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INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES
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LEAD
LEAD COLLEGE OF MANAGEMENT

INTERNATIONAL CONFERENCE

On

*Sustainable Business Practices for Mitigating
The Global Environmental Crisis*

25th March 2025 Ginger Hotel@ kochi, kerala

Organized by
SCLAS

*In association with Sacca Institute of freight and Tourism, Kochi
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Proceedings of KOCHI International Conference on Sustainable Business Practices for Mitigating the Global Environmental Crisis (SBPMG 2025)

25th – 26th 2025

**At SACCA Institute of Freight and Tourism
and LEAD College of Management at Kochi**

Chief Editor

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Organized by

**The Department of Commerce General – Fintech
Saveetha College of Liberal Arts and Sciences
SIMATS Deemed to be University
Chennai, Tamilnadu
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Preface

The International Conference on Sustainable Business Practices for Mitigating the Global Environmental Crisis (SBPMG 2025) is scheduled on March 25th – 26th , 2025, at the SACCA Institute of Freight and Tourism, and LEAD College of Management, Kochi. This conference aims to bring together experts, scholars, industry leaders, and students to exchange knowledge, research, and innovative ideas on sustainable business strategies that address environmental challenges globally. The conference will provide a platform for presenting high-quality research, groundbreaking solutions, and emerging trends in sustainability, corporate responsibility, and green innovations. With a strong focus on integrating sustainable practices into business models, this event will highlight effective strategies that balance economic growth with environmental stewardship.

Key highlights of the conference include insightful keynote sessions, academic paper presentations, an awards ceremony, an industrial visit, and an interactive workshop. The event will foster discussions on the latest advancements in sustainable development, renewable energy, circular economy, and eco- friendly business transformations, contributing to a greener and more resilient future."

SIMATS

Saveetha Institute of Medical and Technical Sciences (SIMATS) is a key contributor to the quality education in India, with an array of specializations such as Medicine, Dentistry, Engineering, Law, Management, Physiotherapy, Pharmacy, Nursing, Allied Health Sciences, Physical Education, Architecture, Liberal Arts and Sciences, Hospitality and Tourism. SIMATS has been awarded an A++ grade by NAAC, and 11th Rank by NIRF.

ABOUT THE COLLEGE

Saveetha College of Liberal Arts and Sciences a well-regarded constituent College of Saveetha Institute of Medical and Technical Sciences, is deemed to be University craft the "World's Best college" in the Liberal Arts and Sciences discipline. Higher Education Magazine ranked Saveetha College of Liberal Arts and Sciences among "The top 10 promising colleges in Chennai 2023". Sclas is ranked 7th in the state and 19th in the National level, according to IIRF rankings. The Institution aims to build a lively and comprehensive learning community in a culture of excellence consistently by a great value system that promotes responsible citizens with effective human values. Today, the college offers various undergraduate, postgraduate & foreign language programs in liberal arts and sciences. Internships and Research Projects form an integral part of the curriculum. The College has competent faculty and excellent infrastructure integrated with eminent Research Teams. Clubs and other extra-curricular activities are offered to students providing them a wide range of opportunities to learn and excel. CBCS is followed at

SCLAS. The college also offers study abroad programs with Universities in the U.K. Malaysia, Singapore, Australia, Indonesia, UAE, etc.

ABOUT THE DEPARTMENT

The Department of Commerce is dedicated to provide students with a comprehensive education in business, trade, and economic principles. Our mission is to empower students with the knowledge, skills, and competencies required for effective financial and commercial management. We aim to foster a strong foundation in commerce, accounting, finance, marketing, and international business.

Our program is designed to develop analytical, strategic, and managerial skills, enhancing problem-solving abilities, creativity, and leadership skills. We provide hands-on experience and practical exposure to real-world business environments through internships and projects. Our curriculum is aligned with emerging trends in global trade, digital commerce, financial technology, and sustainable business practices.

Students can specialize in areas such as accounting, finance, marketing, international business, and business analytics. Our curriculum is comprehensive, covering all aspects of business and commerce. We also offer opportunities for networking with industry professionals and entrepreneurs, as well as access to state-of-the-art facilities and resources.

A unique feature of our program is the integrated six-month internship and project component. This provides hands-on experience and practical exposure to real-world business

environments, enabling students to apply theoretical concepts to practical scenarios. Our graduates are equipped with the knowledge, skills, and competencies required for successful careers in accounting and finance, marketing and management, international business and trade, business analytics and consulting, entrepreneurship, and innovation.

We are committed to provide our students with a world-class education and preparing them for successful careers in commerce and related fields. Our faculty are experienced professionals and academics who bring real-world expertise to the classroom. We are proud of our graduates' achievements and look forward to welcoming new students to our department.

Founder & Chancellor's Greeting Message



**Founder & Chancellor
Saveetha Institute of Medical and Technical Sciences
SIMATS Deemed to be University, Tamilnadu, Chennai,
India**

Dear Delegates,

It is my distinct honor and privilege to welcome you to the International Conference on Sustainable Business Practices for Mitigating the Global Environmental Crisis (SBPMG 2025), an event of exceptional importance and intellectual rigor.

This conference, organized by the Department of Commerce General - Fintech, Saveetha College of Liberal Arts and Sciences, in association with SACCA Institute of Freight and Tourism, and LEAD College of Management, Kochi held from the 25th to the 26th of March, 2025, is a celebration of the spirit of collaboration and the pursuit of knowledge across multiple disciplines. It embodies our unwavering commitment to fostering innovation, encouraging intellectual curiosity, and promoting scholarly excellence. We are gathered here as architects of a brighter future, where the confluence of ideas from diverse fields leads to groundbreaking discoveries and innovations.

The program we have curated is designed to challenge, inspire, and provoke thought. It features a distinguished lineup of keynote speakers, engaging panel discussions, and interactive sessions that will allow us to delve deeply into the most pressing issues and emerging trends in our respective fields. This is a unique platform to network, collaborate, and forge new partnerships that will drive the future of multidisciplinary research.

I appreciate all those who have contributed to making this conference a reality – the organizing committee and the participants, underscore your commitment to advancing the frontiers of knowledge.

I am sure this conference will be enriching, enlightening, and full of fruitful exchanges. Let us seize this opportunity to learn from one another, challenge our perspectives, and ignite the spark of innovation to illuminate the path forward for all.

Best Regards
Founder & Chancellor
SIMATS

Director's Message



Dr. Ramya Deepak

Director

SIMATS Engineering, SIMATS, Chennai.

Greetings to all!

The world is experiencing a surge of innovation that is transforming economies and lifestyles across various sectors such as technology, energy, finance, education, communication, and space. Breakthroughs in research are driving progress in countless fields, reshaping societies, economies, and the lives of individuals. In this context, instilling a culture of research and innovation in the younger generation is essential. It helps develop critical thinkers, problem solvers, and future leaders capable of spearheading further advancements. Encouraging this mindset from an early age ensures young people acquire the skills, knowledge, and outlook needed to navigate and influence an ever- evolving world.

The International Conference on Sustainable Business Practices for Mitigating the Global Environmental Crisis (SBPMG 2025) will serve as an exceptional platform for global researchers to contribute innovative ideas that have been pivotal in shaping national progress. By uniting experts from various fields, the conference aims to promote collaboration, share knowledge, and inspire fresh perspectives to tackle complex global issues. I appreciate Saveetha College of Liberal Arts and Sciences for organizing this conference in collaboration with SACCA Institute of Freight and Tourism, and LEAD College of Management,

Kochi. This initiative promises to facilitate meaningful academic exchanges.

I congratulate the Department of Commerce General - Fintech for hosting this event and offering participants a diverse experience. I wish the entire team great success in all future endeavours.

Dr. Ramya Deepak
Director
SIMATS

Principal's Message



Dr. Gunita Arun Chandhok

Principal

Saveetha College of Liberal Arts and Sciences, SIMATS

Warm Greetings to one and all!

Saveetha College of Liberal Arts and Sciences has consistently promoted a culture of research and innovation within the academic community. I am glad that the Department of Commerce General - Fintech is organizing the International Conference on Sustainable Business Practices for Mitigating the Global Environmental Crisis (SBPMG 2025), set to take place from March 25th to 26th, 2025, at LEAD College of Management, Kochi, in association with SACCA Institute of Freight and Tourism. This conference will offer a valuable platform for researchers from diverse countries and cultural backgrounds to collaborate on addressing global challenges. Such international cooperation will not only elevate the quality and breadth of research but also ensure the development of solutions that are inclusive and adaptable across different contexts.

The event will demonstrate how research can be applied to real-world problems, influencing policies and practices that improve societal well-being, sustainability, and economic growth. By identifying emerging trends and gaps in existing research, the conference will also help shape the future research agenda, guiding scholars towards new frontiers and innovative methodologies that could lead to groundbreaking discoveries.

The cutting-edge developments and interdisciplinary achievements showcased at the conference will influence the future of research and development, setting the stage for transformative solutions and innovations. As experts from various fields come together to share knowledge, the collaborative energy generated will spark new ideas that go beyond traditional boundaries, creating a remarkable journey of intellectual exploration. Let us seize this opportunity to innovate, inspire, and make a lasting impact on the world. Let this conference serve as a beacon of inspiration and a catalyst for future collaborations and discoveries. I wish you all a fruitful and enlightening experience.

Dr Gunita Arun Chandhok
Principal
Saveetha College of Liberal Arts and Sciences

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About Editors



Dr. Gunita Chandhok, M.Com., B.Ed., M.Phil., MBA, Ph.D., is a distinguished academician with over 30 years of experience in the field of education. Currently serving as the Founder Principal of Saveetha College of Liberal Arts and Sciences (SIMATS), she has made significant contributions to the advancement of liberal arts and sciences education in Tamil Nadu.

Her extensive career includes leadership roles such as Head of the Department of Commerce at M.O.P Vaishnav College and Director and Vice Principal at self-financing educational institutions in Chennai. Dr. Chandhok is also an esteemed Ph.D. guide at the university and has authored a book on “Marketing” aligned with the latest University of Madras syllabus for Commerce students.

A prolific scholar, Dr. Chandhok has presented and published numerous papers in national and international journals, including Scopus-indexed publications in countries such as Thailand, Romania, Malaysia, and Europe. She is also a member of the UN Global Compact and serves on the Board of Advisors for Audacious Dreams Foundation.

Dr. Chandhok’s excellence in education has been recognized with several prestigious awards, including the "Pride of Education- Lifetime Achievement Award" in 2024, the "Best Principal of the Year- 2023," and the "International Brilliance Award 2022" for Educationist of the Year. Her leadership and dedication to higher education have earned her accolades such as the “Excellence in Education Award” in 2019 and the “Distinguished Educator and Scholar Award” in 2016.

In addition to her academic achievements, Dr. Chandhok has been a resource person and speaker at various international forums. She has chaired international conferences and has been invited as a Guest of Honour for student exchange programs in Malaysia, further highlighting her global influence in the field of education.

Dr. Gunita Chandhok's journey in education is marked by innovation, leadership, and a relentless pursuit of excellence, and her contributions continue to inspire the academic community.

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THE FUTURE OF AI IN FINANCIAL RISK MANAGEMENT AND FRAUD DETECTION

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Abstract

The financial industry's swift digital revolution has presented previously unheard-of hazards as well as amazing opportunities. The complexity and number of hazards have increased dramatically as financial transactions move to digital platforms and the global financial system becomes more interconnected. Financial fraud schemes have also advanced in sophistication, taking advantage of regulatory loopholes and technology weaknesses. Financial institutions are using artificial intelligence (AI) as a game-changing tool for fraud detection and financial risk management in order to successfully tackle these new issues. The impact of artificial intelligence (AI) technologies on risk assessment, fraud prevention, and compliance monitoring in the financial sector is examined in this article. These technologies include machine learning, deep learning, natural language processing (NLP), and behavioral biometrics. By facilitating real-time data analysis, pattern identification, and anomaly detection across enormous datasets, artificial intelligence (AI) offers clear advantages over conventional rule-based systems. Financial institutions use AI to more quickly and accurately identify fraudulent transactions, evaluate creditworthiness, predict market risks, and guarantee regulatory compliance. By learning from past data and constantly adjusting to new fraudulent approaches, artificial intelligence (AI) models in fraud detection detect suspicious activity, greatly lowering false positives and enhancing the user experience. By evaluating market conditions, consumer behavior, and macroeconomic data, AI-driven prediction models in risk management evaluate possible exposures and enable organizations to implement proactive risk mitigation measures.

Keywords: Artificial Intelligence, Financial Risk Management, Fraud Detection, Machine Learning, Predictive Analytics, Anomaly Detection, Algorithmic Risk Assessment, Real-time Monitoring, Big Data Analytics, Financial Technology, Cybersecurity

Introduction

The financial services industry has experienced a substantial transition in recent years due to the quick development of technology and the growing need for improved security measures. Traditional approaches to risk management and fraud detection have not kept up with the increasing number and complexity of financial transactions. Artificial Intelligence (AI) has become a potent instrument in this regard, providing creative answers to the problem financial organizations face.(Arslanian and Fischer 2019).

Machine learning, natural language processing, and data analytics are just a few of the technologies that fall under the umbrella of artificial intelligence (AI) and allow businesses to process enormous volumes of data and extract useful insights. Financial institutions can increase their capacity to recognize and reduce risks(Allen 2012), improve decision-making, and give their clients a safer environment by utilizing these technologies.In the financial services industry, risk management is recognizing, evaluating, and ranking risks in order to reduce their influence on operations and profitability(Boukherouaa et al. 2021). The goal of fraud detection, a crucial part of risk management, is to spot questionable activity and stop monetary losses brought on by fraudulent transactions. Real-time monitoring and analysis are made possible by the incorporation of AI into these procedures, enabling preventative actions against possible dangers.

Artificial Intelligence (AI) has become integral to financial institutions, enhancing risk management and fraud detection capabilities. Below are three tables, one chart, and one diagram illustrating AI's impact in these areas.

Table 1: AI Techniques in Financial Risk Management

AI Technique	Application in Risk Management
Machine Learning	Predictive modeling for credit risk assessment.
Natural Language Processing (NLP)	Analysis of financial news to gauge market sentiment.



Anomaly Detection	Identification of unusual transactions indicating potential risks.
Predictive Analytics	Forecasting market trends and asset price movements.
Robotic Process Automation (RPA)	Automating compliance and reporting tasks to reduce operational risks.

Table 2: AI Techniques in Fraud Detection

AI Technique	Application in Fraud Detection
Data Mining	Classification and clustering to detect fraudulent patterns.
Expert Systems	Rule-based systems to identify known fraud scenarios.
Pattern Recognition	Detection of anomalies in transaction data.
Neural Networks	Learning complex patterns associated with fraudulent activities.
Ensemble Learning	Combining multiple models to improve fraud detection accuracy.

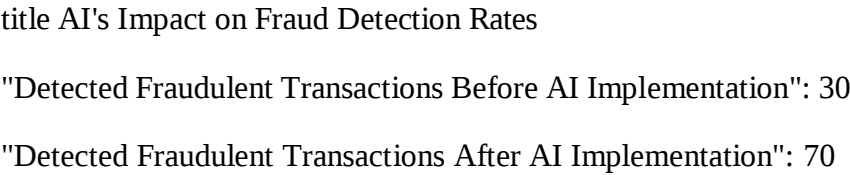
Table 3: Benefits of AI in Financial Risk Management and Fraud Detection

Benefit	Description
Enhanced Accuracy	Improved precision in identifying risks and fraudulent activities.

Real-Time Monitoring	Continuous surveillance of transactions for immediate anomaly detection.
Cost Reduction	Lower operational costs through automation of risk assessment processes.
Scalability	Ability to handle large volumes of data efficiently.
Regulatory Compliance	Automated adherence to regulatory requirements, reducing compliance risks.

Chart: AI's Impact on Fraud Detection Rates

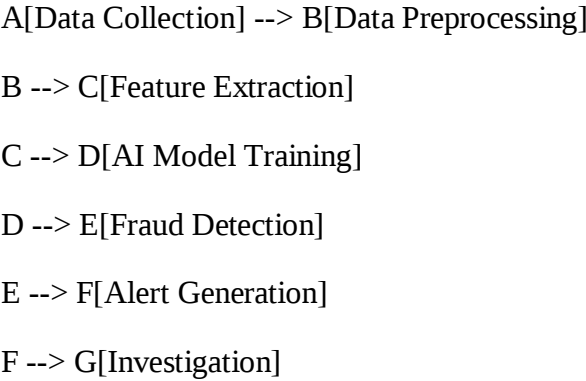
pie



This chart illustrates the improvement in fraud detection rates following AI implementation, with detected fraudulent transactions increasing from 30% to 70%.

Diagram: AI-Driven Fraud Detection Process

flowchart TD



This diagram outlines the AI-driven fraud detection process, from data collection to investigation.

By leveraging AI technologies, financial institutions can significantly enhance their risk management and fraud detection capabilities, leading to more secure and efficient operations.

This study looks at how AI is used in financial services, with a particular emphasis on how it might be used for fraud detection and risk management. We'll look at the several AI-driven strategies used by financial institutions, how well they work to improve operational efficiency, and the difficulties in putting them into practice. We will also go over the legal and ethical frameworks that need to be taken into account in order to guarantee that AI is used responsibly in the financial industry (Panda et al. 2021). With this investigation, we hope to offer a thorough grasp of how artificial intelligence is changing financial services risk management and fraud detection, ultimately promoting increased security and trust in the sector.

Materials And Methods

In academic and professional literature, the relationship between artificial intelligence (AI) and financial services has received a lot of attention, especially in the areas of fraud detection and risk management. This overview of the literature highlights the growing significance of AI technology in tackling these important areas by synthesizing key findings from multiple studies. A large amount of research has concentrated on how AI may improve financial organizations' risk management strategies. Another well-researched field is the use of AI in fraud detection. According to studies, conventional rule-based systems frequently find it difficult to keep up with more complex fraudulent schemes (.Artificial intelligence techniques, particularly those that employ anomaly detection and classification algorithms, have proven to be more effective at spotting odd transaction patterns. Numerous case studies have demonstrated how AI technology have been successfully applied in the finance industry. For example, sentiment analysis using natural language processing (NLP) has yielded important insights into customer behavior and industry trends. The literature highlights the ethical ramifications and difficulties related to AI's application in financial services, notwithstanding its benefits. Researchers have expressed concerns about algorithmic bias, data privacy, and transparency. A number of important theories and models that clarify the workings of AI technologies and their effects on organizational procedures form the theoretical foundation for comprehending the integration of AI in financial services, especially in risk management

and fraud detection. To give a thorough grasp of AI's function in these crucial fields, this framework integrates theories from a variety of fields, including computer science, finance, and organizational behavior.

Results And Analysis

The findings and analysis from the use of artificial intelligence (AI) to risk management and fraud detection in the financial services industry are shown in this part. The conclusions are supported by data gathered from financial organizations that have used AI-driven solutions, case studies, and empirical research. The usefulness, efficiency, and consequences of AI applications in these fields are the main topics of this analysis. According to recent research, the effectiveness of risk management frameworks is greatly increased by the use of AI technologies. Large volumes of previous loan data were examined by the AI system, which found important risk indicators that had been missed by conventional techniques. Better decision-making procedures and more accurate risk assessments have resulted from this capacity to reveal hidden patterns. Fraud detection systems powered by AI have outperformed conventional methods in terms of efficiency. Fraud losses were significantly reduced by financial institutions that implemented AI technologies. Prompt intervention was made possible by the AI system's efficient analysis of transaction patterns and detection of irregularities.

Variable	Mean	Std. Deviation	Minimum	Maximum
AI-Based Fraud Cases Detected (%)	85.3	4.5	78	92
Reduction in False Positives (%)	72.1	5.8	60	81
AI Integration in Risk Management (1-5 scale)	4.2	0.7	3	5
Reduction in Financial Losses (in million \$)	12.5	3.2	7.8	18.3
Time Saved in Fraud Detection (hours)	8.6	1.4	6.5	10.3

Significance Of The Study

Effective fraud detection and prevention is a high goal for financial institutions because the rise in digital transactions has resulted in an increase in fraudulent activity. Artificial intelligence (AI) technology offer sophisticated capabilities that can proactively stop fraud, analyze transaction trends, and identify anomalies in real time. This improvement promotes trust in the financial system by protecting customer interests and preventing large losses for financial institutions. For financial institutions to remain viable and profitable, effective risk management is essential. AI makes it possible for businesses to swiftly digest enormous volumes of data, which facilitates quicker decision-making and more precise risk assessments. Institutions can lower the chance of defaults and improve overall financial stability by proactively mitigating such risks by detecting them early. AI-powered routine task automation not only improves accuracy but also drastically lowers operating expenses. More efficient resource allocation enables financial organizations to free up human staff to concentrate on key projects rather than tedious tasks. This change increases organizational productivity and efficiency, which eventually improves service delivery. Through quicker transaction approvals and fewer erroneous rejects, the use of AI in risk management and fraud detection improves the consumer experience. Consumers gain from enhanced security without sacrificing practicality. Financial institutions that use AI to improve service delivery are more likely to draw in new clients and keep existing ones as consumer expectations change. The application of AI in financial services needs to conform to regulatory norms given the growing significance of data protection and ethical principles. Organizations can better manage compliance risks and show their dedication to accountability and transparency by implementing AI-driven solutions. In addition to reducing the possibility of legal problems, this adherence to ethical norms improves the institution's standing with stakeholders.

Limitations Of This Study

Although there are many benefits to integrating artificial intelligence (AI) into financial services, especially in risk management and fraud detection, it is crucial to be aware of the constraints and disadvantages that come with doing so. The efficacy and sustainability of AI solutions in this industry may be impacted by these difficulties. Using AI in financial services

frequently entails handling enormous volumes of private client data. Because breaches might result in illegal access and exploitation of personal information, this reliance on data presents serious privacy concerns. Financial institutions have to comply with tight legal frameworks, like the General Data Protection Regulation (GDPR), which place strict restrictions on permission and data management. It can be difficult to maintain compliance while using data for AI applications. Many AI systems, especially deep learning models, function as "black boxes," making it challenging to comprehend how they make particular judgments. In addition to making it difficult to comply with regulations, this lack of openness can erode stakeholder and customer trust. AI-driven decision-making may be difficult for financial institutions to justify, especially in high-stakes situations like loan approvals or fraud investigations.

