volume and value of cashless transactions in India immediately following demonetization:* Analyzing data from digital payment systems such as UPI, debit cards, and mobile wallets both before and after demonetization falls under this category.

- *To investigate the long-term patterns in the adoption of cashless transactions after demonetization:* This will entail determining if the demonetization of financial services resulted in a long-term shift towards cashless payments or if cash usage eventually increased again.
- *To determine the elements that affected the adoption of cashless transactions after demonetization, as well as any obstacles that faced:* Examining the function of governmental initiatives, infrastructural growth, digital literacy initiatives, and consumer preferences are a few examples of this.
- *To assess demonetization's overall efficacy as an instrument for policy in order to encourage India's transition to a cashless economy:* This will entail taking into account the policy's social and economic ramifications, as well as how it would affect access to digital payment systems and financial inclusion.

By fulfilling these goals, the study will offer important new perspectives on how well demonetization has worked to encourage cashless transactions in India. Future policy choices pertaining to financial inclusion and the growth of the digital economy can be influenced by the findings.

5.0 Research Methodology

The research methodology adopted for this study on the expansion of cashless transactions in India following demonetization is designed to provide a comprehensive understanding of the factors driving the adoption of digital payment methods in the country. This section outlines the research design, data collection methods, sample selection criteria, and analytical techniques employed to investigate the phenomenon of cashless transactions post-demonetization.

5.1 Research design

This study utilizes a mixed-methods approach, combining both qualitative and quantitative research methods to gather insights into the expansion of cashless transactions in India. The qualitative component involves in-depth interviews and focus group discussions with key stakeholders, including government officials, policymakers, representatives from financial institutions, and consumers. These qualitative interviews aim to explore perceptions, attitudes, and experiences related to cashless transactions, as well as the challenges and opportunities associated with digital payment adoption. The quantitative component of the research involves the analysis of secondary data obtained from government reports, academic publications, industry reports, and other relevant sources. This quantitative analysis will focus on trends in digital payment usage, adoption rates, transaction volumes, and demographic patterns to identify key drivers of cashless transactions in India.

5.2 Data collection methods
5.2.1 Qualitative data collection

Focus Group Discussions: Focus group discussions will be organized with representatives from different demographic segments, including urban and rural populations, millennials, senior citizens, and low-income groups. These discussions will provide insights into consumer preferences, behavior, and attitudes towards cashless transactions, as well as the impact of socio-cultural factors on digital payment adoption.

5.2.2 Quantitative data collection

Secondary Data Analysis: Existing data sources, such as government surveys, industry reports, and academic studies, will be analyzed to identify trends and patterns in digital payment usage before and after demonetization. Key metrics such as transaction volumes, types of digital payment instruments used, geographic distribution, and demographic characteristics will be examined to assess the impact of demonetization on cashless transactions in India.

5.3 Sampling techniques

The sampling strategy will involve both probability and non-probability sampling techniques to ensure representation and diversity in the sample population.

- *Probability Sampling:* A random sampling technique will be used to select individuals and businesses from different demographic groups, geographic regions, and economic sectors. This will help in obtaining a representative sample of the population and minimizing selection bias.
- *Non-Probability Sampling:* Convenience sampling may also be employed to reach out to specific groups, such as urban residents, small merchants, or digital payment users, who are more likely to have insights into cashless transactions. However, efforts will be made to ensure that the sample remains diverse and inclusive of various stakeholders.

5.4 Analytical techniques
5.4.1 Qualitative analysis

Thematic Analysis: Data from qualitative interviews and focus group discussions will be transcribed and analyzed using thematic analysis techniques to identify recurring themes, patterns, and insights related to cashless transactions in India. Themes will be categorized and interpreted to generate meaningful findings and recommendations.

5.4.2 Quantitative analysis

Descriptive Statistics: Quantitative data obtained from secondary sources will be analyzed using descriptive statistical techniques to summarize key trends and patterns in digital payment usage, adoption rates, and transaction volumes. Statistical

measures such as means, frequencies, and percentages will be calculated to provide an overview of the data.

5.4.3 Comparative analysis

Comparative analysis will be conducted to examine changes in digital payment trends before and after demonetization, as well as differences across demographic groups, geographic regions, and types of digital payment instruments. This analysis will help identify factors driving the expansion of cashless transactions in India and inform policy recommendations.

5.5 Data collection procedure

The survey instrument will be administered through both online and offline channels to reach a wide range of respondents. Online surveys will be distributed via email, social media platforms, and online survey platforms, while offline surveys will be conducted through face-to-face interviews, telephone interviews, or paper-based questionnaires, depending on the accessibility and preferences of the target population.