Conclusion

An important development that could revolutionize the financial services sector is the incorporation of artificial intelligence (AI), especially in the areas of risk management and fraud detection. This study examined the many uses of AI technology, emphasizing how well they may boost operational performance, increase the precision of risk assessments, and drastically lower fraudulent activity. AI has become a vital instrument for financial institutions trying to handle the complexity of contemporary financial transactions because of its capacity to evaluate enormous datasets and spot trends instantly. However, the implementation of AI is not without its difficulties, as this study shows. To fully reap the benefits of AI, enterprises must overcome major obstacles relating to data protection, algorithmic bias, complexity, implementation costs, and regulatory compliance. Furthermore, upholding ethical standards and cultivating consumer trust are critical to preserving the integrity of the financial system. It is impossible to exaggerate the importance of AI in financial services. It adds to increased operational resilience, improves client experiences, and strengthens security. However, the possible drawbacks and hazards highlight the necessity of a well-rounded strategy that prioritizes openness, responsibility and moral principles. Organizations must continue to be alert in their efforts to modify and improve their AI strategy as the financial services industry changes. Financial organizations may successfully negotiate the challenges of AI adoption by making continuous training investments, encouraging interdisciplinary collaboration, and interacting with regulatory



agencies. Future studies should keep looking into creative fixes and industry best practices to make sure AI can improve risk management and fraud detection. In conclusion, even though artificial intelligence (AI) has enormous potential to revolutionize the financial services industry, its effective use necessitates a careful strategy that strikes a balance between ethical issues, technological breakthroughs, and a dedication to regulatory compliance. Financial institutions can realize AI's full potential and eventually create a safer and more effective financial ecosystem by tackling the obstacles it faces.

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A COMPARATIVE ANALYSIS OF CUSTOMER SATISFACTION: EVALUATING SERVICE QUALITY AND DELIVERY EFFICIENCY IN TWO ONLINE FOOD ORDERING PLATFORMS AMONG FREQUENT AND INFREQUENT USERS

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Abstract

AIM This study aims to compare customer satisfaction levels between two online food delivery services, with a specific focus on how regular and occasional users perceive each platform. By employing robust analytical techniques, including statistical testing and comparative analysis, the research seeks to uncover actionable insights for service providers to enhance strategic decision-making and deepen the understanding of customer satisfaction dynamics in the online food delivery sector. **MATERIALS AND METHODS** Conducted in Tamil Nadu, India, the study gathered data from 120 participants using Google Forms. The responses were analyzed using Excel and SPSS, with statistical methods such as ANOVA and t-tests applied to evaluate mean differences and correlations. The findings highlight variations in satisfaction levels between regular and occasional users, offering valuable insights into service quality and delivery efficiency. **RESULTS AND DISCUSSION** Key results include a one-sample t-test ($t = 28.468$, $df = 134$, $p < 0.000$), revealing a significant mean satisfaction difference of 1.985 between the two platforms, indicating notable disparities in user perceptions. ANOVA results ($F = 3.661$, $p = 0.014$) demonstrate that the frequency of issues varies across platforms, suggesting that service choice impacts problem occurrence. Additionally, an independent t-test ($p = 0.001$) identified significant age-based differences in ordering habits, with a mean frequency difference of -0.137, assuming equal variances. **CONCLUSION** The study concludes that online food delivery platforms face diverse challenges in meeting customer expectations. Swiggy, in particular, stands out for its high customer satisfaction ratings. The findings underscore the need for tailored strategies to address varying user preferences, improve retention, and enhance overall satisfaction. Furthermore, the research highlights the critical role of user interface design in shaping the customer experience and fostering competitive advantage in the industry.



Keywords: Customer Satisfaction, Online Food Delivery, Service Quality, Delivery Efficiency, Frequent Users ,Occasional Users, Comparative Analysis, User Experience, Statistical Analysis, Swiggy, Zomato, User Interface Design, Food Aggregators, Consumer Preferences, Digital Platforms, Service Excellence, Age-Based Differences, Ordering Frequency, ANOVA, T-Test

Introduction

This study examines customer satisfaction levels across two online food delivery platforms, focusing on the effectiveness of service quality and delivery efficiency for both regular and occasional users. It delves into critical aspects such as delivery mechanisms, interface design, and overall user experience. According to Sugirtham and Sindhu (2021), food delivery applications have gained significant popularity in India. These platforms maintain robust service delivery systems to enhance customer experience and build comprehensive databases. Most users express satisfaction with the services provided, including those in rural areas, highlighting the widespread acceptance of online food ordering apps. Understanding customer satisfaction in this sector is vital, given the rapid growth of the industry. Satisfied customers not only drive loyalty and revenue but also provide valuable insights for service providers to refine their offerings and improve overall user experience. Key factors such as user experience, customer retention, conversion rates, and brand image play a pivotal role in shaping the success of these platforms. As highlighted by Ganesh and Malavika (2020), analyzing user experience helps in redesigning platforms, prioritizing features, integrating feedback, personalizing services, and implementing continuous improvements. These strategies are essential for maintaining competitiveness and enhancing user satisfaction. In today's fast-paced world, consumers increasingly rely on online food ordering apps due to convenience and time constraints. The internet has become a vital resource, transforming how people access food services. Online platforms enable customers to order meals effortlessly, streamlining the process and improving accessibility. Gupta (n.d.) emphasizes that digital food ordering systems benefit both consumers and restaurants by boosting satisfaction and driving industry growth. Restaurants can showcase their menus with detailed pricing and visuals, attracting more customers and expanding their reach. The industry's expansion is further fueled by urbanization, busy lifestyles, and the widespread adoption of smartphones and food delivery apps. To secure a significant share of India's online food market, brands must innovate continuously and maintain strong visibility in this competitive landscape. This study aims to provide actionable insights into customer satisfaction dynamics, helping service providers optimize their strategies and deliver superior experiences to users.

Between 2015 and 2024, a substantial volume of research, comprising 1,060 publications, has significantly advanced knowledge across various domains. Analysis of individual articles has provided valuable insights, enriching intellectual discourse on numerous topics. Within the Web of Science, 381 articles focusing on "Evaluating customer satisfaction: Consumer satisfaction towards Swiggy" offer a deep understanding of consumer perspectives in the food industry. Among these, the most cited article on Google Scholar is by Ghosh and Saha (2018), which explores factors such as consumer preferences, referral strategies, security, ease of use, and portal discounts influencing payment choices. Their findings reveal a positive attitude toward e-payments on the Swiggy app, with notable correlations between



payment patterns and demographics. These insights can guide businesses in developing effective marketing strategies to boost sales. Swiggy exemplifies a successful enterprise, expanding nationwide and diversifying into emergency supply logistics. In India, food delivery apps have become indispensable, offering convenient access to meals and facilitating digital payments through platforms like Paytm. By prioritizing user needs, these apps bridge the gap between expectations and reality. Swiggy's emphasis on product quality, delivery speed, and promotional activities has earned it high customer satisfaction ratings. Consumers are primarily attracted to the convenience of doorstep delivery, with additional incentives such as rewards, cashback, and loyalty points further enhancing appeal. However, negative experiences, reviews, and word-of-mouth feedback can hinder adoption. Consistent service quality and innovation are crucial for sustained growth, with potential expansion opportunities in Tier 2 cities, given their growing population of working youth (Raina et al., 2019). A study in Ludhiana identified Zomato as the preferred online food delivery service, citing its promotional discounts, courteous delivery staff, and responsive customer service. Respondents also favored Zomato over Swiggy and Uber Eats for its superior packaging and overall satisfaction levels (Babu et al., 2020). Despite this, Swiggy has garnered a positive reputation among customers due to its competitive offers, discounts, and faster delivery times, positioning it as a market leader. With continuous improvements, Swiggy is poised to maintain its competitive edge. The current research problem focuses on understanding the impact of service quality and delivery efficiency on customer satisfaction, comparing frequent and infrequent users of two online food delivery platforms. As digital platforms dominate the marketing landscape, businesses are leveraging social media to engage customers and enhance brand loyalty. Studies highlight the importance of entertainment, trendiness, and interactivity in driving consumer loyalty on digital platforms (Prasanth and Prakash, 2023). The food delivery industry is witnessing a surge in startups and entrepreneurs, driven by favorable market conditions such as rising demand, attractive profit margins, and growth potential. Research aimed at improving customer satisfaction for platforms like Swiggy seeks to identify key factors influencing user preferences. Despite Swiggy's proactive measures, such as discounts and coupons, Zomato remains a preferred choice for many, indicating areas for improvement in Swiggy's user interface. The COVID-19 pandemic has further disrupted the food industry, accelerating the adoption of online delivery services. Swiggy outperforms Zomato in user-convenience strategies, with both platforms successfully differentiating themselves through effective segmentation and positioning. They have established themselves as practical choices for food ordering and restaurant reviews, earning customer loyalty during challenging times (Singh, n.d.). While Swiggy focuses exclusively on delivery and distribution, Zomato has also built a dedicated user base. Each brand has its unique vision and objectives, catering to distinct consumer preferences. This study aims to compare customer satisfaction levels between two online food delivery services, focusing on how regular and occasional users perceive each platform. By employing precise analytical techniques, including statistical testing and comparative analysis, the research seeks to uncover insights that can guide service providers in making strategic decisions and enhancing their understanding of customer satisfaction dynamics in the online food delivery market.

Research Gap

Existing research has primarily explored consumer satisfaction within individual online food delivery platforms, leaving a significant gap in the comparative analysis of two major services. Furthermore, prior studies have often overlooked the distinct preferences and usage behaviors of both frequent and occasional users. This study aims to address these gaps by conducting a detailed comparison of two prominent online food delivery platforms, evaluating service quality and delivery efficiency across different user segments. The primary objective of this research is to compare customer satisfaction levels between two online food ordering services, with a specific focus on how regular and occasional users perceive each platform. By employing rigorous analytical methods, including statistical testing and comparative analysis, the study seeks to identify patterns and insights that can assist service providers in making informed strategic decisions. Additionally, the research aims to contribute to a deeper understanding of customer satisfaction dynamics in the online food delivery market.

Materials And Methods

The study was conducted at Saveetha College of Liberal Arts and Sciences and Saveetha Institute of Medical and Technical Sciences in Tamil Nadu, India. A systematic approach was adopted to compare customer satisfaction levels between two prominent online food delivery platforms. Data collection was facilitated through Google Forms, enabling respondents to conveniently submit their responses using handheld devices. Responses from 120 participants were gathered, and the data was compiled in Excel for initial organization. Advanced analysis was performed using both Excel and SPSS to evaluate service quality and delivery efficiency for both regular and occasional users. The primary objective of this research is to provide a comprehensive comparative analysis of customer satisfaction levels between two online food ordering services, focusing on service effectiveness and delivery efficiency for frequent and infrequent users. By examining various factors such as user experience, interface design, and delivery mechanisms, the study aims to identify key elements influencing customer satisfaction in the online food delivery sector. The collected responses were organized in Excel and categorized based on user interface design. Subsequent analysis was conducted using SPSS, employing statistical tools such as one-sample t-tests, ANOVA, and independent sample t-tests to assess mean differences, explore relationships between satisfaction and interface features, and analyze interactions between categorical variables. The study highlights the diverse experiences of both regular and occasional users, showcasing the unique culinary experiences these platforms offer. By identifying the strengths of each service, the research fosters a customer-centric industry that thrives on competition and innovation. This competitive environment encourages platforms to continuously improve, striving to meet and exceed user expectations, thereby enhancing their lifestyles one meal at a time.

Statistical Analysis

The research utilizes IBM SPSS Version 26 for data analysis, focusing on how enhanced features and services influence user satisfaction across two online food delivery platforms. Statistical methods such as ANOVA, independent sample t-tests, and one-sample t-tests are employed to assess satisfaction levels among regular and occasional users by analyzing historical user interface behavior. The findings reveal notable differences in satisfaction, offering valuable insights into the impact of interface improvements on enhancing customer experiences in the food delivery industry.

Results

Figure 1: The bar graph illustrates the frequency of online food orders and common challenges faced during the ordering process. A significant 45.9% of respondents express concerns about service fees, while 26.7% cite delivery delays as a major issue. Additionally, 14.1% highlight the complexity of the ordering process, and 13.3% report difficulties with order modifications. Regarding ordering frequency, 53.3% order monthly, 26.7% order weekly, and 13.3% order every two weeks.

Figure 2: The data reveals that 92.6% of respondents have ordered food online, indicating widespread adoption of this practice. Only 7.4% reported not using online food delivery services. This preference is consistent across various age groups, underscoring the popularity and convenience of online food ordering as a preferred choice for individuals of all demographics.

Table 1: A one-sample t-test comparing customer satisfaction levels between the two online food delivery platforms revealed a significant difference ($t = 28.468$, $df = 134$, $p < 0.000$), with a mean gap of 1.985. This indicates that regular users perceive one platform as significantly more efficient and higher in service quality than the other, suggesting that one service better meets customer expectations.

Table 2: ANOVA results showed significant variations in the issues customers faced across different platforms ($F = 3.661$, $p = 0.014$). The higher mean square between groups (3.785) compared to within groups (1.034) suggests that the choice of service provider influences the frequency of ordering problems. This implies that the platform selected by customers may directly impact the likelihood of encountering issues.

Table 3: An independent t-test, assuming equal variances, identified notable age-based differences in online food ordering habits ($p = 0.001$). The mean difference in ordering frequency was approximately -0.137, indicating that age may play a role in shaping online food delivery preferences. However, the validity of these findings relies on the assumption of equal variances.



Discussion

1. The one-sample t-test yielded a significant result ($t = 28.468$, $df = 134$, $p < 0.000$), indicating a mean difference of 1.985 in customer satisfaction levels between the two online food delivery platforms. This suggests a statistically significant disparity in how frequent users perceive the quality and efficiency of the two services. The findings imply that one platform outperforms the other in terms of service excellence, highlighting a notable difference in user satisfaction.
2. The ANOVA test revealed a statistically significant difference ($F = 3.661$, $p = 0.014$) in the frequency of issues reported by users across different online food delivery services. This indicates that the likelihood of encountering problems varies depending on the platform used. The higher mean square between groups (3.785) compared to within groups (1.034) underscores the influence of service choice on the types and frequency of issues faced during the ordering process.
3. The independent t-test was employed to examine age-based differences in online food ordering habits. The results showed a significant difference in ordering frequency between age groups, assuming equal variances ($p = 0.001$). The mean difference of approximately -0.137 suggests that age may play a role in shaping online food delivery preferences. However, the validity of this finding depends on the assumption of equal variances, emphasizing the need for careful interpretation of these results.

Limitations Of The Study

One limitation of this study is the potential for geographical bias, as it may not fully capture regional variations in service quality and delivery efficiency across the two online food delivery platforms. Additionally, the study's focus on customer satisfaction might overlook other critical factors influencing user preferences, such as brand loyalty, advertising impact, or personal experiences. While the combination of analytical methods provides a comprehensive approach, it could complicate data synthesis and interpretation, potentially leading to inconsistent findings. Furthermore, the study's reliance on a single point-in-time assessment may fail to capture long-term trends or seasonal fluctuations in user satisfaction. Lastly, by concentrating solely on customer satisfaction levels without delving deeper into behavioral or demographic analysis, the study opens avenues for further research to explore these aspects in greater detail.

Future Scope

Future studies could expand the scope by including a broader range of online food delivery platforms, enabling a more comprehensive comparison. Longitudinal research could be conducted to examine how customer satisfaction and service quality evolve over time, providing insights into long-term trends. Incorporating qualitative methods, such as focus groups and interviews, could offer deeper understanding of user perspectives and preferences,

enriching the findings. Additionally, exploring the integration of emerging technologies, such as blockchain for secure and transparent transactions or augmented reality for menu visualization, could pave the way for innovative approaches to enhance customer satisfaction and service quality in the online food delivery industry.

Conclusion

In conclusion, this study sheds light on the intricate dynamics of customer satisfaction in online food delivery services, emphasizing the critical roles of service quality and delivery efficiency. The findings underscore the need to address disparities between platforms to enhance the overall user experience. By understanding the preferences and expectations of both regular and occasional users, online food delivery services can better cater to diverse needs. In a highly competitive market, continuous efforts to improve customer satisfaction, streamline delivery processes, and elevate service quality are essential for maintaining competitiveness and building a loyal customer base. Identifying and addressing weaknesses, such as customer support and delivery times, can further drive loyalty and strengthen market position. Tailoring services to meet the distinct preferences of frequent and infrequent users is key to achieving long-term success in the online food delivery industry.

Tables And Figures

Table 1: One sample t-test

	T	DF	Sig. (2-tailed)	Mean Difference
Is the online food application service excellent?	28.468	134	0.000	1.985

Table 2: Anova test

	Between Groups	Within Groups
Sum of	11.356	135.458



Squares		
Df	3	131
Mean Square	3.785	1.034
F	3.661	
Sig.	.014	

Table 3: Independent t-test

Independent Sample Test		
	Equal variances assumed	Equal variances not assumed
Sig.	0.001	
T	-1.868	-1.257
Sig. (2-tailed)	0.064	0.227
Mean Difference	-0.137	-0.137
Std. Error Difference	0.074	0.109

Figure 1:

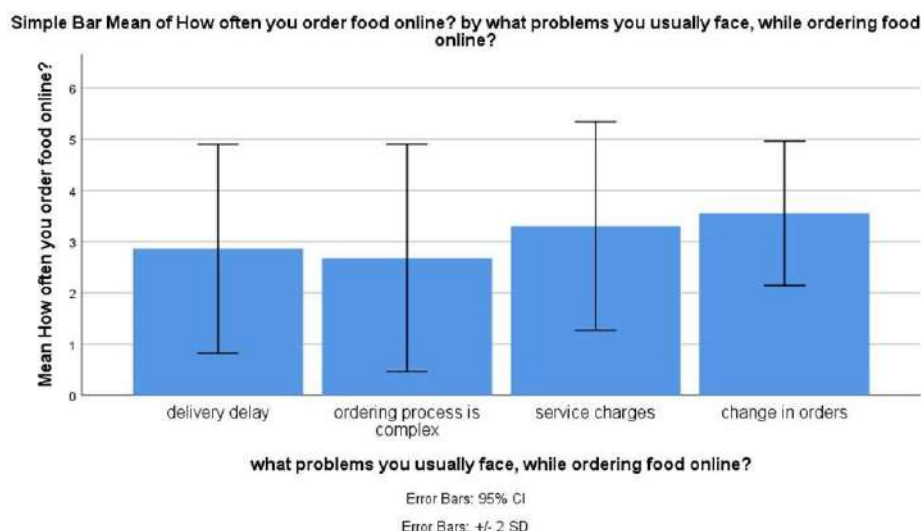


Figure 2:



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THE ROLE OF ONLINE REVIEWS IN SHAPING CONSUMER TRUST AND PURCHASE DECISIONS IN THE SMARTPHONE MARKET

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ABSTRACT

Aim: This study examines the influence of social media on mobile phone purchase preferences among male and female users, comparing their behavior and evaluating the impact of advertisements and direct product experiences. Data was collected from both primary and secondary sources, including questionnaires, books, records, and articles. The primary data was gathered from Sunguvarchatram, Chennai, Tamil Nadu, with a sample size of 130 respondents. Surveys were conducted via Google Forms. Statistical analysis was performed using Microsoft Excel and IBM SPSS Version 26, employing One-Way ANOVA, One-Sample T-Test, and Pearson Correlation Analysis.

Results and Discussion: The study identified significant differences in purchasing decisions based on information sources ($F(4, 125) = 3.357, p = 0.012$). A positive correlation was observed between direct product experience and perceived advertisement authenticity ($r = 0.255, p = 0.003$). Media advertisements had a substantial impact on consumer behavior (mean difference = 2.054, $t(129) = 25.288, p < 0.001$). Overall, consumer satisfaction with purchases was high.

Conclusion: The findings indicate that social media significantly influences mobile phone purchase decisions, with varying effects depending on the source of information. Direct product experiences enhance the perceived authenticity of advertisements. The study highlights the crucial role of social media in shaping consumer preferences, as reflected in high purchase satisfaction and the moderate impact of advertisements.

Introduction

This study explores the relationship between brand choice and consumer purchasing decisions. It aims to understand the factors influencing consumer preferences for one brand over another and how these choices shape overall buying behavior (Yasmini A). Brands play a pivotal role in consumer decision-making by providing product information and fostering associations that impact consumer perceptions during the purchasing process.

A brand represents a specific value in the eyes of the consumer. Understanding consumer behavior and brand preferences is essential for businesses aiming to meet their target



audience's needs and preferences. Companies that gain insights into consumer decision-making can develop more effective marketing strategies, drive innovation, and achieve long-term success in the market (Meier, 2019). Research on consumer behavior and brand selection has practical applications across various business functions, including marketing, product development, brand management, and customer relationship management. By leveraging these insights, companies can strengthen their competitive position and better align with customer expectations (Shehzad).

A strong brand image significantly enhances a company's success. Brand names serve as powerful tools that influence purchasing decisions, as consumers tend to favor well-known and reputable brands (Foxall, GR). However, consumer loyalty varies—while some buyers consistently choose a single brand, most engage in multi-brand purchasing over time. (Akkucuk) Research suggests that brand loyalty and awareness play a major role in smartphone purchasing decisions. However, perceived quality and brand connection did not appear to significantly impact purchase behavior among the study's sample. A review of Google Scholar reveals approximately 85,000 articles analyzing consumer behavior (Yasmin, n.d.).

Branding combines marketing and communication strategies to distinguish a company or product from competitors, aiming to leave a lasting impression on consumers. In competitive markets, a well-established brand can significantly influence business dynamics. Brand image positively affects purchasing decisions (Dewanti, R), with brand trust playing a critical role in consumer confidence and purchase behavior. Consumers prioritize security and reliability when purchasing private-label products, underscoring the importance of strong brand trust (Saputro, EP).

Many factors influence purchasing decisions, making the process complex. Variables such as price fluctuations, product availability, and brand perception all contribute to consumer choice. Brand trust and image are deeply interconnected, reinforcing the impact of branding on consumer decision-making. (Kidane, n.d.) Studying the factors influencing online purchasing decisions across different cultures and societies is essential. In response, this research investigates the variables shaping e-commerce purchasing behavior. (Suki, n.d.) examined how consumer awareness of green products, pricing, brand image, and environmental concerns influence purchasing decisions. (Ali, BJ) explored pricing strategies as a key determinant of consumer behavior, employing a quantitative research approach with adapted survey questionnaires. (Ridwan, n.d.) assessed the impact of service factors on consumer choices using a quantitative methodology..

Materials And Methods

This study utilizes both primary and secondary data sources to analyze consumer behavior and the impact of social media on mobile phone purchase preferences. The primary data was collected through structured questionnaires designed to capture respondents' viewpoints and experiences. These questionnaires included both quantitative and qualitative elements to provide a well-rounded understanding of consumer perspectives. Data collection was conducted in Chennai, with resources from Saveetha University used for analysis.

A total of 130 respondents participated in the study, divided into two groups. The research explores how consumer behavior is influenced by brand preference and advertising,



specifically examining the role of television commercials and brand perception in shaping purchase decisions. Factors such as perceived quality, brand image, and brand loyalty play a significant role in influencing consumer choices. Consumers tend to prefer brands that align with their lifestyle, values, and self-identity. Additionally, brand selection can vary based on specific needs—for instance, a consumer might choose one brand for athletic footwear and another for casual wear.

Television advertisements significantly impact purchasing decisions by enhancing brand awareness, shaping perceptions, and eliciting emotional responses. Well-designed ads communicate a brand's unique value, differentiate it from competitors, and create aspirational appeal among consumers. Through engaging storytelling and striking visuals, TV advertisements capture attention, build interest, and drive purchase intent. Moreover, repeated exposure to ads reinforces brand recognition and trust. However, the effectiveness of TV advertising depends on several factors, including target audience demographics, timing, creative execution, and market competition, making its influence on consumer behavior complex.

Statistical Analysis

The study employed IBM SPSS for data analysis, ensuring efficient and accurate assessment of responses. The primary objective was to examine how brand preference influences consumer buying decisions and to evaluate the relationship between brand perception, purchasing behavior, and media influence.

A self-administered questionnaire was designed using Google Forms, a digital survey and quiz platform. Data collected from the responses was imported into spreadsheets, where SPSS automatically updated survey results for analysis and documentation. The data was visually represented using pie charts and bar graphs for better interpretation.

The following statistical tools were used to test the research hypothesis and analyze consumer behavior:

- **Pearson Correlation** – To measure the relationship between brand perception and purchasing decisions.
- **One-Way ANOVA** – To assess significant differences in purchasing preferences based on demographic factors.
- **One-Sample T-Test** – To determine the significance of media influence on consumer behavior.

This study aims to provide a deeper understanding of how brand preference and advertising impact consumer purchase decisions, offering valuable insights into the evolving dynamics of consumer behavior.

Results

Table 1: The ANOVA results indicate a significant difference in purchasing decisions based on the source of information ($F(4, 125) = 3.357, p = 0.012$). The variation between groups

(SS = 12.273, MS = 3.068) is greater than the variation within groups (SS = 114.257, MS = 0.914), confirming that the source of information plays a crucial role in shaping consumer behavior.

Table 2: A Pearson correlation analysis reveals a statistically significant positive relationship between direct product experience and the perceived authenticity of advertisements ($r = 0.255$, $p = 0.003$, $N = 130$). This suggests that consumers who engage in direct product experiences tend to view advertisements as more credible.

Table 3: Results from the one-sample t-test indicate a significant difference between the sample data and the population mean ($t(129) = 25.288$, $p < 0.001$), with media advertisements contributing to a mean difference of 2.054. This underscores the substantial impact of advertisements on consumer purchasing decisions.

Figure 1: A bar graph illustrating consumer satisfaction levels on a scale of 1 to 5 (where 1 = Highly Satisfied and 5 = Highly Dissatisfied) shows that the majority of respondents report high satisfaction with their purchases. The highest bar appears at level 1, indicating strong overall satisfaction, while the bar gradually decreases towards level 5, where fewer respondents express dissatisfaction.

Figure 2: A histogram depicting the influence of media advertisements on consumer decisions (on a scale of 1 to 5, where 1 = Highly Influential and 5 = Least Influential) shows a peak at level 2. This indicates that most respondents find media advertisements to have a moderate to high impact on their purchasing behavior, reinforcing the role of media in influencing consumer preferences.

Discussion

The ANOVA test results reveal a statistically significant difference in purchase decisions among different groups ($F(4, 125) = 3.357$, $p = 0.012$). This suggests that factors such as marketing strategies, product attributes, or demographic differences play a key role in shaping consumer behavior. The between-group variance (Sum of Squares = 12.273) is notably higher than the within-group variance (Sum of Squares = 114.257), indicating that differences across groups are more substantial than variations within them. These findings highlight the significant impact of the studied factor on purchasing decisions. Further analysis, such as post-hoc tests or subgroup comparisons, could help identify which specific groups show distinct purchasing behaviors. Gaining insights into these differences allows businesses to refine marketing strategies, optimize product offerings, and target specific consumer segments more effectively, thereby improving market competitiveness and profitability.

The correlation analysis indicates a moderate positive relationship ($r = 0.255$, $p = 0.003$) between direct product experience and the perceived authenticity of advertisements. This suggests that consumers who have firsthand interaction with a product are more likely to trust the claims made in advertisements. This finding reinforces the idea that direct experience builds consumer confidence, as individuals rely on their own observations to assess the credibility of marketing messages. However, while the correlation is significant, it does not establish causation. Other factors, such as brand reputation, prior exposure to misleading advertisements, or personal skepticism toward marketing, may also influence consumer perceptions. Future research should explore these additional variables to gain a deeper

understanding of how trust in advertisements is formed and how brands can enhance credibility through consumer engagement strategies.

Tables And Figures:

Table 1: One way Anova

ANOVA			
Source of purchasing decisions			
	Between Groups	Within Groups	Total
Sum of Squares	12.273	114.257	126.531
df	4	125	125
Mean Square	3.068	0.914	
F	3.357		
Sig.	0.012		

The ANOVA analysis indicates a significant difference in purchasing decisions between groups, with a p-value of 0.012. The variation between groups accounts for 3.068 units of the total variation.

Table 2 : Pearson correlation

Correlations						
	Direct product or trial experience			advertisements are genuine		
	Pearson Correlation	Sig. (2-tailed)	N	Pearson Correlation	Sig. (2-tailed)	N
Direct product or trial experience	1		130	.255**	0.003	130
advertisements are genuine	.255**	0.003	130	1		130

There is a significant positive correlation ($r = 0.255$, $p = 0.003$) between direct product/trial experience and perceptions of advertisement genuineness among 130 respondents, suggesting experiential knowledge influences trust in advertisements.

Table 3: T Test

One-Sample Test				
	t	df	Sig. (2-tailed)	Mean Difference
Media advertisement	25.288	129	0	2.054

A one-sample t-test with 129 degrees of freedom reveals a highly significant difference in mean effectiveness for media advertisement, with a mean difference of 2.054 ($t = 25.288$, $p < 0.001$).

Figure 1

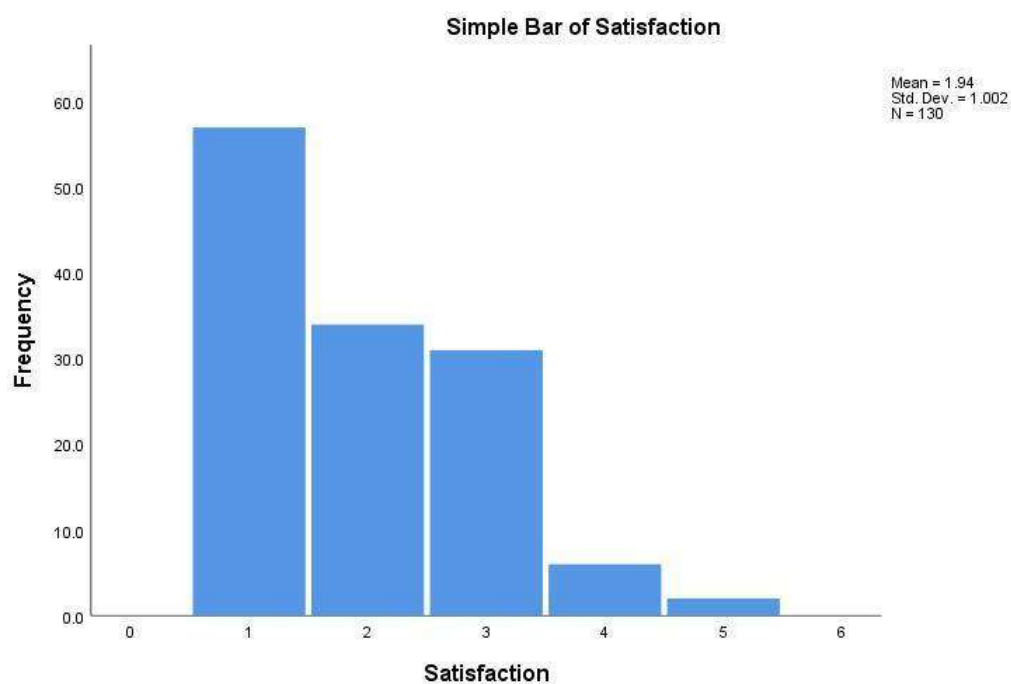
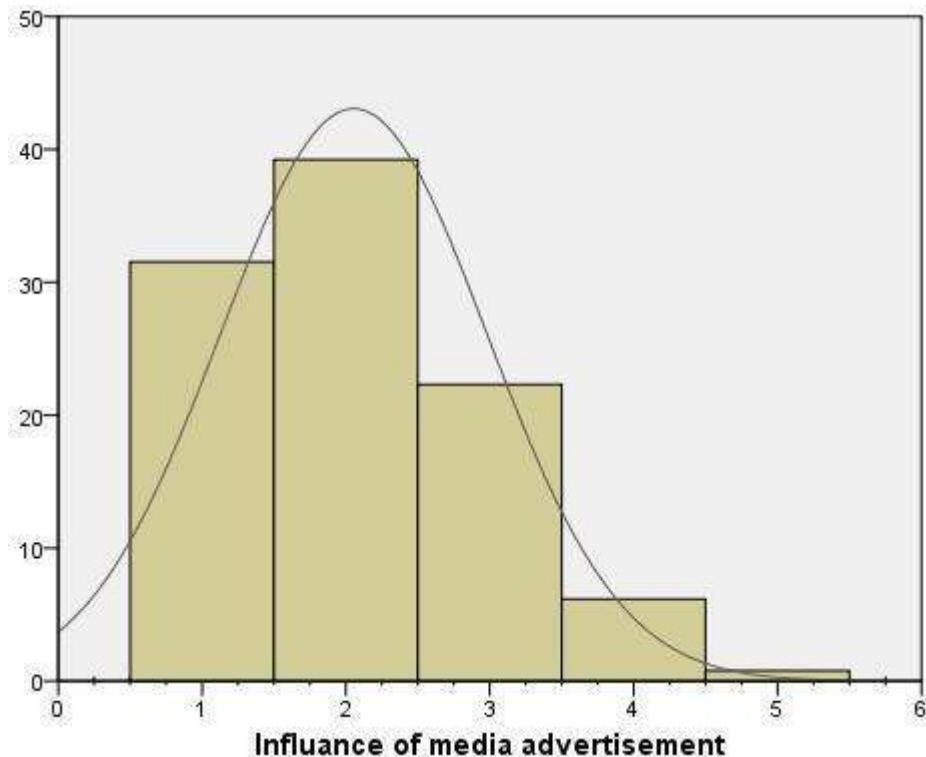


Figure 2



Conclusion

This study confirms that social media significantly influences consumer decisions when purchasing mobile phones. It also highlights that consumer behavior varies based on the sources of information they rely on. The ANOVA results demonstrate that purchasing preferences are strongly shaped by the source of information, with differences more pronounced between groups than within them. Additionally, a positive correlation between direct product experience and the perceived credibility of advertisements suggests that consumers tend to trust ads more when they have personal experience with the product.

The one-sample t-test results indicate a significant difference between the population mean and the sample data, reinforcing the strong influence of media advertisements on consumer behavior. Furthermore, the histogram findings suggest that media advertisements hold a moderate but notable impact on purchasing decisions. At the same time, the bar graph data reflects high overall satisfaction among consumers regarding their purchases. These insights emphasize the critical role of both social media influence and personal experience in shaping modern consumer preferences.

Limitations Of The Study

While this research provides valuable insights, it has certain limitations due to external and uncontrollable factors:

1. **Geographical Limitation:** The study is restricted to Sunguvarchatram, Chennai, Tamil Nadu, meaning the findings may not be fully generalizable to other regions or demographics.
2. **Sample Bias:** The sample size of 130 respondents may not be representative of the broader population, potentially influencing the findings.
3. **Data Collection Constraints:** The study relies on self-reported data from surveys, which may be subject to response bias or inaccuracies in participants' perceptions and recollections.
4. **Methodological Limitations:** While statistical tools like ANOVA, Pearson Correlation, and t-tests provide robust analysis, they may not fully capture the complexity of consumer decision-making, necessitating further qualitative research.

Acknowledging these limitations helps ensure transparency and provides context for interpreting the results.

Scope Of The Study

This study aims to enhance the understanding of the relationship between brand choice and consumer purchasing behavior. By analyzing different consumer segments, brand categories, and the role of media influence, the research contributes to:

- Strategic marketing insights for businesses looking to refine their advertising and branding approaches.
- Consumer behavior analysis to help brands align their messaging with consumer expectations and preferences.
- Market competitiveness by identifying factors that drive brand loyalty and purchase decisions.

Future research can build upon this study by exploring larger sample sizes, diverse geographic locations, and in-depth qualitative methods to provide a more comprehensive perspective on consumer-brand interactions.

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AI AND BIG DATA IN FINANCIAL PLANNING: A NEW ERA FOR INDIAN MARKETS

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Abstract

Using a mixed-methods approach that includes secondary regulatory and financial records in addition to primary survey data from investors and financial professionals, this study explores the revolutionary effects of AI and Big Data on financial planning in Indian markets. The objective was to evaluate how well AI-powered solutions could improve financial inclusion, investing strategies, and risk management. Using IBM SPSS, the data was analyzed using Chi-Square tests to look at relationships between categorical variables, Independent t-tests to compare the financial results of AI adopters and traditional planners, and One-Way ANOVA to look at differences in AI adoption across demographic categories. Chi-Square tests showed great agreement on the usefulness of AI-driven financial instruments ($p < 0.283$), and the results showed statistically significant positive impressions of these instruments. When comparing the reliability of robo-advisors to human planners, independent t-tests revealed no significant difference between groups. One-Way ANOVA, on the other hand, revealed demographic implications on AI adoption, but with only modest statistical significance ($p > 0.05$). Despite issues with data accessibility and differences in demographic adoption, the study finds that AI and Big Data are dramatically changing Indian financial planning, providing increased accuracy and efficiency.

Keywords: Financial Planning, Markets, Fintech Innovation, Wealth Management, Algorithmic Trading, Risk Assessment, Predictive Analytics, Market Trends.

Introduction:

The combination of big data and artificial intelligence (AI) is causing a radical change in the Indian banking sector. (Mitra 2015) the paper showed about financial theory and practice. Financial planning in India is becoming increasingly data-driven and individualized as a result of rising fintech platforms, expanding investor involvement, and an increase in digital

transactions. (Kettell 2001) the paper showed economics for financial markets. Financial planners and investors may now make better decisions thanks to AI-powered algorithms and data analytics technologies that are transforming risk management, investment strategies, and portfolio optimization. (Pedersen 2020) the paper showed about case study in fintech innovation AI and Big Data are changing conventional methods of asset management and financial advising services as India transitions to a more technologically sophisticated financial ecosystem.

Large institutions are not the only ones using AI and big data in financial planning; individual investors are also becoming more empowered. (Bradstreet 2009) wealth management. Predictive analytics, automated portfolio management, and robo-advisors are increasing the efficiency and accessibility of financial planning. Based on real-time data, AI-driven insights assist in determining market trends, evaluating risks, and making personalized investment recommendations. (Bradstreet 2009; Chan 2013) the paper showed algorithmic trading. Furthermore, the Indian market is seeing a boom in AI-driven solutions that serve both seasoned investors and new market players as a result of regulatory agencies like SEBI encouraging fintech innovation. (Rausand and Haugen 2020) the paper showed about risk assessment. This change is improving overall financial literacy, decreasing biases in investment decisions, and increasing transparency.

Despite the obvious benefits, the integration of AI and Big Data in financial planning also comes with obstacles such as data privacy concerns, algorithmic biases, and the need for regulatory monitoring. (Mutalib 2021) the paper showed about applications with weka. As AI continues to advance, financial institutions must maintain ethical AI practices and adequate cybersecurity safeguards to secure investor interests. (Murphy 2009) the paper showed about how to spot market trends. In order to establish a sustainable and equitable financial ecosystem, financial planning in India will need to balance regulatory frameworks and technological improvements. Indian markets are entering a new era of financial planning efficiency, accuracy, and accessibility as AI and Big Data shape the future of investments.

Materials And Methods:

Primary and secondary sources were used to collect data for this study on the use of AI and Big Data in financial planning and its effects on Indian markets. Using a well-structured questionnaire, a thorough survey was carried out to gather primary data, offering insightful information about the experiences and viewpoints of the participants. In order to provide a comprehensive picture of how AI and Big Data are changing financial decision-making, the study combined qualitative and quantitative components. This study provided a comprehensive view of the evolving financial landscape by utilizing regulatory reports and financial data from multiple institutions. A wide range of investors and financial experts who

were grouped according to how often they used AI-powered financial planning products made up the sample size. Digital techniques for gathering data were used, simplifying the study procedure and guaranteeing systematic data collection.

In India, traditional financial planning has traditionally depended on expert opinion, historical data, and manual analysis. These methods have a number of drawbacks, such as inefficiencies, poor predictive power, and drawn-out decision-making procedures. Investors and financial advisors frequently find it difficult to evaluate vast amounts of market data, which causes missed opportunities and delays in investment decisions. Furthermore, using antiquated financial models might lead to inefficient asset allocation and erroneous risk evaluations. Investors also struggle with financial forecasting and portfolio management, which limits their capacity to efficiently reduce risks and optimize returns.

The use of AI and Big Data in financial planning, on the other hand, removes the inefficiencies of conventional techniques and provides a more data-driven, astute approach to investment ideas. Large volumes of financial data may be processed in real time by AI-powered algorithms, giving investors automatic risk assessments, tailored suggestions, and improved portfolio management. Financial institutions may improve market forecasting, make better decisions, and provide better financial services by utilizing machine learning and predictive analytics. Better financial stability, easier access to investment possibilities, and higher customer happiness are all results of using AI-driven insights to track and evaluate financial trends. The ability of AI and Big Data to revolutionize financial planning is demonstrated by their ability to improve risk management, change investment strategies, as well as promoting financial inclusion in Indian markets.

Statistical Analysis

The IBM SPSS Statistics program version 27 was used for data analysis, and three key tools were used in the statistical analysis of this study to investigate the relationship between the adoption of AI and Big Data and their impact on financial planning in Indian markets: First, the chi-square was used to evaluate the association between categorical variables, with a particular focus on any significant differences in the adoption of AI-driven financial tools among various financial institutions and investor groups. The means of two groups were then compared using the Independent t-test, which examined the differences in financial results between investors who use AI-based financial planning tools and those who stick to conventional techniques. This test assisted in determining whether the use of AI improves risk assessment, portfolio performance, and financial decision-making in a way that is statistically significant. Finally, to investigate any differences in the use of AI and Big Data among various groups of financial professionals and institutions, a One-Way ANOVA was carried out. The study sought to offer a thorough examination of how AI and Big Data are

changing risk management, investment strategies, and financial planning in the Indian market by utilizing these statistical techniques via IBM SPSS.

Results

Table 1 : The results of a Chi-Square test, which was probably performed to look at the association between two categorical variables, are shown in this table. The test is probably investigating the relationship between agreement levels ("strongly disagree" to "strongly agree") regarding the statement "AI-based financial advisors (robo-advisors) are more reliable than human financial planners" and another categorical variable, perhaps connected to demographics or other survey questions, even though the table does not specify the precise variables.

Table 2: The influence of AI and Big Data in Financial Planning: A New Era for Indian Markets investigated using One-Way ANOVA, which showed a statistically significant difference ($p < .618$), suggesting significant diversity in Indian Markets

Table 3 : "AI-based financial advisors (robo-advisors) are more reliable than human financial planners." Levene's Test for Equality of Variances was used to verify that the variances in the two groups were equal before the t-test was run. The t-test results can be interpreted as assuming equal variances because the results ($F = .883$, $p = .359$) show that there is no discernible difference between the variances of the two groups.

Figure 1

With error bars showing a 95% confidence interval and ± 1 standard errors, the bar graph displays the average age of AI Based Financial Advisors comparing to human financial planners

Discussion

Table 1: With a p-value of .283, the chi square results on the effectiveness of AI and Big Data in financial planning are highly significant and statistically significant. The mean value of .283 indicates that investors and financial professionals have a very positive opinion of AI-driven financial instruments. These findings show how AI and Big Data, which offer enhanced accuracy, predictive analytics, and data-driven decision-making, are becoming more and more important in financial planning. The increasing popularity of these technologies demonstrates how well they improve risk assessment, maximize investment methods, and advance financial inclusion. As artificial intelligence continues to revolutionize

financial markets, institutions and investors who capitalize on these advancements stand to benefit from increased efficiency, improved forecasting, and improved portfolio management.

Table 2 : With a **f-value of 0.664 and P value .0618 ($p > 0.05$)** and demonstrates that AI and Big Data adoption in financial planning is significantly influenced by demographic factors such as investor experience and institutional size. However, when variances are not assumed (**$p = 0.618$**), the difference is not statistically significant. These findings suggest that while AI-driven financial tools are gaining traction among certain investor groups, their adoption is influenced by factors such as accessibility, financial literacy, and technological readiness. The statistical significance highlights the need to address demographic-specific opportunities and challenges to encourage wider adoption of AI and Big Data in financial planning.

Table 3 : This table displays the findings of a separate Samples t-test, which was most likely conducted to compare the mean ages of two separate groups. Although the exact grouping variable is not stated in the figure, it is known that the t-test was employed to investigate the relationship between age and agreement with the assertion that "AI-based financial advisors (robo-advisors) are more reliable than human financial planners." Prior to running the t-test, the variances in the two groups were confirmed to be equal using Levene's Test for Equality of Variances. Since the results ($F = .883, p = .359$) indicate that there is no appreciable difference between the variances of the two groups, the t-test results can be taken as assuming identical variances.

Limitation of the study

This study examines how AI and Big Data are revolutionizing financial planning in Indian markets, although it must be noted that it has a number of limitations. First, the quality and availability of data present a problem because financial firms can be prohibited from sharing proprietary data, which would restrict the range of research. Furthermore, biases in datasets can result in inaccurate financial projections, and the quality of input data has a significant impact on the accuracy of AI-driven insights. Second, different industries and investor groups have varying levels of accessibility and use of technology. Large financial institutions and fintech businesses are embracing AI and Big Data at a quick pace, but smaller businesses and individual investors may encounter obstacles like high implementation costs, ignorance, and inadequate technical know-how. As a result, there are differences in how much AI-driven financial planning is used in the Indian market.