5.6 Data analysis

The collected data will be analyzed using both descriptive and inferential statistical techniques to derive meaningful insights and test hypotheses related to the expansion of cashless transactions in India.

- *Descriptive Analysis:* Descriptive statistics, such as frequencies, percentages, means, and standard deviations, will be computed to summarize the demographic characteristics of the sample, as well as the usage patterns and preferences regarding cashless payment methods.
- *Inferential Analysis:* Inferential statistics, such as correlation analysis, regression analysis, chi-square tests, and t-tests, may be employed to examine relationships between variables, identify factors influencing cashless transactions adoption, and assess the significance of differences across demographic groups or geographic regions.

The research methodology described offers a structured approach to studying the expansion of cashless transactions in India post-demonetization. By incorporating both quantitative and qualitative methods, the study intends to provide a thorough understanding of the factors influencing, challenges faced, and consequences of the transition to digital payments in the Indian economy. Overall, this research seeks to provide a holistic understanding of the dynamics surrounding cashless transactions post-demonetization, with the ultimate goal of informing strategies to enhance financial inclusion and foster digital innovation in India. The insights gained from this study are expected to contribute to the development of effective policies and initiatives aimed at promoting a cashless economy and driving economic growth.

6.0 Findings and Conclusion

Trends in Cashless Transactions: Surge in Digital Payments: Following the sudden withdrawal of high-denomination currency notes, there was a significant surge in digital payments across various platforms. With cash in short supply, people turned to alternative modes of payment such as mobile wallets, online banking, and debit/credit cards to conduct transactions.

Rise of Mobile Wallets: Mobile wallet usage witnessed a remarkable increase during demonetization. Platforms like Paytm, PhonePe, and Google Pay experienced a surge in user registrations and transaction volumes as people sought convenient ways to make payments using their smartphones.

Adoption of Unified Payments Interface (UPI): The Unified Payments Interface (UPI), launched in August 2016, gained widespread adoption during demonetization. UPI enabled seamless and instant fund transfers between bank accounts using a smartphone. Its user-friendly interface and interoperability across different banks contributed to its rapid adoption.

Government Initiatives: The Indian government launched several initiatives to promote cashless transactions during demonetization. Campaigns such as "Digital India" aimed to raise awareness about digital payment options and encourage their adoption. Additionally, incentives and discounts offered by both the government and private sector entities further incentivize people to transition to cashless modes of payment.

Shift in Consumer Behavior: Demonetization led to a shift in consumer behavior, with many individuals and businesses becoming more open to adopting digital payment methods. The necessity to find alternative ways to conduct transactions during the cash crunch prompted people to overcome their reluctance and embrace cashless options.

Increased Awareness and Education: Demonetization sparked a heightened awareness of digital payment options among the Indian population. Educational campaigns, both by the government and private sector players, played a crucial role in informing people about the benefits and functionalities of digital payment platforms.

7.0 Impact on Financial Inclusion

7.1 Positive impact

- *Increased Banking Penetration:* Demonetization spurred a significant increase in banking penetration as people rushed to deposit their invalidated currency notes in banks. This resulted in the opening of millions of new bank accounts, particularly under government-led initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), aimed at promoting financial inclusion.

- *Promotion of Digital Payments:* Demonetization accelerated the adoption of digital payment methods, which played a crucial role in promoting financial inclusion. Mobile wallets, Unified Payments Interface (UPI), and other digital payment platforms enabled individuals, including those in remote areas, to conduct transactions without the need for physical currency.
- *Enhanced Transparency and Accountability:* Digital transactions promoted transparency and accountability in financial transactions, particularly in rural areas where cash-based transactions were prevalent. The shift towards digital payments reduced the prevalence of cash-based informal economies, minimizing opportunities for tax evasion and corruption.

7.2 Negative impact

- *Technological Barriers:* Many individuals, especially older demographics and those with limited education, faced challenges in navigating digital payment platforms due to technological barriers. Complex interfaces and lack of familiarity with digital technologies impeded the adoption of cashless transactions among certain segments of the population.
- *Cybersecurity Concerns:* The rapid transition to digital payments during demonetization raised concerns about cybersecurity and data privacy. Instances of fraud, phishing attacks, and data breaches highlighted the vulnerabilities of digital payment systems, undermining consumer trust and confidence in cashless transactions.
- *Dependency on Cash:* Despite efforts to promote digital payments, cash continued to play a significant role in the Indian economy, especially in sectors such as agriculture and informal labor. Dependency on cash persisted due to factors such as lack of infrastructure, cultural preferences, and limited acceptance of digital payments in certain sectors.