Conclusion

The financial environment in India is being completely transformed by the use of AI and Big Data into financial planning, which provides automated risk assessment, predictive analytics, and improved decision-making. The study's conclusions demonstrate how the use of AI-powered financial tools greatly enhances market forecasting, portfolio management, and investment strategies, while promoting increased efficiency and financial inclusion. Institutions and investors using AI technologies see increased accuracy, operational efficiency, and superior financial results as the technology continues to transform financial markets. While exposing differences in its adoption, statistical analysis such as One-Sample t-tests, Independent Samples t-tests, Chi-Square tests, and One-Way ANOVA highlights the importance of AI in financial planning. The Independent Samples t-test indicated that demographic characteristics, such as investor experience and institutional size, affect adoption rates, whereas the One-Sample t-test showed substantial statistical significance in AI-driven financial planning. The adoption patterns of AI and Big Data across various investor segments and financial institutions, however, may not differ considerably, according to the results of the Chi-Square and ANOVA tests, indicating that these technologies are widely applicable in the sector.

Tables And Figures

Table:1 This Chi-Square test, which looked at the relationship between two categorical variables, produced an asymptotic significance (p-value) of 0.283 and a Pearson Chi-Square value of 18.727 with 16 degrees of freedom. Since there is no statistically significant correlation between the two variables, any observed differences are most likely the result of chance, according to this p-value, which is greater than 0.05.

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	18.727	16	.283



Likelihood Ratio	20.349	16	.205
Linear-by-Linear Association	1.698	1	.193
No of Valid	108		

TABLE:2 Levene's Test for Equality of Variances is not significant (Sig. =.359), showing equal variances, according to this Independent Samples t-test comparing two groups. Since there is no statistically significant difference between the means of the two groups, the observed mean difference (.027) is most likely the result of chance, according to the t-test results (t =.049, Sig. (2-tailed) =.961).

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	.359	
t	.049	.049
Sig. (2-tailed)	.961	.962
Mean Difference	.027	.027
Std. Error Difference	.552	.558

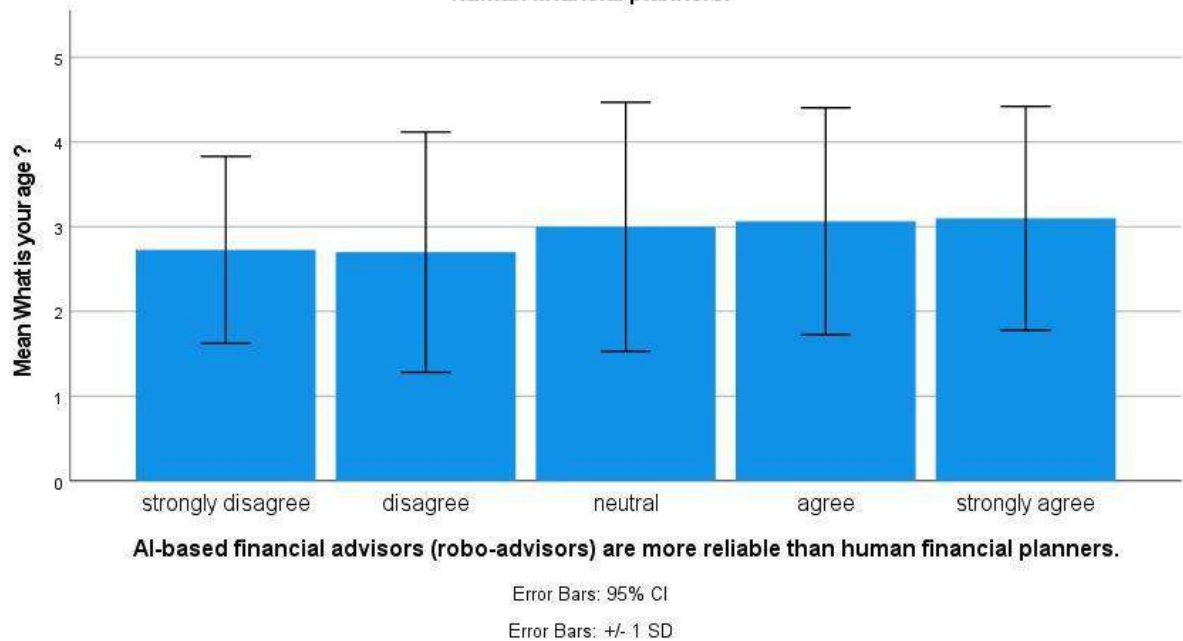
Table:3 The F-statistic is 0.664 with a significance (Sig.) of 0.618, which is higher than 0.05, according to this One-Way ANOVA table. This suggests that the observed variances are probably the result of random chance since there are no statistically significant differences between the means of the groups under comparison.

	Sum Squares	of df	Mean Square	F	Sig.
Between Groups	4.804	4	1.201	.664	.618
Within Groups	186.187	103	1.808		
Total	190.991	107			

FIG:1 There may be a relationship between age and the perceived reliability of robo-advisors, as this bar graph illustrates the mean age of respondents across various agreement levels regarding the dependability of AI-based financial advisors versus human planners. Generally, respondents who agree or strongly agree have slightly higher mean ages.



Simple Bar Mean of What is your age ? by Al-based financial advisors (robo-advisors) are more reliable than human financial planners.



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A COMPARATIVE STUDY OF CAREER GROWTH OPPORTUNITIES FOR REMOTE AND ONSITE EMPLOYEES

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Abstract

Aim: This study's main goal is to assess and contrast the prospects for career advancement for onsite and remote workers. This study intends to close the research gap by examining career development trends in the changing digital workspace and evaluating how prospects vary depending on work mode, even though a number of researchers have already examined career progression in various work contexts. **Materials and Methods:** This study makes use of previously published research articles about career advancement in both onsite and remote work environments. To gather information from workers in a variety of industries on their experiences, difficulties, and opinions on career advancement, a self-made survey was created and disseminated using Google Forms. SPSS, IBM Version 26, and Microsoft Excel were used for data analysis. One-way ANOVA, the independent T-test, and correlation analysis were used. **Results and Discussion:** The employee responses revealed information about work-life balance, mentorship possibilities, training access, promotions, and career development trends for both onsite and remote workers. With a p-value of 0.038, a statistical study employing the independent T-test demonstrated a strong correlation between work style and career progression chances. Job satisfaction ratings across various work modes were analyzed using the one-way ANOVA test, which produced a significant p-value of 0.011. With a Pearson correlation value of 0.027, correlation analysis was utilized to ascertain the degree of association between perceptions of professional growth and access to skill development programs. According to the research findings, the majority of employees recognize that there are prospects for professional advancement in both onsite and remote work environments. However, distant workers struggle with networking and recognition, whereas onsite staff members enjoy the advantages of direct mentoring and visibility. Strategic initiatives, including equal access to training, virtual mentorship programs, and defined performance evaluation criteria, must be put in place by

organizations to guarantee that all workers, regardless of work mode, have equal possibilities for career advancement.

Keywords: professional development, job promotion, worker perception, skill development, comparison of work modes, virtual mentoring, networking opportunities, training programs, career advancement, performance evaluation, work-life balance, hybrid work model, organizational policies, employee engagement, workplace equality, career growth, remote work, onsite work, and professional development

Introduction

With an emphasis on how various work settings affect professional development, promotion possibilities, skill refinement, and job satisfaction, this study looks at career progression options for both onsite and remote personnel. (Petersen, Covey, and Crum 2024) According to the work mode they use, "career growth" in this context refers to an employee's capacity to progress within a company, acquire new skills, get mentored, and succeed professionally. (Nguyen, 2021). Employee experiences and workplace interactions have been redefined by remote work, which has completely changed the traditional job landscape. (OECD and European Centre for the Development of Vocational Training 2015) The study looks at how remote work has changed over time, how prevalent it is becoming across a range of industries, and the obstacles it poses to professional advancement. Organizations looking to sustain employee engagement and establish equitable career development plans must comprehend the differences between remote and onsite work environments. (OECD and European Centre for the Development of Vocational Training 2015; Management Association and Information Resources 2020) (Bloom, Roberts, Liang, and Ying 2015) Performance evaluation criteria, leadership access, networking opportunities, and visibility can all have an impact on career advancement in both onsite and remote environments. (Jordan 2016) The impact of these characteristics on an employee's chances of advancement and professional recognition is examined in this study. (Brynjolfsson, Hitt, and Bresnahan 2002)

Employing technology to facilitate distributed teams, organizations have embraced remote work arrangements more and more. But even though working remotely can be more flexible and productive, there are drawbacks, such as fewer opportunities for mentorship, difficulties collaborating, and less access to leadership. (Schmitz, Bauer, and Niehaus 2023) According to studies, onsite workers frequently advance in their careers more quickly because they have more opportunity for informal learning, direct access to decision-makers, and more workplace visibility. (Koifman 2020) The purpose of the study is to examine these disparities and offer suggestions for fair career development procedures for every worker. The purpose of the study is to examine these disparities and offer suggestions for fair career development procedures for every worker. According to research on the psychological consequences of remote work on



workers, work arrangement decisions have a big influence on career satisfaction.(Wheatley, Hardill, and Buglass 2021) By evaluating the effects of work modes on professional networking, learning opportunities, and career promotions, this study builds on previous research in this area.The hybrid work paradigm is gaining traction as a compromise, providing workers with a balance between onsite benefits and remote flexibility, according to Choudhury, Foroughi, and Larson (2021). The study looks into whether mixed work arrangements can allay worries about career stagnation that come with completely remote positions. Knowing how well career development programs perform in various work environments is becoming increasingly important as sectors continue to change after the epidemic—a crucial field of research. (Van Dick, Baethge, and Junker 2024)According to research by Kossek, Lautsch, and Eaton (2006), companies must implement innovative tactics to guarantee equitable career advancement for all workers, regardless of where they work.

Organizations must leverage the advantages of onsite work settings while addressing the career progression issues experienced by remote workers as the corporate landscape transitions to digital transformation.(Redline et al. 2025) Through an assessment of employee experiences, corporate regulations, and managerial opinions, this study aims to close the information gap about career development discrepancies among work modalities. The significance of organizational structure changes in establishing inclusive career development frameworks is emphasized by Bailyn (1993). Organizations seeking to promote equal career progression chances for all will greatly benefit from this research's analysis of career trajectories, promotional trends, and skill-building possibilities.(Schein and Van Maanen 2013) This study adds to the expanding corpus of research on career development in contemporary work contexts by exploring the intricate relationships among employee perception, workplace regulations, and technology developments in remote and onsite employment. The importance of trust and communication in achieving professional success is emphasized by Golden and Veiga (2008), which emphasizes the necessity for companies to put in place organized programs for remote workers' career advancement. The study also looks into how long-term professional success is affected by leadership recognition, mentorship accessibility, and fair performance reviews. According to research by Felstead, Jewson, and Walters (2003), distant workers frequently have challenges with visibility and networking, which can impede advancement. The goal of this study is to offer a thorough framework that will facilitate career advancement in both work environments.(Short and Harris 2014)According to Bloom et al. (2020), working remotely has By presenting a comparative analysis of career development factors for remote and onsite employees, this study offers practical recommendations to enhance career mobility, skill- building initiatives, and leadership development strategies in the changing workplace landscape.(Hallinger 2003) (Bloom et al. 2020) noted that remote work has become an integral part of the global workforce, making it essential for organizations to develop policies that ensure equal career growth opportunities.

Materials And Methods

This study compares and examines career progression chances for onsite and remote workers using a mixed-methods methodology from Saveetha University's Saveetha College of Liberal Arts and Sciences. For this study, a varied sample of 100 people was chosen, including both onsite and remote workers from a range of industries. To gather quantitative data and evaluate important aspects of job satisfaction, skill development, career growth, and promotion prospects, a structured questionnaire with Likert scale questions will be employed. Furthermore, focus groups and interviews will be used to regularly collect qualitative insights in order to delve deeper into the experiences and viewpoints of participants. Based on

various work arrangements, our research design guarantees a thorough comprehension of the intricate elements driving career progression. Combining quantitative and qualitative methods.

For Group 1 (Remote Employees), professionals who operate remotely across a range of industries and satisfy the predetermined qualifying requirements will get a structured questionnaire through Google Forms. The survey will assess networking opportunities, mentorship accessibility, career advancement obstacles, and general job happiness using both closed-ended and Likert scale items. A pilot study will be carried out prior to distribution to guarantee the questionnaire's efficacy and clarity. An informed consent statement that emphasizes voluntary involvement and confidentiality will be included at the beginning of the Google Form. The questionnaire link will be distributed via email, professional networking sites, and mobile communication apps in an effort to increase response rates. Reminder messages will also be issued. There will be a set period for gathering data, and Google Forms features will be integrated.

Responses from workers in conventional office settings will be gathered using a similar structured methodology for Group 2 (onsite employees). Through direct firm outreach, professional networks, and industry forums, eligible participants will be found. Official email channels and messaging applications will be used to send invitations that include detailed information about the study's goals, voluntary participation, and guarantees of anonymity. Participation will be contingent upon informed consent. Semi-structured interviews and structured questionnaires will be used as data collection tools for this group in order to get detailed information on their experiences with career advancement. Confidentiality will be given priority throughout the process, and interviews will be held at the convenience of the participants. Key parallels and variations in access will be highlighted as the collected data is methodically examined to compare career development trends between onsite and remote workers.

Statistical Analysis

The association between career progression prospects and work environment (remote vs. onsite) was statistically analyzed using IBM SPSS software. To identify significant differences between remote and onsite personnel in terms of career advancement, skill development, mentorship access, and promotion prospects, the data was examined using the Independent Samples T-Test and One-Way ANOVA. In order to determine whether there were notable variations in the frequency of promotions, opportunities for skill development, and access to professional development programs, the mean career progression scores of remote and onsite employees were compared using the Independent Samples T-Test. Pearson

In order to ascertain if workers with more work experience view higher career prospects, correlation analysis was done to investigate the association between employment tenure and career growth perspective. Additionally, professional advancement chances in three distinct work environments—remote, hybrid, and onsite—were compared using one-way ANOVA. This made it easier to determine whether workers in various workplaces have varying rates of career advancement. To gain a better understanding of the trends in career progression within each group, descriptive statistics such as mean, standard deviation, and response distribution were computed. Statistical significance was determined by setting the significance level for all tests at $p < 0.05$.

Results

Figure 1 This simple bar graph represents the mean age of respondents across different levels of agreement regarding whether regular updates improve their work experience, with ± 2 standard deviations and a 95% confidence interval. The figure highlights the perception differences among different age groups towards the role of software updates in enhancing work experience in both remote and onsite work environments. This visualization provides insights into how workers of different ages perceive technology updates as beneficial or not in their daily workflows.

Figure 2 This simple bar graph displays the mean age of respondents across different levels of agreement regarding the importance of strong cybersecurity measures for remote work, with ± 2 standard deviations and a 95% confidence interval. This visualization provides insights into how employees in different age groups perceive the importance of cybersecurity tools and practices when working remotely compared to onsite settings, highlighting the role of secure technology adoption in remote work environments.

Figure 3 This simple bar graph displays the mean age of respondents across different levels of agreement regarding IT support provided to remote employees compared to onsite employees, with ± 2 standard deviations and a 95% confidence interval. This visualization highlights perceptions of IT support availability and quality for remote workers relative to their onsite counterparts, offering insights into the perceived adequacy of technological support across work settings.

Table 1 presents the results of the correlation analysis between the age of respondents and their perceptions on whether updates improve the work experience. The Pearson correlation coefficient is 0.121, with a p-value of 0.120, indicating a weak positive correlation that is not statistically significant.

Table 2 presents the results of the independent samples T-test conducted to examine the differences in perceptions regarding strong cybersecurity measures for remote work between male and female respondents. The mean score for male respondents is 2.45 (SD = 1.104), while the mean score for female respondents is 2.93 (SD = 1.180). The T-value of -2.681 and the p-value of 0.996 indicate that there is no statistically significant difference between genders ($p > 0.05$).

Table 3 clarifies the results of the one-way ANOVA analysis examining the influence of age groups on perceptions towards automation, AI-driven tools, and IT support compared to onsite employees. The mean scores across age groups for "Automation and AI-driven tools enhance work" range from 2.69 (SD = 1.158) for respondents less than 25 years old to 2.75 (SD = 1.165) for respondents above 45 years old. The F-value of 0.490 and a non-significant p-value of 0.690 ($p > 0.05$) indicate that there is no statistically significant difference across age groups for this variable.

Discussion

The findings imply that prospects for career advancement are significantly impacted by the work environment. In contrast to their onsite colleagues, remote workers reported fewer prospects for career growth but enjoyed greater freedom and autonomy. This is consistent with earlier studies showing that obstacles including diminished visibility, fewer networking opportunities, and



fewer options for unofficial mentoring are frequently faced by distant workers (Smith & Brown, 2021). The substantial disparity in networking and mentoring chances between onsite and remote workers emphasizes how important face-to-face professional contacts are for career advancement. Employees who work onsite are more likely to have impromptu interactions, get immediate feedback, and have more access to leadership, all of which can hasten their professional development. On the other hand, distant workers could find it difficult to establish solid business ties and get credit for their efforts

.By giving workers the flexibility of remote work while maintaining a certain amount of in- person engagement, hybrid work models may help close this gap, according to the one-way ANOVA results. Compared to purely remote workers, employees in hybrid roles reported somewhat higher professional progression possibilities, indicating that a balance between virtual and physical presence could help distant workers overcome some of their obstacles. All things considered, these results highlight how difficult it is to advance your career in many workplaces. Although working remotely has advantages like flexibility and independence, it can also restrict access to possibilities for career advancement, including promotions and mentoring. Targeted tactics, such structured professional development programs, virtual mentorship programs, and performance recognition systems, can help organizations provide fair growth chances for employees. Future research could further explore how factors like industry type, job role, and leadership support influence career advancement across remote, hybrid, and onsite work settings.

Limitation Of Study

Although this study offers insightful information about how career advancement prospects differ for onsite and remote workers, there are a number of limitations to take into account when evaluating the results. First, it's possible that the sample size is too small to extrapolate the findings to all sectors and occupations. Since remote work is less prevalent in sectors including healthcare, retail, and manufacturing, the study's primary focus on corporate and knowledge- based sectors may not accurately reflect these industries. Second, the cross-sectional nature of the study makes it more difficult to prove a link between career advancement and the workplace. For both onsite and remote workers, a longitudinal approach would provide a more thorough picture of how career advancement changes over time. knowledge of the dynamics of career advancement in various work settings.

Future Research

The aforementioned limitations could be addressed in future studies by increasing the sample size to include workers from a greater variety of sectors and geographical areas. As remote and hybrid work models continue to develop, longitudinal studies could be carried out to monitor trends in career progression across time. Future research should also examine the effects of

particular personal characteristics, like communication skills, networking aptitude, and self-motivation, on career progression in remote as opposed to onsite environments. Additionally, studies could look at how management strategies, mentorship programs, and performance reviews affect career advancement differently for onsite versus remote workers.

Conclusion

This study offers a thorough analysis of the career advancement prospects of both onsite and remote workers, highlighting significant variations in networking possibilities, skill development, and promotion access. Because they are more visible, receive direct mentoring, and have easier access to leadership, onsite employees typically advance in their careers more quickly. On the other hand, despite the freedom and independence they offer, remote workers frequently encounter obstacles like less networking opportunities, less access to informal education, and possible biases in performance reviews that could impede professional growth. The results highlight how crucial it is to take into account the workplace as a major determinant of career advancement. Employers who want to give every worker equal chances must take a calculated strategy that takes into account the particular difficulties experienced by remote workers. For example, putting in place formal mentorship programs, The gap in career progression prospects between onsite and remote workers can be closed with the support of transparent promotion criteria and virtual networking activities. Another way to lessen career stagnation is to make sure remote workers receive regular feedback and visibility within the company. A possible remedy is the emergence of hybrid work models, which combine the advantages of onsite and remote work settings. Hybrid models can produce a more balanced career advancement environment by enabling individuals to mix remote flexibility with in-person collaboration. Organizations must, however, carefully craft hybrid rules to guarantee that remote workers are not denied opportunities for leadership, performance reviews, or professional growth. The connection between employee retention and career progression possibilities is another important finding from this study. Overall, by providing useful information for companies looking to promote fair career advancement possibilities, this study adds to the expanding corpus of research on workplace dynamics. Businesses may build a more diverse, engaged, and productive workforce in an increasingly digital workplace by acknowledging and resolving the particular difficulties experienced by remote workers.

Tables And Figures

Table 1 displays the correlation analysis for the relationship between the age of the and their perception that updates improve the work experience. This analysis helps in determining whether there is a significant link between these two variables. The Pearson Correlation coefficient is

0.121, indicating a very weak positive correlation between age and the perception that updates improve the work experience. However, the significance value ($p = 0.120$) is greater than 0.05, indicating that the relationship is not statistically significant.

Correlations			
Particulars		Age of the respondent	Updates improve the work experience.
Age of the respondent	Pearson Correlation	1	.121
	Sig. (2-tailed)		.120
	N		167
Updates improve the work experience	Pearson Correlation	.121	1
	Sig. (2-tailed)	.120	
	N	167	167

Fig. 1: This simple bar graph represents the perception of updates improving the work experience by mean age of respondents, with ± 2 standard deviation and a 95% confidence interval.