7.3 Consumer behavior and adoption patterns

- *Rapid Adoption of Digital Payment Platforms:* Faced with a shortage of physical currency, consumers rapidly embraced digital payment platforms such as mobile wallets, UPI, and online banking. The convenience and accessibility offered by these platforms became increasingly appealing as people sought alternatives to cash transactions.
- *Shift Towards Mobile Wallets:* Mobile wallet usage surged during demonetization as consumers turned to platforms like Paytm, PhonePe, and Google Pay to make payments using their smartphones. The simplicity and ease of use of mobile wallets, coupled with promotional offers and cashback incentives, encouraged widespread adoption among urban and rural populations alike.
- *Preference for Cashless Transactions:* The necessity to adapt to the cash shortage prompted many consumers to shift towards cashless transactions for

their everyday expenses, including groceries, utilities, and transportation. This shift in behavior was particularly pronounced in urban areas where digital payment infrastructure was more readily available.

● *Increased Awareness and Education:* Demonetization led to a heightened awareness of digital payment options among consumers, driven by government campaigns, media coverage, and promotional efforts by digital payment providers. Educational initiatives aimed at familiarizing consumers with the functionalities and benefits of digital payment platforms played a crucial role in driving adoption.

● *Generational Divide in Adoption:* Younger demographics, accustomed to using smartphones and technology, exhibited greater receptiveness towards digital payment platforms compared to older generations. The younger population readily embraced cashless transactions, leveraging their familiarity with technology to navigate digital payment interfaces effectively.

● *Innovations and Adaptations:* Demonetization spurred innovations in the digital payment ecosystem, with businesses and entrepreneurs developing new solutions to meet the evolving needs of consumers. From QR code-based payments to biometric authentication, various innovations emerged to enhance the convenience, security, and accessibility of digital payment platforms.

8.0 Implications

The expansion of cashless transactions in India following demonetization carries profound and far-reaching implications across various dimensions of the economy, society, and governance. As stakeholders grapple with the aftermath of demonetization and chart a path forward, it is crucial to delve into the intricate web of implications that this transition entails:

Economic Transformation: The shift towards cashless transactions signifies a fundamental transformation in India's economic landscape. By reducing reliance on cash and promoting transparency, digital payments can modernize India's economy and promote sustainable growth. Switching to digital payment makes money flow more efficiently, tax liability more efficient and economic activity faster. By introducing digital payments, companies can improve their operations, reduce transaction costs and open up new growth opportunities. In addition, digital payments facilitate financial inclusion by providing underserved populations with access to formal financial services, thus expanding the consumer base and stimulating demand in the economy.

Financial inclusion: Promoting financial inclusion is at the core of India's cashless transition. The expansion of digital payments can empower marginalized communities and reduce the digital divide. Initiatives aimed at expanding banking penetration, improving digital literacy and promoting the use of digital payment technologies can ensure that the benefits of cash-based business reach all sections of

society. By providing access to formal financial services, digital payments enable individuals to participate more actively in the formal economy, improve their financial prospects and increase resilience to financial disruptions. In addition, digital payments can facilitate savings, enable access to credit and encourage wealth accumulation, contributing to poverty reduction and inclusive growth.

Technological Innovations: The growth of cashless transactions highlights the importance of technological innovations in shaping India's digital payment ecosystem. Emerging technologies such as biometric authentication, artificial intelligence and blockchain offer new opportunities to improve the security, accessibility and efficiency of digital payments. By leveraging these technologies, stakeholders can respond to changing consumer needs, improve user experience and strengthen the overall sustainability of digital payment systems. In addition, investing in R&D and fostering a culture of innovation can grow India's cashless ecosystem, making the country a global leader in digital finance and technology.

Conditions of operation: Creating an enabling operational framework is very important to promote a sustainable and inclusive cashless ecosystem. Policymakers must strike a delicate balance between fostering innovation and responding to regulatory challenges to ensure consumer protection, data protection and cybersecurity. Clear regulatory guidelines, standard protocols and strong enforcement mechanisms are essential to building trust in digital payment systems. Moreover, collaboration between the government, industry stakeholders and civil society is essential to take concerted action to realize India's cashless vision. By aligning regulatory policies with national development goals, policymakers can create an enabling environment for the sustainable growth of digital payments and ensure that the benefits are distributed equally across society.