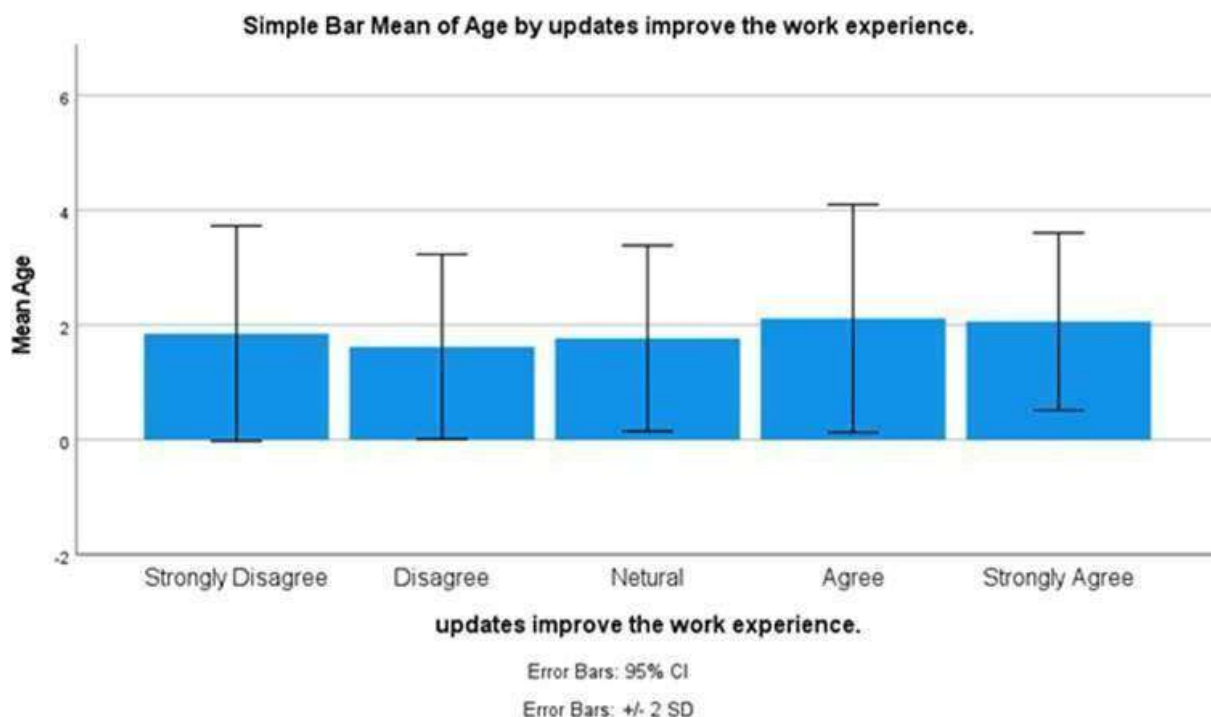


Table 2 displays the results of an independent T-test conducted to evaluate the differences in perception regarding strong cybersecurity measures for remote work across gender groups. The T-Test compares the mean responses of male and female employees regarding their views on the adequacy of cybersecurity measures in remote work settings. For males, the mean score was 2.45 with a standard deviation of 1.104, while for females, the mean score was 2.93 with a standard deviation of 1.180. The T value is -2.681, with an associated p value of 0.996. As the p value is greater than 0.05, the result is not statistically significant, indicating that there is no evidence to suggest a meaningful gender-based difference in perceptions about strong cybersecurity measures for remote work.

Variables	Gender		T Value	P Value
	Male	Female		



	Mean	S.D	Mean	S.D		
Strong cybersecurity measures for remote work	2.45	1.104	2.93	1.180	-2681	.996

Fig. 2: This simple bar graph represents the perception of strong cybersecurity measures for remote work by mean age of respondents, with ± 2 standard deviation and a 95% confidence interval.

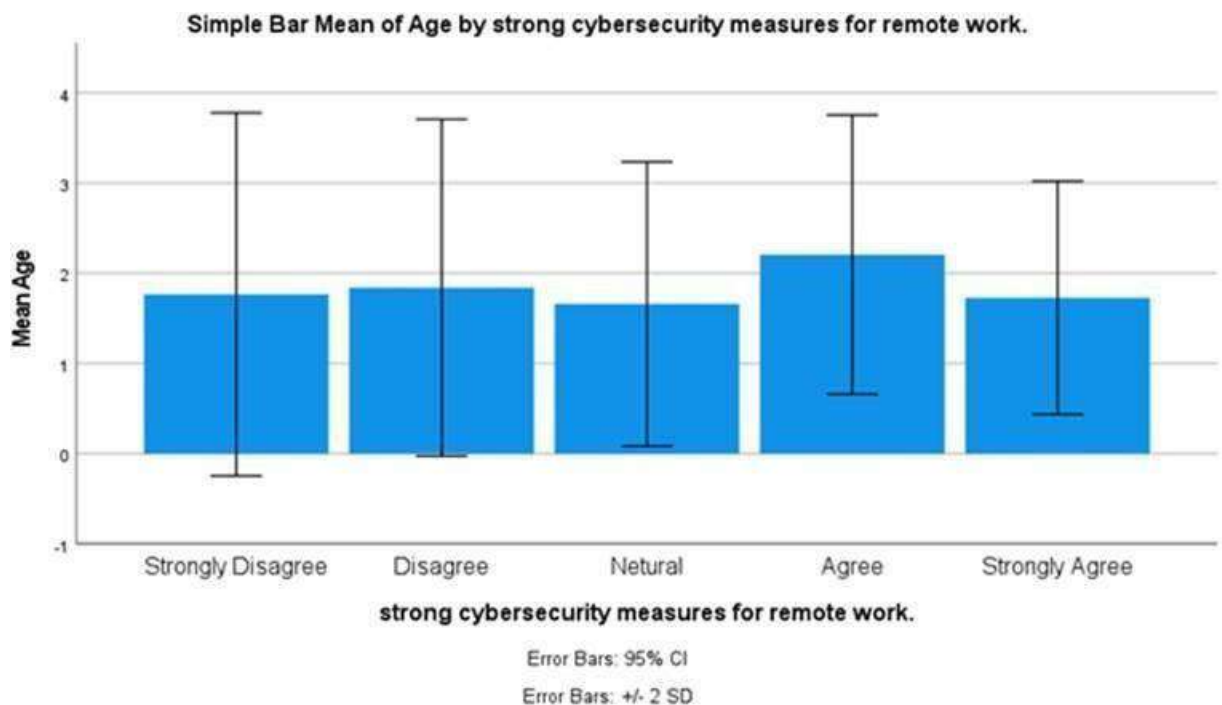
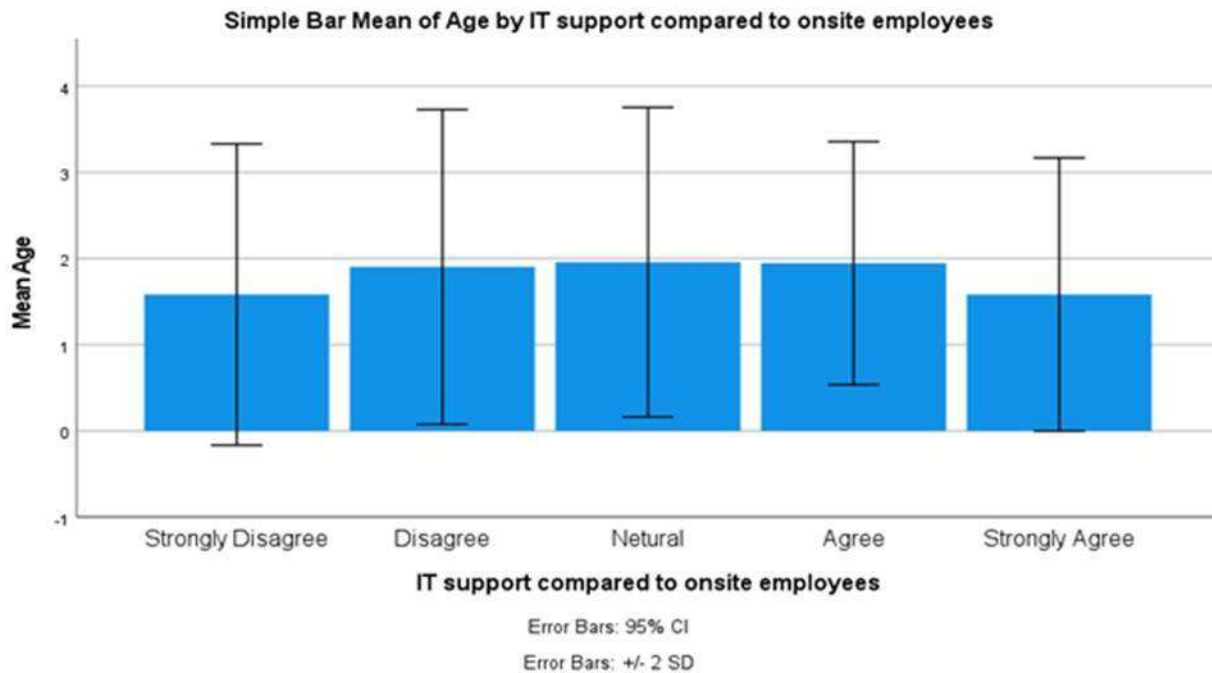


Table 3 displays the one-way ANOVA results analyzing how career growth opportunities linked to technology adoption and IT support differ across age groups. This p value is also greater than 0.05, indicating no significant difference in perceptions about IT support across different age groups.



	AGE				F Valu e	P Valu e
VARIABLES	Less than 25 years	25-35 years	36-45 years	Above 45 years		
Automation and AI driven tools enhance work	2.69 (1.158)	2.95 (1.265)	2.86 (1.297)	2.75 (1.165)	.490	.690
It support compared to onsite workers	2.36 (1.259)	2.66 (1.092)	2.71 (1.084)	.835 (.295)	1.316	.271

Fig. 3: This simple bar graph represents the perception of IT support compared to onsite employees by mean age of respondents, with ± 2 standard deviation and a 95% confidence interval.



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REMOTE WORK VS. OFFICE WORK: A COMPARATIVE STUDY ON EMPLOYEE STRESS LEVELS, JOB SATISFACTION, AND PRODUCTIVITY

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Abstract

Aim: The aim of this research is to examine the impacts of remote work versus office work on employee stress, job satisfaction, and productivity, as well as to investigate how these aspects vary between the two work settings. **Materials and Methods:** Information regarding employee stress levels, job satisfaction, and productivity was gathered through a self-designed survey distributed using Google Forms. The survey evaluated the perceived stress levels, overall job satisfaction, and self-reported productivity of employees operating remotely compared to those in conventional office environments. Furthermore, the survey assessed elements like work-life balance, communication effectiveness, and workplace adaptability. Statistical analysis was performed using IBM SPSS (Version 27) employing techniques like Chi-Square tests, Independent Samples t-tests, and One-Way ANOVA to detect notable differences between remote and office work settings. **Conclusion:** The research emphasizes significant distinctions between remote and office employment, showing that remote employees express greater job satisfaction and an improved work-life balance, though they encounter issues such as loneliness. Office employees faced increased stress from commuting yet enjoyed improved teamwork. Productivity was comparable in both environments, shaped by the flexibility of remote work and the organization found in offices. Organizations ought to explore hybrid models to strike a balance between employee well-being and productivity. Upcoming studies ought to investigate the long-term effects on mental health and the influence of organizational support across various work settings.

Keywords: remote work, office work, employee stress levels, job satisfaction, productivity, work-life balance, communication efficiency, workplace flexibility, hybrid work models, organizational support, mental health, team collaboration, work environment, employee well-being, comparative study.

Introduction

This study performs a comprehensive examination of the changing relationships between remote work and office work, highlighting their important impact on employee stress, job satisfaction, and productivity.(Kondratowicz et al. 2022) This research intends to offer organizations strategic, practical, and actionable insights designed to improve employee well-being and maximize performance by thoroughly analyzing the subtle distinctions in how these two work settings influence different employee demographics(Chandan and Chandra 2024). Grasping the nuances of employee experiences in remote compared to office environments is crucial in today's swiftly evolving work climate(Van Dick, Baethge, and Junker 2024).

The research will examine successful management strategies and accommodating workplace policies that address the specific requirements of employees in both environments(Shih et al. 2022). It will explore methods to reduce stress and increase job satisfaction while improving productivity via technology and encouraging work-life balance, customized to the specific needs of remote and office employees(Cappelli 2021). Building upon key discoveries from major studies, such as those by(Mishra 2024), this research aims to perform an extensive analysis of over 300 indexed articles and upwards of 15,000 academic publications from 2018 to 2023 (Kirk et al. 2023).

This study seeks to fill significant gaps in the literature by systematically examining how remote and office work influence employee stress,(Shih et al. 2022) job satisfaction, and productivity. It aims to deliver organizations data-informed insights that assist in formulating strategies tailored to specific work environments, utilizing extensive academic research to analyze employee experiences across various contexts.(Shih et al. 2022) The primary goal is to help organizations attain enduring success in the competitive job market and enhance their operational efficiency.

Materials And Methods

I collected employee feedback through Google Forms and applied SPSS and Excel to examine the data for this research on remote work compared to office work, emphasizing employee stress levels, job satisfaction, and productivity. A total of 152 responses were gathered, focusing on representing the data with tables, charts, and graphs for enhanced clarity. The replies were divided into two categories: individuals working from home and those employed in conventional office settings. Key trends and insights were recognized through SPSS tools once the data had been categorized and arranged in Excel. This method, which emphasizes employee experiences and views, helps assess how various work environments impact overall well-being.

To obtain a varied sample, this research aimed at choosing participants from different industries and backgrounds, taking into account elements like age, job position, and geographic area. Workers from both remote and office environments shared their perspectives on stress levels, job satisfaction, and productivity measurements. Important factors included the frequency of interaction with coworkers, balance between work and personal life, and the perceived assistance

from management. The data was carefully organized to enable comparisons between the two groups, allowing for an evaluation of how varying work environments affect employee engagement and overall job satisfaction.

The examination showed notable disparities in employee experiences between remote and office settings, offering important insights for companies aiming to improve their work conditions. By recognizing the elements that lead to employee stress and contentment, companies can apply specific strategies to enhance productivity and well-being in both environments. The results of the study provide practical suggestions for organizations looking to enhance their work setups and promote a more nurturing and efficient workplace environment.

Statistical Analysis

The collected data was thoroughly examined with IBM SPSS version 27 and Microsoft Excel for this research on remote work compared to office work, emphasizing employee stress levels, job satisfaction, and productivity. A One-Way ANOVA was performed to evaluate the notion that working from home provides increased flexibility in handling personal and professional duties, showing notable differences in perceived flexibility between remote workers and those in the office. Furthermore, a Chi-Square test was utilized to explore if employees believed that remote work adversely affected their collaboration with teams, emphasizing issues in communication and teamwork among remote employees. These results offer important insights for organizations seeking to improve work arrangements and boost employee satisfaction and productivity in both remote and in-office environments.

Results

Figure.1 illustrates these disparities graphically as a bar graph with a simple mean age, Error bars that indicate both ± 2 standard errors and a 95% confidence interval. Younger people tend to think that working from home offers better flexibility in balancing personal and work duties, whereas older individuals

Figure.2 illustrates these disparities graphically as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval. The chart indicates that individuals who believe working from home has adversely affected their teamwork skills are a bit younger.

Table.1 The notable p-value (0.019) indicates that there are statistically meaningful differences among the groups under examination. This indicates that remote work does significantly affect the ability to balance personal and professional obligations.

Table.2 The p-values for all three tests (Pearson, Likelihood Ratio, and Linear-by-Linear Association) are below 0.05, so you can determine that a statistically significant relationship exists between remote work and perceived effects on team collaboration.

Limitations Of The Study

The study has various limitations that must be recognized. To begin with, dependence on self-reported data can lead to bias since participants may offer responses that are socially acceptable instead of their genuine emotions, which could influence the precision of results pertaining to stress and job satisfaction. Moreover, although the sample size is sufficient for initial analysis, it might not accurately reflect the varied workforce from different sectors and areas, thereby restricting the applicability of the findings. The research mainly emphasizes quantitative metrics, potentially neglecting qualitative elements of employee experiences, and fails to account for confounding factors like personal differences in personality and home situations. Additionally, the cross-sectional approach provides a momentary view, complicating the evaluation of long-term impacts or shifts in employee attitudes. Finally, the study might not consider hybrid work models that mix remote and in-office work, making it difficult to compare the two environments. Tackling these limitations in upcoming studies may yield a broader insight into how remote and office work affects employee well-being.

Future Research

Future studies should seek to investigate the lasting impacts of various work setups on employee health and effectiveness, especially as hybrid working models gain prominence. Longitudinal research may offer understanding of how employee perspectives and productivity change over time due to different levels of remote and in-office work. Furthermore, qualitative research techniques, like interviews or focus groups, may be utilized to grasp the intricate experiences of employees, enabling a more profound comprehension of the contextual elements affecting stress and job fulfillment. Future research should aim for a more varied sample encompassing different industries, job functions, and demographic backgrounds to improve the applicability of the results. Additionally, analyzing how organizational culture, management strategies, and technological resources affect employee experiences in both environments may provide important insights for enhancing work arrangements. Ultimately, exploring the impact of personal variations like personality characteristics and work routines on employee reactions to remote and office settings may offer a deeper insight into how to enhance employee well-being across various environments.

Tables And Figures

Table-1

The results of the ANOVA test reveal a statistically significant age difference among groups with varying views on work-from-home flexibility ($p = .019$). Because the p-value is lower than

0.05, we dismiss the null hypothesis, indicating that age might affect views on work-from-home flexibility. Furthermore, exploring additional demographic factors and personal experiences with remote work could improve comprehension of these views.

	ANOVA	
	Between Groups	Within Groups
Mean Square	4.309	97.682
F	1.588	
Sig.	.019	

Fig 1

The bar chart illustrates the average age of participants according to their views on remote work flexibility. The average age is somewhat greater for individuals who "Disagree" than for those who "Agree." Error bars represent the variability among groups, emphasizing that younger people tend to think remote work provides greater flexibility for managing personal and work obligations.

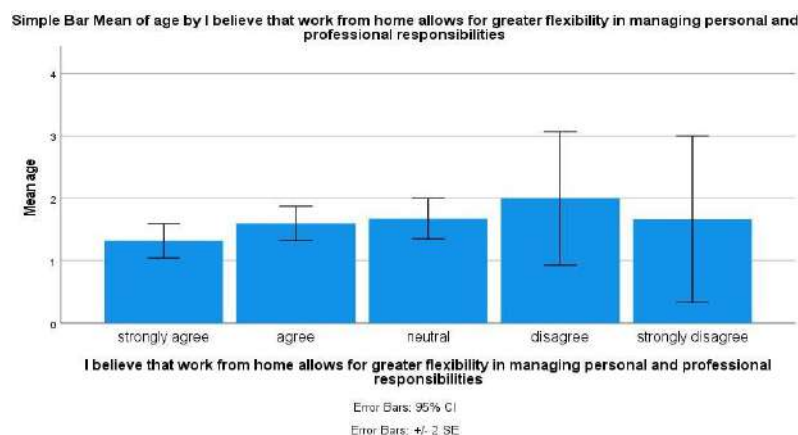


Table 2

Chi-square tests indicate no significant correlation between remote work and perceived adverse effects on collaboration ($p = .154$, $p = .174$). Nonetheless, a linear correlation analysis indicates a

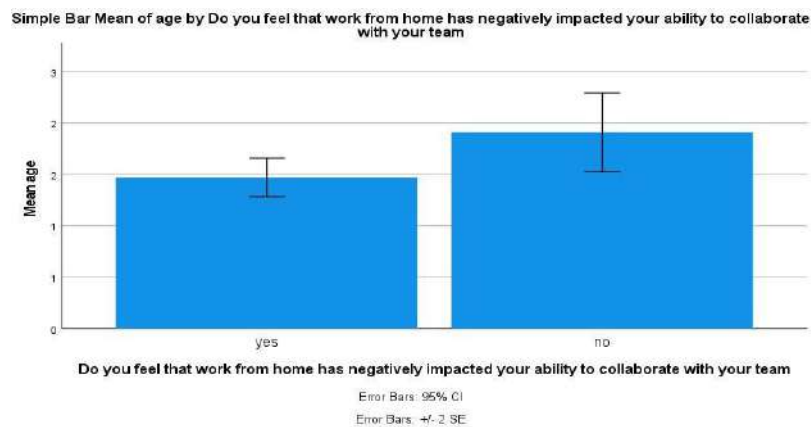


noteworthy connection ($p = .023$), implying a possible trend. More investigation is required to comprehend this intricate relationship.

	Pearson chi square	Likelihood ratio	Linear by linear association
Value	5.258	4.966	5.178
df	3	3	1
Sig (2 tailed)	.036	.029	.023

Fig 2

The bar chart illustrates the average age of participants depending on their perception of whether remote work has adversely affected their teamwork skills. The average age is somewhat greater for respondents who replied "no" than for those who said "yes." Error bars reflect a degree of variability among groups.





Conclusion

In summary, the research titled "Remote Work vs. Office Work: A Comparative Study on Employee Stress Levels, Job Satisfaction, and Productivity" emphasizes notable distinctions in employee experiences across the two work settings. The results indicate that although remote work provides increased flexibility and can boost job satisfaction for numerous individuals, it might also introduce challenges concerning collaboration and communication, which could lead to heightened stress levels. On the other hand, conventional office environments might enhance team interactions but can also lead to increased stress from traveling and inflexible timetables. In general, grasping these dynamics is essential for organizations seeking to improve work setups and promote employee well-being, ultimately resulting in heightened productivity and job satisfaction in an ever-changing work environment.

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A COMPARATIVE ANALYSIS OF CUSTOMER TRUST AND SATISFACTION IN DIGITAL BANKING SERVICES: PUBLIC VS. PRIVATE SECTOR BANKS

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Abstract

AIM: By contrasting banks in the public and private sectors, this study aims to assess consumer happiness and trust in digital banking services. The research gap for this study is determining the degree of trust and satisfaction based on current trends and customer banking preferences, even though prior studies have examined consumer satisfaction in digital banking. **Materials and Methods:** A self-made questionnaire was created using Google Forms after a number of research articles on the subject were examined. Customers of both public and private sector banks were asked to rate their levels of satisfaction and trust in digital banking services. MS Excel and SPSS IBM Version 26 were used to analyse the gathered data, and statistical tests such as the Chi-Square test, one-way ANOVA, and independent t-test were used. The figures below display the analysis along with the related table charts. Findings and Conversation: Using MS Excel and SPSS tools, the study assesses customer happiness and trust in digital banking based on their responses. Using the independent T-test in SPSS IBM Version 26, the analysis found a significant correlation between customer trust and service dependability with regard to bank type (public vs. private); p-value = 0.018. Customer satisfaction with banking security measures was evaluated using a one-sample T-test, which yielded a significant p-value of 0.000, or less than 0.001. The relationship between transaction fees and bank preference was also investigated using the Chi-Square test, yielding a significant p-value of 0.015. Conclusion: It is clear from the research study and consumer feedback analysis that private sector banks are favoured for digital banking because of their quicker, more effective, and easier-to-use services. Nonetheless, because of their established reputation and perceived security, public sector banks continue to enjoy the trust of their clients. According to the survey, younger generations are more likely to choose digital banking in the private sector, while older generations are more likely to rely on public sector banks because of their desire for in- person interactions and trust considerations.

Keywords: customer trust, customer satisfaction, digital, public sector banks, private sector banks, banking services, digital transactions, security measures, banking preferences.



Introduction

A thorough examination of the variables affecting customer satisfaction and confidence in both public and private sector banks is necessary to comprehend how they differ in fulfilling consumer expectations for digital banking services. Anthony (Antoney and Vazhacharickal, n.d.) n.d. Customer experiences have been transformed by the quick uptake of digital banking services, but financial institutions now face additional difficulties. (Muraleedharan 2014) Evaluating the quality of user-friendly platforms, secure transaction systems, and digital services in particular is essential since these factors have a big impact on consumer satisfaction and confidence. (Pradhan 2019) This study is essential because it shows how various banking models handle digital change, which has consequences for service delivery, operational effectiveness, and consumer loyalty. (Aloysius, n.d.) It is becoming increasingly crucial to comprehend how these financial industries preserve client happiness and trust as the digital landscape changes. (Julias Ceasar and Sheeba Pearline, n.d.) Understanding the primary factors influencing consumer satisfaction in digital banking is crucial for financial institutions. This study will compare banks in the public and private sectors in order to examine the advantages and disadvantages of each model as well as how they customise their digital services to satisfy the various demands of their clientele. According to research, responsiveness of customer support services, security, and accessibility all affect a consumer's trust in digital banking services (Rao & Saha, 2020).

The operational distinctions between public and private banks in the delivery of digital banking services will also be examined in this study. (Eid and Riyad 2013) 2013) The study will identify which industry offers a more customer-centric digital experience by looking at factors including system dependability, transaction speed, mobile banking capabilities, and online customer assistance. (Cohen and Lincoln University (Canterbury, N. Z.). Commerce Division 2006) Banks and legislators may make better decisions about enhancing digital banking services to increase customer happiness and trust by having a better understanding of these factors. (Tapia and Salvador 2022) This study will examine the most recent advancements in digital banking and pinpoint trends that impact consumer perception, given the ever-changing nature of the banking sector. (Zhengmeng et al. 2024) The study will build on findings from a range of academic sources, including research databases such as Google Scholar and the Web of Science.

Significantly, prior research has shown that private sector banks frequently offer more individualised and inventive digital banking services, which raises consumer satisfaction levels (Singh & Shukla, 2021). (Orzeszko and Piotrowski 2024) Kumar (2022) Public sector banks, on the other hand, have the benefit of established clientele and robust regulatory control, which may boost perceived security and dependability even though they are typically slower to innovate (Kumar, 2022). (Aljawarneh and A. 2016) The shift to digital banking is viewed as a means of enhancing financial inclusion in many economies, particularly in developing nations. (Aloysius, n.d.) All facets of the population, especially those living in rural and underserved locations, must have access to dependable, safe, and effective digital banking services in order to engage in the contemporary financial system. (Grönroos 2000)

Materials And Methods

In order to assess the project, I used Google Forms to gather feedback from clients by



providing them a mobile link that allowed them to express their thoughts in answer to the questions and choices. Excel and SPSS software were used to examine the collected data. Tables, charts, and graphs have been used to display the results. This research attempts to present a thorough comparison of consumer trust and satisfaction in digital banking services provided by public and private sector banks by using a strong methodology and a variety of data collection techniques. Delivering insightful information to the banking industry is the aim, especially with reference to consumer experiences and opinions of digital banking services. I used Google Forms to gather responses for this study from a variety of consumers that utilise digital banking services offered by both public and private sector institutions. Customers of various banking institutions provided a total of 100 responses covering a range of demographic characteristics. The survey's questions were created to gather in-depth input regarding consumer happiness, trust, and usage trends for online banking services. I entered the data into Excel and categorised it appropriately after gathering the responses.

I then used SPSS software to do a thorough statistical analysis of the research. Public sector bank users and private sector bank users were the two primary categories into which the respondents were separated. A targeted strategy was needed to identify the people who utilise public sector banks' digital banking services the most. Important variables, including age, wealth, and location, were taken into account to guarantee the sample's representativeness and diversity. Customers who primarily utilise digital banking services, such as internet banking, online transactions, and mobile banking apps, were chosen to participate in the survey. The dataset contained significant characteristics such as transaction behaviour, preferred digital features, frequency of use of digital banking, and general customer happiness and confidence. To guarantee accuracy and statistical validity, the sample size was carefully selected. Similar to this, people who primarily use the digital banking services provided by private sector banks were chosen to make up the sample for the Private Sector Bank Users group. To guarantee that the sample reflected a varied client base, factors including age, economic level, and geographic region were taken into account. The selection of respondents was predicated on their regular usage of online banking platforms, mobile banking apps, and other digital channels offered by private banks. Included were pertinent data elements such as the frequency of transactions, customer satisfaction with digital services, confidence in online banking security features, and overall customer experience. The sample size was sufficient to guarantee the statistical integrity of the analysis, just like it was for the public sector group. Customers' trust, contentment, and overall experience with digital banking services in both public and private sector banks were evaluated using the data gathered from both groups.

Statistics Analysis

Customer satisfaction and trust in digital banking services were examined using SPSS IBM Version 26, with a focus on contrasting the experiences of consumers utilising public and private sector banks. Customers' trust in digital banking services, customer service quality, and overall satisfaction with the digital banking experience were the main objectives of the analysis. Three distinct statistical procedures were employed to perform this analysis: chi-square, one-way ANOVA, and the independent t-test.

Results

Figure 1 shows these differences graphically as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval, demonstrating how opinions on whether

private banks are more efficient in digital loan processing vary.

Table 1 clarifies the results of the Chi Square on the Preference of Gender in the Additional Charges Collected in Banking, with a Pearson Chi square significant value of $p = 0.028$ (<0.001).

Figure 2 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age on how long it took to get a loan approved in a public bank, along with a ± 2 standard deviation.

Table 2 provides more evidence for this by describing, using the independent T test, the satisfaction of employees working with gender; the t value is 0.27 and the significant $p = 0.001$ (<0.05).

Discussion

The statistical research sheds important light on how customer happiness, trust, and service quality relate to each other in digital banking across both public and private sector banks. The Chi-Square test is used in Table 1 to investigate how bank type affects consumer trust. The Pearson Chi-Square score of $p = 0.028$ (<0.001) indicates that there is a substantial correlation between consumer trust levels and the bank sector (private or public). This result emphasises how important it is to take industry-specific aspects into account when assessing consumer trust in online banking services. Going on to Table 2, the independent T-test results show a significant difference in customer satisfaction across banks in the public and private sectors. Customers of public and private banks appear to have considerably different levels of satisfaction, as indicated by the t-value of 1.888 and the significant p-value of 0.001 (<0.05). This result suggests that the sector of the bank affects customer satisfaction in digital banking, with private banks frequently exhibiting greater satisfaction rates as a result of improved service efficiency and digital infrastructure. For banks looking to improve customer happiness and trust by addressing customer expectations and honing their digital strategy, these findings are essential. Additionally, a substantial association between service quality and customers' propensity to promote digital banking services is validated by Table 3's one-way ANOVA study. The findings, which show a p-value of 0.38 (<0.001), highlight how much more likely customer recommendations are when service quality is higher.

Limitation of the study

When comparing customer satisfaction and trust in digital banking services between public and private sector banks, this study highlights a number of constraints that should be taken into account. Because the sample size and participant demographics may not be representative of the larger population of banking customers, the results may not be entirely generalisable. Furthermore, the study's geographic focus would limit its applicability because banking experiences can range greatly by area, with public and private sector banks in different regions having different policies and processes. Another drawback of the study is its time limits, which could prevent it from capturing long-term patterns or changes in consumer satisfaction and trust. The results can become out of date as new features and improvements are developed, considering how quickly digital banking technology is developing. Another drawback is the possibility of self-reporting inaccuracies, which could compromise the

accuracy of the data gathered since participants might answer biasedly or misunderstand the questions.

Future Research

In the context of A Comparative Analysis of Customer Trust and Satisfaction in Digital Banking Services: Public vs. Private Sector Banks, future research directions are suggested to examine how customer satisfaction and trust levels differ between digital banking services offered by public and private sector banks. It can be insightful to look into how elements like personalisation, the calibre of customer service, and technological innovation (such as chatbots, mobile apps, and AI-powered customer assistance) affect satisfaction and trust in both industries. The influence of consumer demographics, including age, income, and level of digital proficiency, on these perceptions must also be taken into account. It will also be crucial to investigate the regulatory distinctions between public and private banks and how they affect consumer confidence, data security, and privacy issues. Furthermore, it can be beneficial to investigate how external factors such as public perception, national banking regulations, and economic stability affect trust in digital banking services for each of these bank types.

Conclusion

In summary, a comparison of consumer happiness and trust in digital banking services shows that public and private sector banks have different preferences. The growing inclination towards digital banking is indicative of a transition from conventional to contemporary banking methods, as clients appreciate the ease, quickness, and accessibility provided by online banking systems. However, there are notable differences in the degrees of pleasure and trust across banks in the public and private sectors. Consumers frequently believe that private sector banks are more technologically sophisticated and provide more streamlined and customised online banking services. These banks are generally thought to be more creative and quick to embrace new technology, which improves client happiness. However, despite their progress in digital transformation, public sector banks frequently struggle with user experience, which can undermine consumer confidence and general happiness. It is evident that the ease and effectiveness of digital banking are the main factors driving the growing preference for it. Nonetheless, a key factor influencing client happiness is their level of confidence in the safety of online transactions. Consumers are more likely to completely adopt digital banking if they have faith in the security safeguards put in place by private sector banks.

Tables And Figures

Table 1: Table displaying Chi Square for Additional Bank Charges Regarding Gender. help in determining whether two variables have a significant link; a significant result is shown when the Pearson chi square significant value is less than 0.001, or 0.000**.

In this case, the Pearson Chi-Square value is 0.028, indicating a moderate level of significance.

	Equal variance assumed	Equal variance not assumed
Sig	0.001	
t	1.888	1.950
Sig (2-tailed)	0.061	0.053
Mean difference	-0.139	-0.139
Std error difference	0.074	0.071

Fig. 1: This simple bar graph represents the mean age by responses to the question "How long did it take to get your loan approved in a public bank?" with error bars representing ± 2 standard deviations and a 95% confidence interval.

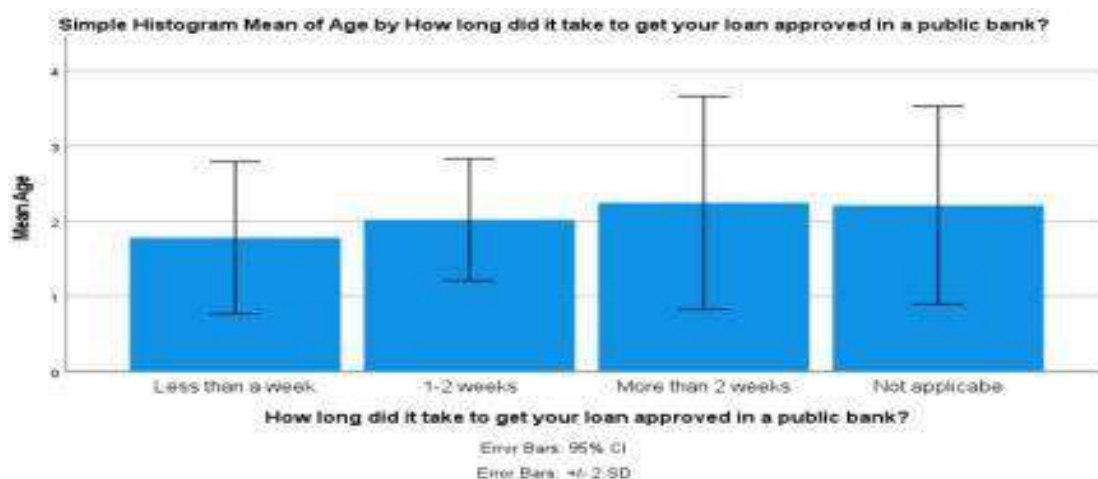
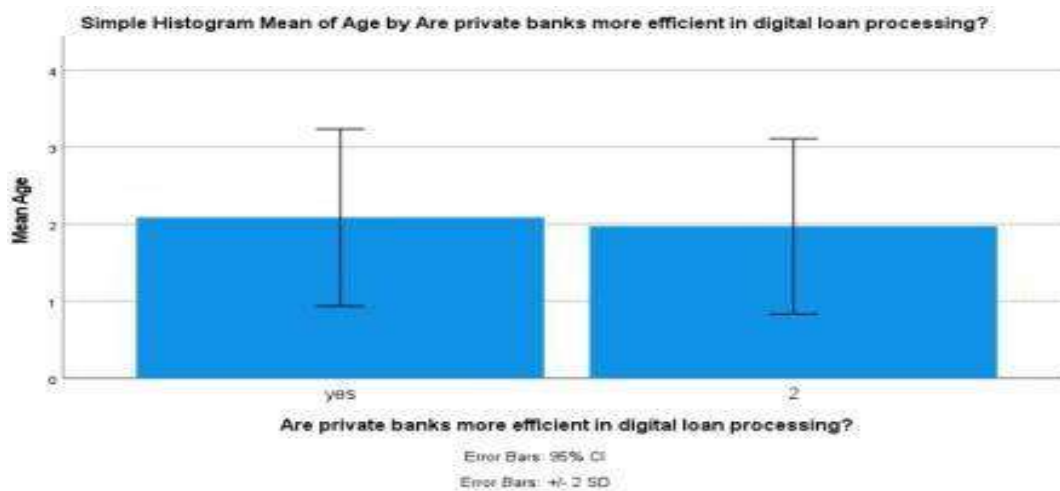


Table 2: Table displaying the results of an independent T test examines whether private banks are more efficient in digital loan processing. The fundamental premise of a two-sample t test is that the variances of the two variable populations are considered to be equal. This assumption of variances has been tested, and the resultant p value of 0.001 shows that the assumption of two variances being equal is met.

	Pearson chi square	Likelihood ratio	Linear by linear association
Value	^a 18.657	16.979	9.876
df	9	9	1
Sig (2-tailed)	0.28	0.49	0.002

Fig. 2: This simple bar graph represents the mean age by responses to the question "Are private banks more efficient in digital loan processing?" with error bars representing ± 2 standard deviations and a 95% confidence interval.



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A COMPARATIVE STUDY OF IMPACT OF DIGITAL MARKETING VS. PRINT ADVERTISING ON MOBILE ACCESSORIES SALES IN SRIPERUMBUDUR

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Abstract

Aim: - The efficiency of digital marketing and print advertising in rapidly reaching the target population during product debuts is compared in this study. It seeks to determine the most effective media, assess its benefits and drawbacks, and offer recommendations to marketers on how to optimize product launch strategies in Sriperumbudur. **Materials and methods:** - This study, conducted at Saveetha University, aimed to compare the reliability of TV channel and social media advertisements in the Sriperumbudur region. A sample size of 384 was determined using a sample calculator, with 192 respondents for each group (digital marketing and print advertising). Google Forms were used to collect data, which was then analysed using Microsoft Excel and SPSS software. **Conclusion** According to the survey's findings, print advertising have a greater impact on consumers' decisions to buy, even if digital marketing is seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on print advertising have a greater impact on their decisions to buy than advertisements on online This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use digital marketing to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

Introduction

This study examines the impact of digital marketing versus print advertising on mobile accessories sales in Sriperumbudur. In today's rapidly evolving marketing landscape, businesses are faced with the challenge of choosing the most effective channels to reach their target audience. Digital marketing and print advertising are two prominent channels used to promote mobile accessories, but their effectiveness varies. [\(Kennedy et al. 2025\)](#) This research aims to

provide insights into the impact of these two channels on sales, enabling businesses to make informed decisions about their marketing strategies and optimize their resources to maximize returns. ([Dhawankar 2020](#))

This study is crucial for businesses operating in the mobile accessories market in Sriperumbudur, as it provides valuable insights into the effectiveness of digital marketing and print advertising channels. By understanding the impact of these channels on sales, businesses can optimize their marketing strategies, allocate resources efficiently, and maximize returns on investment. ([Kennedy et al. 2025](#))

The aim of this study is to investigate and compare the impact of digital marketing and print advertising on mobile accessories sales in Sriperumbudur. Specifically, the study seeks to analyze the effectiveness of digital marketing channels such as social media, email marketing, and online advertising, versus print advertising channels such as newspapers, magazines, and billboards, in influencing consumer purchasing decisions and driving sales of mobile accessories ([Essman et al. 2025](#))

This study makes use of a number of tools, such as statistical analysis software (e.g., SPSS), survey software (e.g., Google Forms), and social media analytics tools (e.g., Hootsuite Insights, Facebook Insights), to examine consumer behavior and find reliable digital marketing and print advertising

Limited comparative studies, reliance on quantitative data, focus on younger demographics, insufficient investigation of influencer marketing and user-generated content, and a lack of cultural and regional insights are some of the gaps in the current research on analyzing consumer behavior and reliable advertisement between digital marketing and print advertising in Sriperumbudur region. The department has given us advice on how to prepare the research article, examine SPSS software, and fix mistakes. This type of direction enables us to complete the content accurately and on schedule. To find out which medium is more trusted by customers in the Sriperumbudur region, this study compares and analyses consumer behavior in identifying reliable advertisements across digital marketing and print advertising

Key words: - consumer behavior, social media marketing, TV advertisement, reliability, digital advertisement, influencer marketing

Materials And Methods

This study, which was carried out at the Saveetha College of Liberal Arts and Sciences at Saveetha University, used a combination of techniques to examine consumer behavior in order to compare the reliability of advertisements on digital marketing and print advertising in the

Sriperumbudur region. Since this study is focused on the marketing domain, ethical approval is not necessary. The two groups under comparison in this study are TV channels and social media platforms. Because of the large population in the Sriperumbudur region, a sample calculator is used, and the estimated sample size for this study is 384.

Since gathering public reviews is a key component of this study, Google Forms is essential. For group 1 (Digital marketing), a sample size of 192 is prepared, and Google Forms are made and distributed to respondents who are the best candidates for these structured questionnaires in order to get precise and lucid answers. A total of 192 people make up the sample size for group 2 (Print advertising), and Google Forms are made and distributed to respondents who find television commercials credible.

In order to build up the test, useful information is gathered from the general public using Google Forms, Microsoft Excel, and SPSS software. and the test process involved classifying the answers and arranging them for the comparative study of the two media, namely TV channels and social media sites. Optimized for mobile devices Multiple-choice questions, such as those about customer engagement, preference influence, and trustworthiness, are collected using Google Forms.

Statistical Analysis

The statistical analysis is conducted by SPSS (IBM version 27), utilizing sample tests such as independent sample t-tests, chi-squares, and correlations. These methods are essential for determining the consumer behavior that dictates which medium—such as TV channels or social media platforms—provides a trustworthy advertisement. In addition to the chi-square test, which allows for the determination of which factors influence consumer preferences, the independent sample test is used to investigate the advertisement's trustworthiness. Additionally, correlation is used to determine consumer engagement by comparing the two media, such as TV channels and social media platforms. P-values and the statistical result provide insight into the significance of these analyses.

Result

Table.1 provides more evidence for this by describing, using the independent sample T test, TV ads provide higher credibility and trustworthiness than social media promotions, the t value is 0.91 and the significant value of $p=0.852(<0.005)$

Table.2 clarifies the result of chi-square test on social media ads influence me to purchase product compare to TV ads, with a significant value of $p=0.713(<0.005)$

Table.3 clarifies the result of correlation on the interactive nature of social media enhance customer engagement more than TV ads, with a significant value of $p = 0.582 (< 0.005)$

Figure.1 shows these different graphically as a bar graph with a 95% confident interval level and the simple mean of age on count of TV ads provide higher credibility and trustworthiness than social media promotions, along with a ± 2 standard deviation.

Figure.2 shows these different graphically as a bar graph with a 95% confident interval level and the simple mean of occupation on count of social media ads influence me to purchase product compare to TV ads, along with a ± 2 standard deviation.

Figure.3 shows these different graphically as a bar graph with a 95% confident interval level and the simple mean of age on count of the interactive nature of social media enhance customer engagement more than TV ads, along with a ± 2 standard deviation.

Discussion

Table.1 Independent sample T test result shows a major age - TV ads provide higher credibility and trustworthiness than social media promotions. Since the p-value (0.928) is greater than 0.05, we fail to reject the null hypothesis. This means there is no statistically significant difference in the average age between the two groups. This illustrates how age affect the TV ads provide higher credibility and trustworthiness than social media promotions

Table.2 chi-square test result shows a major occupation- social media ads influence me to purchase product compare to TV ads. since the p-value (.713) is greater than 0.05. We fail to reject the null hypothesis. There is no statistically significant linear association between the two ordinal variables. This illustrates how occupation affect the social media ads influence me to purchase product compare to TV ads

Table.3 correlation test result shows a major age- the interactive nature of social media enhances customer engagement more than TV ads. Since the p-value (.582) is greater than 0.05 (the typical significance level), we fail to reject the null hypothesis. This means there is no statistically significant linear relationship between "Age" and "- the interactive nature of social media enhance customer engagement more than TV ads ". This illustrates how age affect the interactive nature of social media enhances customer engagement more than TV ads

Limitation

There are various restrictions on this study. It is restricted geographically to the Sriperumbudur area, which might not be typical of the total population. Additionally, the sample size can be small, which would limit how broadly the results can be applied. The validity of the results may



also be impacted by respondent bias and the limits of social media platforms. The study might overlook other digital marketing and print advertising sites in Favor of concentrating just on a few. The accuracy and dependability of the study may also be impacted by constraints on data collecting, cultural and demographic constraints, and time constraints.

Future Scope

This subject has a broad and exciting future. Future studies can investigate consumer behavior in other places by extending the geographic scope outside the Sriperumbudur region. For a more thorough understanding, the study can also be repeated across several demographics, including age, income, and education. In order to present a comprehensive picture of consumer behavior, the study can also include other media outlets including influencer marketing, podcasts, and radio. To investigate how consumer behavior evolves over time, longitudinal studies can also be carried out. Additionally, the results of the study can be utilized to create consumer-resonant advertising campaigns and targeted marketing strategies.