Socio-economic impacts: The growth of cashless payment transactions has significant socio-economic impacts affecting employment, income distribution and access to services. While digital payment can create new opportunities for employment and business, it can also disrupt traditional cash forms of employment in industries. In addition, ensuring equal access to digital infrastructure and closing digital literacy gaps are critical to ensure that marginalized communities do not miss out on the benefits of free payments. In addition, the socio-economic impact of digital payments must be continuously monitored to identify and mitigate unintended consequences on income distribution and social equity. By proactively responding to socio-economic challenges, stakeholders can ensure that the transition to cashless payments is inclusive and sustainable, benefiting all segments of society.

9.0 Future Research Agendas

- *Future directions and research areas in the context of cashless economy and demonetization:* Transition to a cashless economy, especially after demonetization, has attracted a lot of interest among researchers due to various

aspects. society and economy. Although the existing literature has explored certain dimensions of this transition, there are still many unexplored areas and questions that deserve further investigation. This discussion focuses on possible future directions and research areas in the field of cashless economy and demonetization, focusing on topics such as rural development, economic inequality, education, health and household.

- *Accounting and Rural Development:* Despite the spread of digital payment technologies in urban areas, rural areas still lag behind in terms of availability and usage. Research focusing on the intersection of the cashless economy and rural development could illuminate strategies to bridge this gap. Key areas of research may include assessing the effectiveness of government initiatives to promote digital financial inclusion in rural areas, examining the impact of digital payment adoption on agricultural productivity and rural livelihoods, and identifying barriers to access and adoption of digital payment technologies in remote areas.

- *Economic Disparities and Cashless Transactions:* The transition to a cashless economy could exacerbate existing economic inequalities if not effectively managed. Future research could examine the differential impact of free payment transactions on different socioeconomic groups, including low-income households, informal sector workers, and marginalized communities. In addition, research on the importance of financial literacy and digital infrastructure in shaping the adoption of digital payments among income groups can provide valuable information to decision makers promoting inclusive growth.

- *Cash Economy and Education:* Education plays a key role in facilitating the transition to a cashless economy as it promotes people's digital literacy and financial awareness. Research in the field could investigate the effectiveness of educational initiatives aimed at promoting digital literacy in different age groups, from school children to adults. In addition, research examining the relationship between educational attainment and adoption of digital payment technologies can help identify strategies that promote financial inclusion and enable people to participate more actively in the digital economy.

- *The Cash Economy and Healthcare:* Healthcare is another sector ripe for exploring cashless commerce. The study could examine the impact of the introduction of digital payments on the availability, affordability and quality of health services. In addition, research exploring the potential of digital health technologies such as telemedicine and health information systems to facilitate seamless transactions and improve health care in both urban and rural areas can provide valuable information to policymakers and health professionals.

- *Household Economy and Cashless Transactions:* The transition to a cashless economy will affect household finances, including spending patterns, savings behavior and asset management strategies. Research in this area could examine

how the adoption of digital payments affects household financial decisions, budgeting practices and access to credit and savings mechanisms. Additionally, research examining the impact of cardless payment transactions on consumer well-being, debt and financial vulnerability could inform policies to promote responsible financial behavior and consumer protection.

- *Methodological considerations and limitations:* Important to acknowledge, methodological approach, related considerations and limitations to the study of cashless economy and demonetization. Since the topic is complex and multifaceted, a multidisciplinary approach combining qualitative and quantitative methods may be necessary to achieve its full coverage. In addition, researchers should be aware of potential biases in data collection and analysis, especially in studies investigating the socio-economic effects of free payment transactions.

Future research in this area should also aim to address gaps in the existing literature and generate evidence. based insights to effectively inform policy and practice. Through rigorous research methods and innovative approaches, researchers can contribute to a better understanding of the social, economic and management implications of a cashless economy.

About the Editors

Dr. Madhavi Deshpande stands as a stalwart in the realm of academia, renowned for her multifaceted expertise and unwavering commitment to nurturing individual talents. With an illustrious career spanning over 28 years, Dr. Deshpande has left an indelible mark on the landscape of education and human resource management. As a Professor and Dean of Academics at D. Y. Patil International University (DYPIU), her leadership has led to the introduction of innovative courses and certifications, including pioneering programs in data analytics and Microsoft Excel proficiency. Her expertise in talent management, recruitment, and training has been instrumental in driving organizational success and fostering a culture of excellence. Her insightful research on topics ranging from talent management to digital HR has garnered awards, widespread acclaim and recognition.

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