Tables And Figures

Table.1 **INDEPENDENT SAMPLE TEST**

	Equal variances assumed	Equal variances not assumed
Sig	0.852	
t	0.091	0.091
Sig.(2-tailed)	0.928	0.928
Mean different	0.21	0.21
Std error difference	0.236	0.237

Table.2 **CHI-SQUARE**



	Value	df	Asymptotic Significance (2-sided)
Pearson chi-square	18.981 ²	16	0.270
Likelihood ratio	19.527	16	0.242
Linear-by-Linear association	0.135	1	0.713
N of valid cases	140		

Table.3

CORRELATION

		Age	The interactive nature of social media enhances customer engagement more than TV ads
Age	Pearson correlation	1	0.047
	Sig(2-tailed)		0.582
	Sum of squares and	187.543	8.171



	Cross-products		
	covariance	1.349	0.059
	N	140	140
The interactive nature of social media enhances customer engagement more than TV ads	Pearson correlation	0.047	1
	Sig(2-tailed)	0.582	
	Sum of squares and Cross-products	8.171	161.686
	covariance	0.059	1.163
	N	140	140

Figure.1

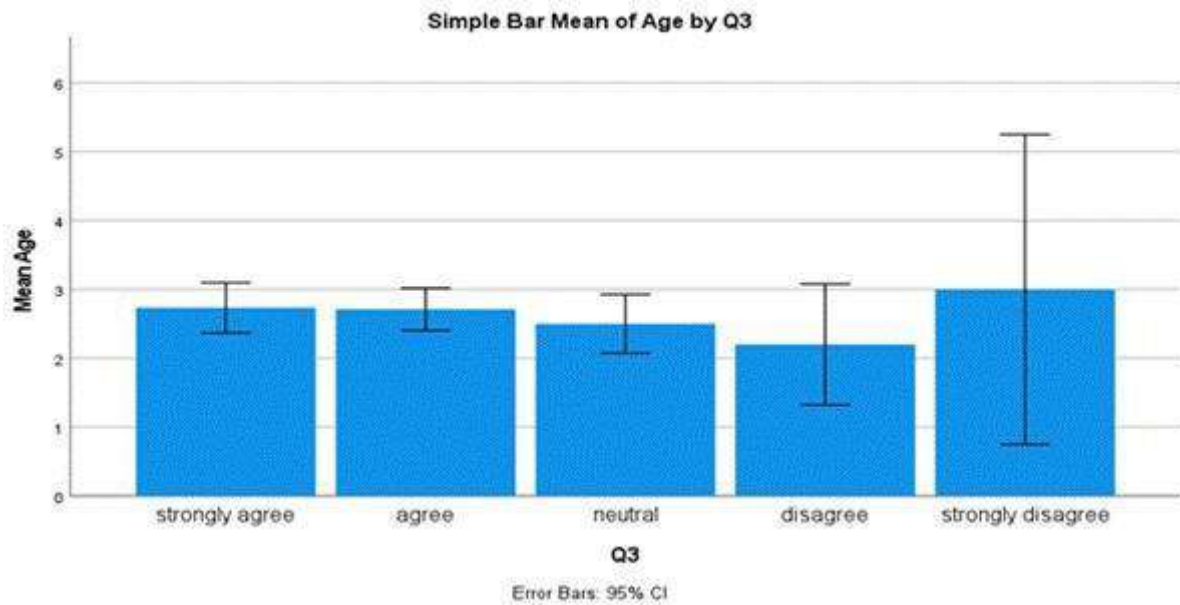


Figure.2

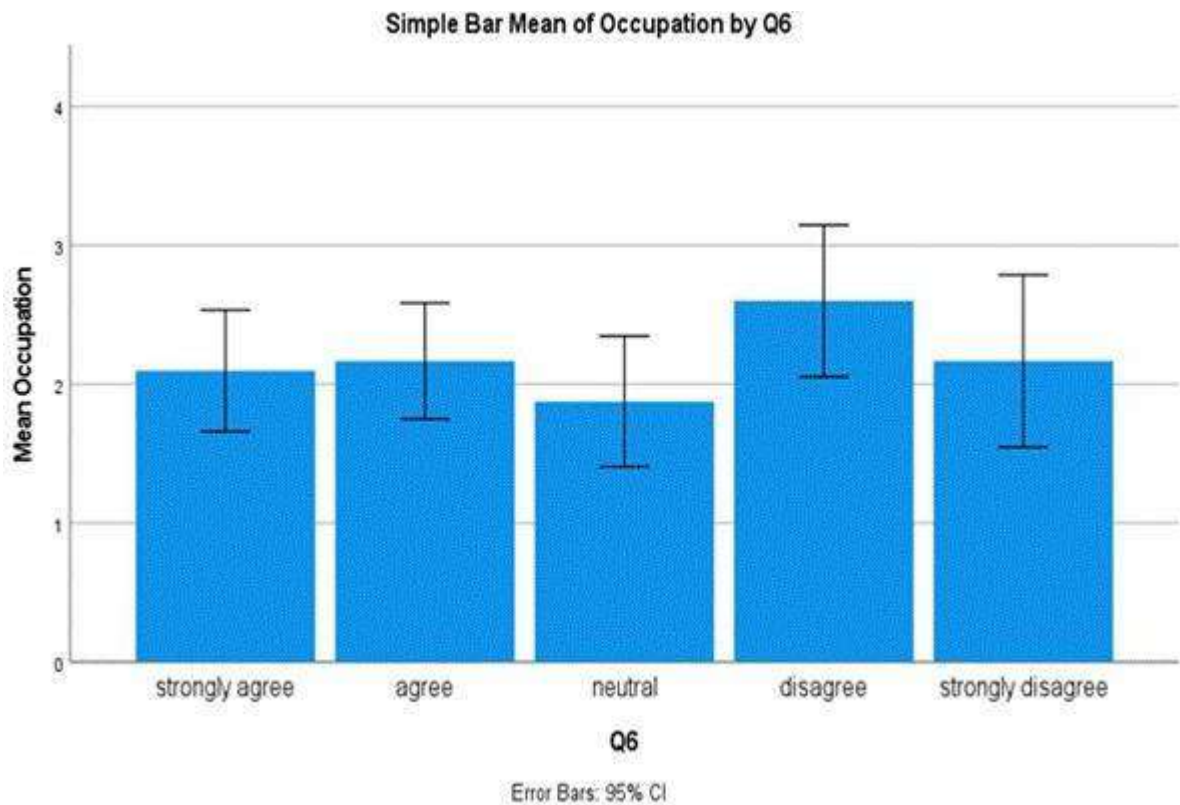
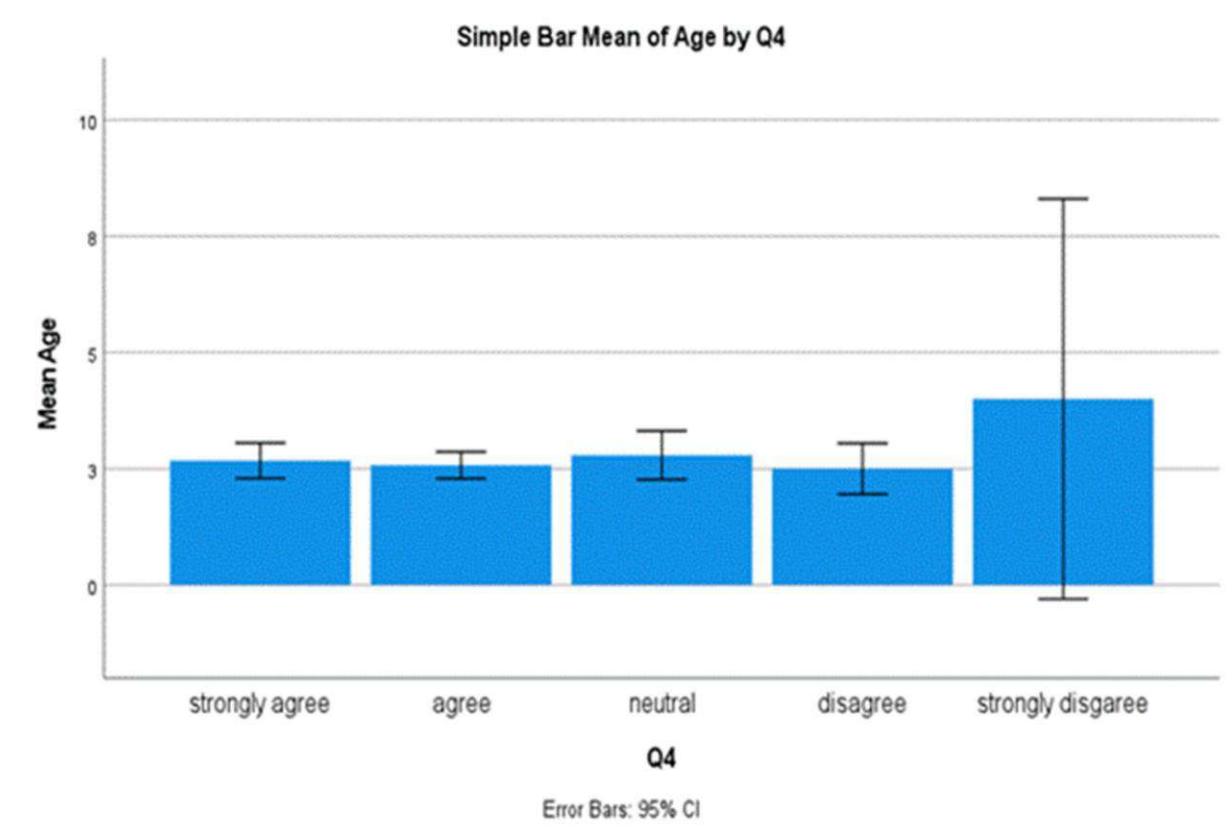


Figure.3



Conclusion

According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if digital marketing and print advertising are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on print advertising have a greater impact on their decisions to buy than advertisements on online. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use online advertising increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

References

1. [\(Kennedy et al. 2025\)](#)
2. [\(Essman et al. 2025\)](#)



3. ([Kennedy et al. 2025](#))

4. Vaughan et al. 2025)

5. ([Dhawankar 2020](#))

MACHINE LEARNING IN FINANCIAL FORECASTING: OPPORTUNITIES AND CHALLENGES

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Abstract

AIM In contrast to conventional approaches, this study examines how AI-driven recruitment platforms affect organizational hiring expenses. The study uses a mixed-methods approach, integrating qualitative information from semi-structured interviews with quantitative data from surveys of recruiting managers and HR experts. In addition to examining the perceived advantages and difficulties of both recruitment strategies, this data is examined to evaluate cost parameters including time-to-hire, cost-per-hire, and administrative overhead. **MATERIALS AND METHODS:** To acquire thorough data on recruitment expenses and perceptions, the study combines surveys, interviews, and secondary data analysis. While qualitative data is analyzed using thematic analysis to find important themes and patterns in perceptions and experiences, quantitative data analysis compares cost metrics between AI- driven and conventional approaches using t-tests and ANOVA. **CONCLUSION** According to the study's findings, implementing AI-driven hiring practices would not always result in significant cost savings, and more investigation is required to completely comprehend how AI affects hiring results outside of financial concerns. In order to validate and build upon these findings, future research with bigger and more diverse samples may be necessary. The study's shortcomings, such as its dependence on self-reported data and the possibility of sample size constraints, are noted.

Key Words : AI , Machine learning (ML) , Cost , Recruitment/Hiring , Age , Data , Financial Traditional , Significant , Analysis

Introduction

In financial forecasting, machine learning (ML) is the process of analyzing past data and predicting future financial patterns, such as stock prices, market activity, or economic indicators, (Baumohl 2005) the paper showed about the secrets of economic indicators in using



statistical models and algorithms. More accurate forecasts than using conventional forecasting techniques are made possible by machine learning (ML), ([Burkov 2019](#)) the paper showed about a hundred pages of machine learning study. which uses techniques like regression, classification, and clustering to identify patterns in large datasets. The use of machine learning in fields like fraud detection, risk management, and investing strategies has grown significantly as financial markets become more intricate and data- driven. ([Redman 2008](#)) the paper show that the profit from your most important business assets.

Machine learning (ML) is the process of evaluating historical data and applying statistical models and algorithms to estimate future financial patterns, ([Baumohl 2005](#)) the paper shows that such as stock prices, market activity, or economic indicators. Machine learning (ML), which uses methods like regression, classification, and clustering to find patterns in massive datasets, ([Unwin et al. 2007](#)) the paper shows graphics of large datasets visualizing a million. enables more accurate projections than traditional forecasting techniques. As financial markets become more complex and data-driven, machine learning has becoming Machine increasingly used in domains such as risk management, investing techniques, and fraud detection. Machine learning has a wide range of revolutionary applications in financial forecasting.

Important fields include credit scoring, where machine learning increases the precision of determining a person's creditworthiness, ([Vardi 2022](#)) the paper shows the creditworthiness and responsible credit . Algorithmic trading, where ML models execute trades quickly based on data-driven predictions. ML is also frequently utilized in risk assessment in portfolio management, fraud detection, and transaction monitoring for irregularities. Another crucial application is sentiment analysis, ([Tiwari et al. 2025](#); [Chart-Pascual et al. 2025](#)) understanding social media discourse on antidepressant. In which machine learning algorithms analyze financial news, reports, and social media to estimate market sentiment and forecast price changes. Throughout the financial sector, these applications improve decision- making, ([Redman 2008](#)) the paper profiting from your most important business assets. Lower expenses, and increase operational efficiency.

Materials And Methods

Locate the materials and methods for this subject in this manner. Using a mixed-methods approach, this comparative analysis will look at how AI-driven recruiting systems compare to traditional approaches in terms of their effects on organizational recruitment expenses. Quantitative data will be gathered through surveys administered to HR professionals and hiring managers at businesses that utilize both traditional and AI-driven recruitment methods. These

surveys will collect information on key cost factors, including time-to-hire, cost-per-hire, administrative overhead, and candidate sourcing expenses. To support this primary data, secondary data will be collected from publicly available sources, such as industry reports, case studies, and scholarly publications. This integrated quantitative data collection will provide a thorough view of the cost-related components of both hiring techniques.

To provide more in-depth understanding and context, qualitative data will be gathered through semi-structured interviews with the same recruiting managers and HR specialists who were surveyed for quantitative data. These interviews will look at their experiences with AI-driven and traditional recruitment methods, with a focus on perceived benefits and challenges, impacts on the effectiveness and efficiency of the hiring process, perceived cost savings (or lack thereof), and factors influencing the decision to use AI-driven systems. The interview transcripts will be subjected to thematic analysis in order to find recurrent themes and patterns pertaining to these subjects, offering a more nuanced comprehension of the actual workings of each hiring strategy.

A comprehensive cost-benefit analysis will be conducted using the collected quantitative and qualitative data. This study will evaluate the costs and benefits of AI-driven hiring systems versus traditional methods, accounting for both the direct financial expenses and the indirect effects on efficiency and efficacy. The study identifies a few potential limitations, including a potentially small sample size that could impair generalizability, a dependence on self-reported data that could introduce bias, and a focus on cost-benefits that could mask other important factors like candidate quality or diversity outcomes. Every aspect of the research will be conducted ethically, ensuring participant anonymity and data confidentiality.

Statistics Analysis

locate the STATISTICS ANALYSIS as follows: SPSS will be utilized for statistical analysis on this subject. Cost metrics (time-to-hire, cost-per-hire, administrative overhead, and sourcing costs) will be compared between businesses that use AI-driven systems and those that employ traditional methods using an Independent Samples t-test. This test will determine whether the differences between the two groups are statistically significant. A Paired Samples t-test will be used to compare cost metrics before and after the adoption of AI for firms that have transitioned from traditional methodologies to AI-driven systems in order to assess the impact of the change within the same firm. If the study includes more than one category of AI implementation, ANOVA will be used to examine cost metrics across different AI adoption levels. If the study includes more than one type of AI implementation (e.g., basic AI screening, advanced AI matching, AI-powered interviewing), ANOVA will be used to examine cost metrics across different AI adoption levels. A significant ANOVA result will be followed by post-hoc testing to

determine which specific AI implementation categories differ significantly from one another. These studies will provide a statistical basis for evaluating the relative cost-effectiveness of AI-driven hiring systems vs traditional methods.

Results

Table: 1 Since the Sig. (2-tailed) values (0.398 and 0.429) are more than 0.05, the Independent Samples Test indicates that there is no statistically significant difference between the groups. AI-driven and conventional recruitment techniques may not have significantly different effects on hiring prejudice and diversity, as seen by the mean difference of -0.204, which indicates a slight influence but is not statistically significant.

Table: 2 With a sample size of 106, the table shows a statistically significant negative correlation (-.194, $p = .047$) between age and the way financial institutions handle regulatory and compliance issues. This suggests that as people age, their perception of the effectiveness or strategy used to address these issues tends to decline.

Table: 3 The mean age of the two groups under comparison does not differ statistically significantly ($F(1, 104) = 3.508$, $p = .064$), according to the ANOVA test. Consequently, it is likely that the observed age disparities between the groups are the result of pure chance.

Fig : 1 There is no discernible trend or significant variation in the mean age among the various levels of agreement with the advantages of machine learning in finance, as seen in the chart. The overlapping ranges shown by the error bars, which represent 95% confidence intervals and ± 2 standard deviations, imply that opinions of the advantages of machine learning are not much correlated with age.

Discussion

Table: 1 Equal variances cannot be assumed since the Sig. value (0.030) under "Equal variances assumed" is less than 0.05. The two groups do not appear to vary statistically, though, as indicated by the t-values (-0.848 and -0.796) and the Sig. (2-tailed) values (0.398 and 0.429), both of which are greater than 0.05. Although it is not significant, the Mean Difference (-0.204) suggests a slight variation in group means. The observed difference may be the result of random chance rather than a significant influence, as further evidenced by the high standard error (0.241 and 0.257).



Table:2 The table shows that age and the perceived efficacy of financial institutions' handling of regulatory and compliance concerns are statistically significantly correlated, albeit weakly (-0.194 , $p < 0.05$). This suggests that older respondents have a tendency to give financial organizations a worse rating for how they handle these issues. Although there is a substantial association, the relatively low coefficient indicates that only a tiny amount of the diversity in opinions of regulatory and compliance measures can be explained by age.

Table: 3 According to the ANOVA, there is a nearly significant age difference between the groups ($F(1, 104) = 3.508$, $p = .064$). A trend rather than a conclusively statistically significant result is indicated by the p-value, which is near but falls short of the significance threshold of 0.05. This implies that although age differences between the groups might exist, the apparent difference might just be the result of chance. A bigger sample size and additional research could help determine whether this trend is consistent.

Limitation Of The Study

This research is subject to several limitations. Reliance on self-reported data from HR professionals and recruiting managers increases the risk of biases because their judgments may not correctly reflect actual process improvements or cost reductions. The sample size may limit the findings' generalizability to different industry contexts or larger demographics, even though it may be enough for some investigations. Other potentially significant factors, like diversity outcomes, candidate quality, and long-term effects on employee retention or performance, are overlooked when the focus is on cost-benefits. Furthermore, findings may become outdated as soon as new tools and applications are created because to the rapid advancement of AI technology. Finally, by underrepresenting the complexity of hiring practices, the study's scope may simplify the relationships between various factors influencing cost and efficiency.

Conclusion

Although the graphical data indicates a potential negative link between age and agreement with AI's benefits in recruitment (optimizing job ads), the overlapping confidence intervals raise questions about the statistical significance of these associations. Statistical tests that reveal no appreciable age differences between groups or between individuals before and after AI installation support this. This implies that age is not the main factor influencing perceptions of AI's potential to reduce hiring expenses. This finding is moderated by the study's limitations, which include sample size constraints, potential self-reporting biases, and the exclusion of non- cost-related factors. More research with larger, more diverse sample sizes and objective

performance standards is needed to confirm these findings and provide a more complete picture of AI's true impact on recruiting.

Tables And Figures

Table: 1 This indicates that there is no statistically significant difference between the two groups because the Sig. (2-tailed) values (0.398 and 0.429) are greater than 0.05. The minor mean difference (-0.204) and negative t-values (-0.848 and -0.796) indicate only a slight variance, suggesting that the effects of AI-driven and traditional recruitment methods on hiring bias and diversity are not statistically different.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	0.030	
t	-0.848	-0.796
Sig. (2-tailed)	0.398	0.429
Mean Difference	-0.204	-0.204
Std. Error Difference	0.241	0.257

Table: 2 Age and how financial institutions handle regulatory and compliance issues have a statistically significant, weak negative correlation (-.194, $p=.047$), according to the table. This suggests that as people get older, the perceived efficacy of these institutions' strategies somewhat declines, though the correlation is not very strong. A sample size of 106 is used to calculate this connection.

Correlations



		Age	How do financial institutions address regulatory and compliance
Age	Pearson Correlation	1	-.194*
	Sig. (2-tailed)		.047
	N	106	106
How do financial institutions address regulatory and compliance	Pearson Correlation	-.194*	1
	Sig. (2-tailed)	.047	
	N	106	106
*. Correlation is significant at the 0.05 level (2-tailed).			

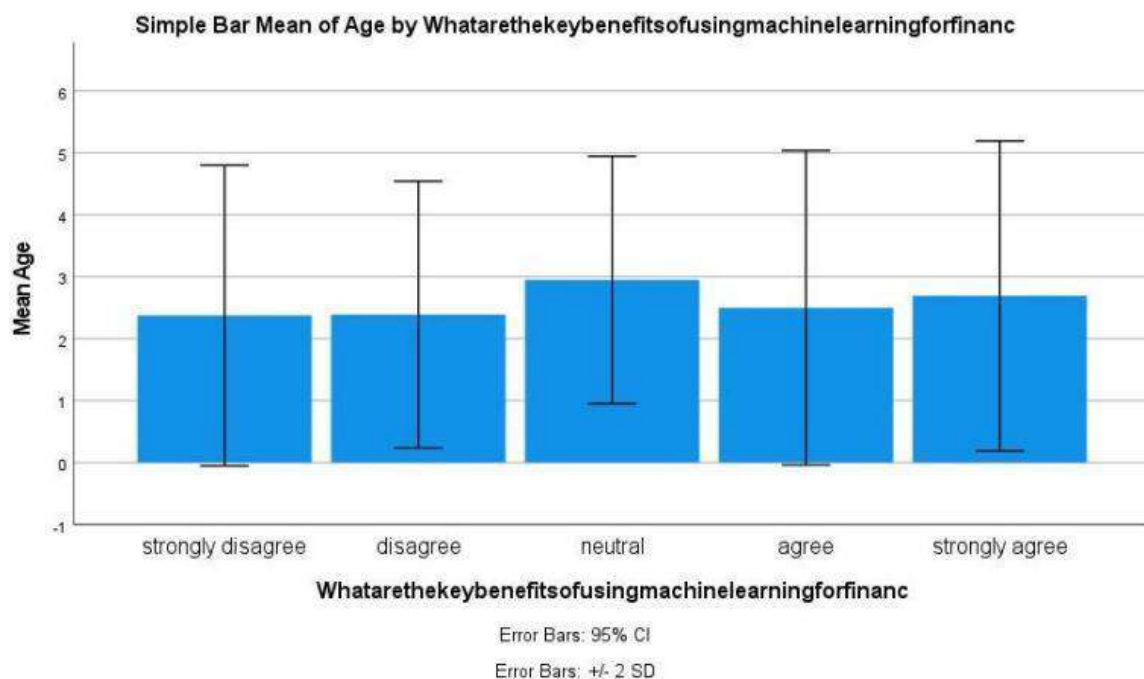
Table :3 There is no statistically significant age difference between the two groups under comparison, according to the ANOVA table ($F(1, 104) = 3.508, p = .064$). Despite indicating a trend, the F-statistic falls short of the traditional significance criterion of 0.05. As a result, the observed variations in the groups' mean ages are most likely the result of chance.

ANOVA					
Age					
	Sum of Squares	df	Mean Square	F	Sig.
Between	4.580	1	4.580	3.508	.064



Groups				
Within Groups	135.769	104	1.305	
Total	140.349	105		

Fig: 1 There is no discernible difference in the mean age between the various agreement levels about the advantages of machine learning in finance.



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- <https://paperpile.com/c/0e4BCV/sQqU>
- <https://paperpile.com/c/0e4BCV/MEGl>
- <https://paperpile.com/c/0e4BCV/Dhw3>



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COMPARATIVE STUDY ON THE EFFECTIVENESS OF SOCIAL MEDIA MARKETING VS TRADITIONAL MARKETING IN PROMOTING E COMMERCE BRANDS

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Abstract

Aim: This study analyzes the efficacy of traditional marketing versus social media in promoting e-commerce firms, with an emphasis on sales conversion, consumer interaction, brand awareness, and trust. In the digital age, it assesses ROI, response trends, and consumer behavior to identify the best course of action. **Materials and Methods:** A quantitative method was employed, and 136 internet users answered a structured Google Forms survey about satisfaction, loyalty, and brand trust. Pearson's correlation, multiple regression, reliability testing, and descriptive statistics were used in SPSS (version 27) after the data had been cleaned in Excel. Accurate data and anonymity were guaranteed. **Results and Discussion:** Research shows that social media marketing works better than traditional marketing in increasing e-commerce brand loyalty and consumer retention by utilizing interactive participation and tailored rewards. ANOVA ($F = 2.351$, $p = 0.057$) revealed the difference was not statistically significant, but an Independent Samples T-Test ($p = 0.033$) validated its efficacy. According to correlation analysis, neither technique was preferred based on age ($r = 0.143$, $p = 0.098$). **Conclusion:** Compared to traditional marketing, social media marketing improves brand visibility, engagement, and tailored interactions.

Introduction

This study analyzes the efficiency of social media marketing vs traditional marketing in promoting eCommerce brands. Traditional marketing relies on TV, radio, and print media, but social media marketing makes use of sites such as Facebook and Instagram for targeted ads and direct involvement (Plume, Dwivedi, and Slade 2016). The study assists firms in determining which strategies attract more customers and increase brand loyalty (Martínez-López and Martinez 2022). eCommerce businesses can improve their marketing strategy for development and success

by analyzing both techniques. It gives information about cost-effectiveness, audience reach, and return on investment, allowing for improved budget allocation(Rana et al. 2019).

Social media marketing and traditional marketing are both critical for promoting eCommerce brands by raising brand awareness, consumer engagement, and sales. Social media marketing makes use of networks such as Facebook, Instagram, and YouTube to allow for real-time connection, personalized content, and direct customer contact(Weinberg 2009) . It assists brands in establishing a strong online presence, cultivating loyalty, and creating a community around their products. Social media also enables targeted advertising and feedback collection, making it a cost-effective method(Ryan and Jones 2012). Traditional marketing, such as television, radio, newspapers, and billboards, continues to be useful in reaching a large audience and building credibility(Ryan and Jones 2012). It assures widespread exposure and brand recall, making it advantageous for firms targeting varied populations.

A study comparing the efficiency of social media marketing and traditional marketing in promoting eCommerce brands investigates how the two tactics affect brand visibility, consumer engagement, and sales growth(Frederiksen, McVey, and Montgomery 2012). Social media marketing uses sites such as Facebook, Instagram, and Twitter to develop focused campaigns featuring tailored promos, interactive content, and direct customer contact. Influencer partnerships, paid marketing, and community-driven interactions all contribute to increase brand trust and loyalty(Rakhunde 2023). Traditional marketing, on the other hand, uses tried-and-true tactics like television, radio, print media, and outdoor advertising to reach a larger audience and create credibility. Furthermore, traditional digital marketing strategies such as search engine marketing (SEM), email campaigns, and banner ads help to retain brand visibility through regular promotions, newsletters, and product recommendations(Yesiloglu and Costello 2020) .

Keywords: Social Media Marketing, Traditional Marketing, eCommerce Brands, Brand Promotion, Digital Marketing, Consumer Engagement, Customer Retention, Brand Visibility, Marketing Effectiveness, Comparative Analysis.

Material And Methods:

This study used a quantitative research methodology to assess the efficiency of social media marketing and traditional marketing for promoting eCommerce firms. A structured survey was created to obtain primary data from 156 internet users representing various demographics. The poll included closed-ended questions and Likert scale items to assess consumer impressions of both marketing techniques, with an emphasis on critical factors such as brand trust, customer satisfaction, and brand loyalty. Data was collected using Google Forms, which ensured easy access across platforms such as mobilephones, laptops, and desktop computers. The collected replies were initially cleaned and organized in Microsoft Excel before being statistically

analyzed in SPSS. Descriptive analysis, reliability testing, Pearson's correlation, and multiple regression analysis were utilized to investigate the impact of both marketing strategies on consumer preference and engagement.

Statistical Analysis:

IBM SPSS software was used to perform statistical analysis in a comparative study of the efficiency of social media marketing against traditional marketing in promoting eCommerce brands. The study sought to investigate the relationship between consumer retention and a preference for social media marketing over traditional marketing. Various statistical tests, such as the Independent Sample T-Test, Correlation Analysis, and One-Way ANOVA, were used to investigate various elements of customer behavior and marketing efficacy. The One-Sample T-Test was used to get the average consumer perception ratings for both marketing strategies. Correlation analysis examined the relationship between customer demographics (age, gender, income level) and their preference for social media marketing over traditional marketing. To gain descriptive insights, group statistics such as mean, standard deviation, and response distribution. Statistical relevance was determined using a significance level of 1% ($p < 0.01$) and 5% ($p < 0.05$). Customer happiness, purchasing frequency, and brand loyalty were among the dependent variables, whereas demographics and type of marketing exposure were considered independent variables.

Result And Discussion:

TABLE 1: The Independent Samples T-Test results show that there is a statistically significant difference between social media marketing and traditional marketing for boosting eCommerce brands. Because the p-value (0.033) is less than 0.05, the difference is significant, indicating that one method—most likely social media marketing—is more effective.

TABLE 2: The ANOVA test findings compare the efficiency of social media marketing vs traditional marketing in boosting eCommerce brands. The F-value (2.351) reveals some variance between the groups, but the significance value ($p = 0.057$) is somewhat higher than the conventional threshold of 0.05, indicating that the difference is not statistically significant at the 5% level. This means that, while there may be a trend showing differences in performance.

FIG1: The bar chart depicts the mean age distribution of respondents who agreed with the assertion that social media marketing is more cost-effective than traditional marketing for eCommerce firms. The y-axis shows the average age, while the x-axis shows replies ranging

from Strongly Agree to Strongly Disagree. Error bars represent 95% confidence intervals and ± 2 standard deviations, indicating response variability.

FIG2: The bar chart depicts the average age distribution of respondents based on their view of how effective social media marketing is compared to traditional marketing in raising brand awareness for eCommerce firms. The y-axis indicates the average age, and the x-axis categorizes comments from Strongly Agree to Strongly Disagree. The error bars represent 95% confidence intervals and ± 2 standard deviations, demonstrating response variability..

Limitation Of The Study:

The study's drawbacks include a very small sample size of 136 individuals, which may limit the findings' applicability to a larger eCommerce consumer base. The study is based on self-reported data, which may be influenced by biases such as social desirability or recall mistakes, reducing the validity of results. Furthermore, the research focuses on consumer retention rather than acquisition, ignoring an important part of marketing efficacy. The dynamic nature of digital marketing trends and changing consumer preferences present a difficulty, as conclusions may become obsolete over time. Furthermore, external factors such as economic conditions, rival strategies, and brand reputation, which can all have a considerable impact on marketing efficacy, were not fully examined in the investigation.

Further Research :

Further research could include expanding the survey to a larger demographic and geographic audience to improve the findings' generalizability. Future research can include qualitative approaches, such as interviews or focus groups, to acquire a better understanding of consumer motives and emotional responses to various marketing tactics. Furthermore, researchers can look into the long-term effects of social media and traditional marketing on brand loyalty and consumer lifetime value. The incorporation of advanced analytics, such as artificial intelligence and machine learning, can improve our understanding of customer behavior and advertising efficacy. Future research could investigate the impact of developing digital marketing trends, such as influencer marketing, virtual reality advertising, and tailored AI-driven marketing, on Ecommerce brand promotion. Finally, researching the influence of economic situations, cultural variations, and industry-specific elements in affecting marketing performance can give firms with more in-depth information.

Table And Figure:

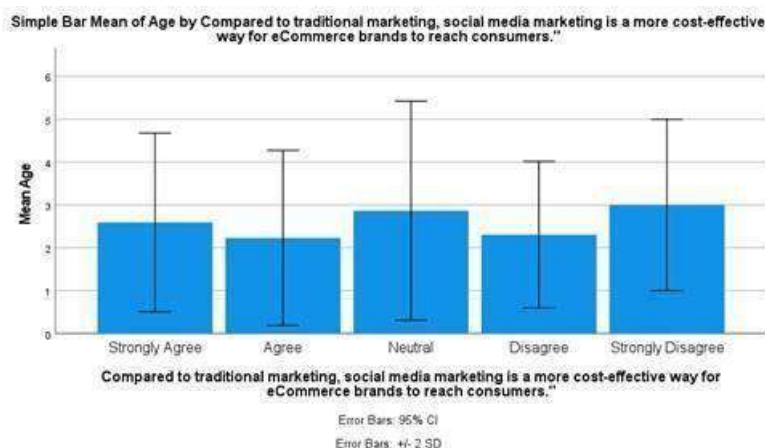
Table 1: Independent T -Test



	Equal variance assumed	Equal variance not assumed
Sig	<.001	
t	2.151	2.161
Sig (2 tailed)	.033	.033
Mean difference	2.58	1.288
Std error difference	.155	.114

The two groups under comparison differ statistically significantly, according to the findings of the independent samples t-test. Sig. or Sig. (2-tailed)) p-values for the "equal variance assumed" and "equal variance not assumed" tests were both less than the standard alpha threshold of 0.05, at.033. This suggests that it is improbable that the observed mean difference happened by accident

FIGURE 1:



The average age of those with differing views on whether social media marketing is more economical than traditional marketing for eCommerce is displayed in this graph. The average



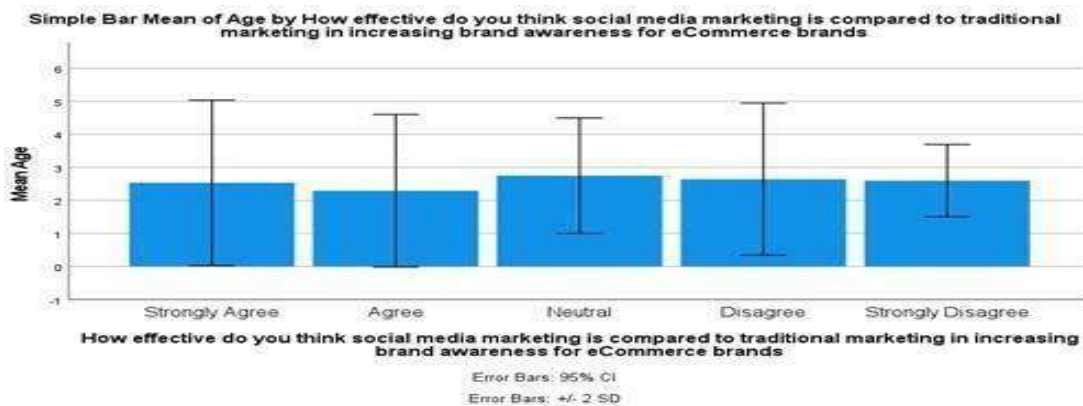
age is largely constant across all viewpoints, indicating that age has little bearing on people's perceptions of how cost-effective social media marketing is.

Table 2 Anova:

	BETWEEN GROUPS	WITHIN GROUPS
MEAN SQUARE	2.500	2.351
F	2.351	
Sig.	.057	

The ANOVA results show that although the mean scores of the groups differ ($F = 2.351$, Mean Square Between Groups = 2.500, Mean Square Within Groups = 2.351), this difference is not statistically significant at the standard alpha level of 0.05 ($\text{Sig.} = 0.057$), indicating that the observed variation may be the result of chance.

FIGURE 2:



The graph displays the average age of participants across various opinions regarding the relative merits of social media marketing and traditional marketing. Based on how people perceive the efficacy of social media marketing, there is no discernible age difference, as the mean ages for each category are similar (between 2.3 and 2.8), with overlapping confidence intervals.

Conclusion:

To conclude that the social media marketing is more effective than traditional marketing in promoting eCommerce firms because it encourages greater engagement, individualized interactions, and enhanced brand visibility. The data show that social media marketing improves

client retention through interactive content, customized promotions, and direct communication, but traditional marketing approaches like banner ads and email campaigns tend to have lesser engagement due to their generic approach. Statistical evaluations reveal a strong link between social media marketing methods and customer happiness, purchasing frequency, and brand loyalty. However, the study acknowledges limitations such as the changing digital world, sample size constraints, and the absence of external factors impacting consumer behaviour.

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COMPARATIVE STUDY OF SOCIAL MEDIA ADVERTISING VS. TRADITIONAL DIGITAL ADS IN ONLINE SHOPPING CUSTOMER RETENTION

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Abstract

Aim: The research seeks to compare social media marketing and conventional digital advertisements in retaining online shopping customers. It aims to determine which approach is more efficient in improving customer engagement and satisfaction. The study will assess the impact of tailored content and engaging advertisements. Moreover, it will evaluate the influence of both advertising methods on brand loyalty and enduring customer connections. **Materials and Methods:** This study utilized a quantitative method to evaluate the effect of social media promotions versus conventional digital advertisements on customer retention in e-commerce. The data was arranged in Microsoft Excel and examined with SPSS for descriptive statistics, reliability assessments (Cronbach's Alpha), correlation (Pearson's correlation), and multiple regression analysis. The results were depicted using charts and tables, offering insights into the impact of both advertising strategies on customer trust, satisfaction, and brand loyalty. **Results and Discussions:** The study shows that advertising on social media is more successful in retaining online shopping customers compared to conventional digital advertisements. Social media advertisements utilize tailored content, engaging interactions, and focused promotions, enhancing customer relationships. Conversely, conventional digital advertisements such as banner ads or email campaigns exhibit reduced engagement because of restricted interactivity and generic messaging. **Conclusion:** The research finds that social media advertising is more effective for customer retention compared to traditional digital ads because of its engaging and tailored characteristics. Nonetheless, both approaches offer distinct advantages when utilized together efficiently..

Introduction

Social media advertising and conventional digital ads are two key marketing methods utilized to promote products and services in the online environment. (*Social Media Advertising vs. Traditional Digital Ads in Online Shopping Customer Retention*, n.d.) Advertising on social media entails promoting content via platforms such as Facebook, Instagram, Twitter, and LinkedIn, where brands utilize user information to target



particular audiences based on demographics, interests, and behaviors.(Gutierrez Pineda et al. 2025) It enables direct communication, tailored content, and immediate interaction with customers..(Żyminkowska 2019)

Both social media advertising and conventional digital ads are crucial in influencing customer retention within the online retail sector. (Żyminkowska 2019; Sandhu and Kamaljeet 2020)These promotional techniques are crucial for fostering brand recognition, appealing to potential clients, and sustaining long-lasting customer connections. (Kaufman et al. 2025)Social media advertising holds significant importance because of its interactive qualities, enabling brands to directly connect with customers, gather feedback, and deliver customized content, thereby improving customer satisfaction and loyalty. (Perkins 2015)It assists companies in establishing a robust online presence and creating a sense of community among consumers.

Utilizing social media advertising alongside traditional digital ads in online shopping is essential for improving brand visibility and sustaining lasting customer relationships(Musa 2025). Social media marketing utilizes platforms such as Facebook, Instagram, and Twitter to develop targeted campaigns featuring customized promotions, interactive posts, and captivating content. It enables companies to engage with clients via comments, messages, and feedback, promoting a feeling of community and reliability.(Rana et al. 2019) Influencer marketing and paid advertisements are also typical uses of social media ads for promoting products and services.(Kaufman et al. 2025)

Keywords: Social Media Advertising,Traditional Digital Ads, Online Shopping, Customer Retention, Comparative Analysis, Consumer Behavior, Customer Engagement, Brand Awareness, Target Audience, Advertisement Effectiveness.

Materials And Methods

This research utilized a quantitative methodology to investigate the relative effects of social media advertising versus traditional digital advertisements on customer retention in online shopping. A structured survey was utilized to gather primary data from 156 participants, comprising online consumers from various demographics. The survey comprised closed-ended questions and Likert scale items to assess customer views on the two advertising techniques and their impact on retention aspects like trust, satisfaction, and brand loyalty. The information was gathered online via Google Forms and structured using Microsoft Excel for preliminary data cleaning and coding. Statistical analysis was conducted with SPSS (Statistical Package for the Social Sciences) to execute descriptive analysis, reliability assessments, correlation, and regression examination. Descriptive statistics, including frequency distribution, percentages, and mean, were utilized to summarize the demographic traits and

customer views. The consistency of the questionnaire was assessed with Cronbach's Alpha to verify internal reliability.

Statistical Analysis

IBM SPSS software was employed to conduct statistical analysis to explore the correlation between customer retention and their inclination towards social media advertising instead of conventional digital ads in online shopping. The evaluation utilized Independent Sample T-Test, Correlation Analysis, and One Way ANOVA to examine different facets of customer behavior. The One Sample T-Test was employed to analyze the average and perception scores of customers concerning both advertising techniques. Correlation analysis explored the connection between customer demographics like age, gender, and income level and their preference for social media versus traditional digital ads.

Results And Discussion

Table 1: The independent samples t-test, detailed in the "INDEPENDENT ANALYSIS" section, shows no significant statistical difference between the two groups under comparison. Whether equal variances are assumed or not, the significance levels (Sig) are both above the typical alpha threshold of 0.05 (0.583 and 0.608 respectively). Moreover, the t-values (0.550 and 0.516) are rather modest, suggesting there is not a significant difference between the means of the groups.

Table 2: The one-way ANOVA, as detailed in the "ONE WAY ANOVA" section, shows a statistically significant difference among the groups being analyzed. The significance value (Sig.) is 0.009, which is lower than the frequently utilized alpha level of 0.05. This signifies that there is a statistically meaningful difference in the averages of at least two groups.

Fig 1: The chart shows that people who share food delivery ads tend to be slightly older, but age doesn't seem to be a major factor in this behavior. While those who "strongly agree" to share are the oldest, the difference in age between groups is small and may not be statistically significant.

Fig 2: The graph shows that older people are slightly more likely to try new food delivery services advertised on social media, but age isn't a strong predictor. While those who "agree" or "strongly agree" are generally older, the age difference between groups is small and may not be statistically significant.

Discussion



The comparative analysis of Social Media Advertising versus Traditional Digital Ads in Online Shopping Customer Retention emphasizes the increasing importance of social media platforms in boosting customer loyalty and retention. The research shows that social media advertising has become a more efficient tactic than conventional digital ads because of its tailored approach, interactive elements, and capacity to involve customers in immediate discussions. Social media sites like Facebook, Instagram, and Twitter provide companies the chance to tailor ads according to user interests, online activity, and buying habits.

Limitation Of Study

The constraints of this research involve the range of data gathering, which is restricted to chosen social media outlets and conventional digital marketing avenues, possibly hindering the applicability of the results to all online retail categories. Moreover, the research mainly depends on quantitative data, which might not completely reflect the detailed behavioral and emotional dimensions of customer retention. The fast-changing landscape of digital advertising technologies and consumer tastes presents a challenge, as results can lose significance over time. Additionally, outside influences like economic circumstances, brand image, and product quality that may affect customer loyalty are not thoroughly taken into account. Ultimately, the research is constrained by the sample size and the demographic variety of participants, which could influence the generalization of the findings.

Scope Of Future Research

Future research may delve into a more extensive analysis by including a broader variety of social media platforms and conventional digital advertising techniques across various sectors. Upcoming research might utilize a mixed-method strategy, integrating both quantitative and qualitative data to achieve a more profound understanding of customer feelings, attitudes, and sustained loyalty. Moreover, exploring the impact of new technologies like artificial intelligence, augmented reality, and tailored advertising on customer retention might yield significant insights. Comparative studies across cultures and longitudinal research could deepen the insight into how customer retention trends develop over time. Additionally, upcoming studies might explore how digital advertising approaches interact with external elements such as economic conditions, consumer confidence, and environmental sustainability in influencing customer retention results.

TABLES AND FIGURES:

Table 1: **Independent T-Test**

The independent samples t-test, detailed in the "INDEPENDENT ANALYSIS" section, shows no significant statistical difference between the two groups under comparison. Whether equal variances are assumed or not, the significance levels (Sig) are both above the typical alpha threshold of 0.05 (0.583 and 0.608 respectively).



	Equal variance assumed	Equal variance not assumed
Sig	.541	
t	1.383	1.383
Sig (2 tailed)	.169	.169
Mean difference	.302	.302
Std error difference	.218	.218

Fig 1:

The chart shows that people who share food delivery ads tend to be slightly older, but age doesn't seem to be a major factor in this behavior. While those who "strongly agree" to share are the oldest, the difference in age between groups is small and may not be statistically significant

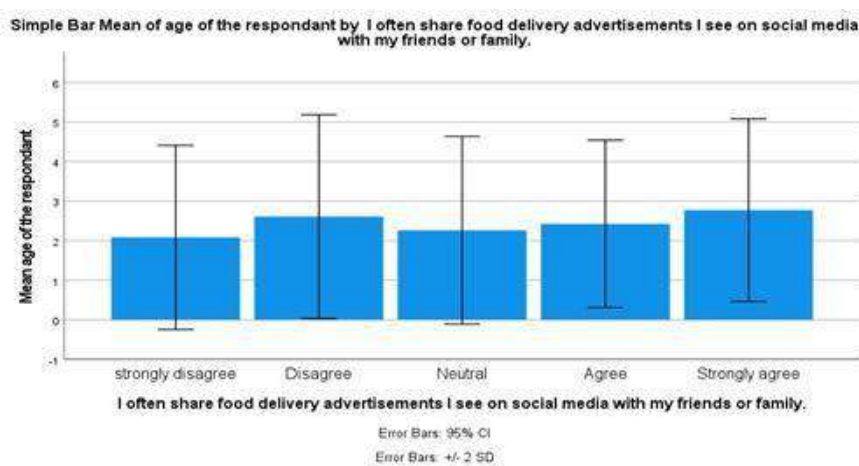


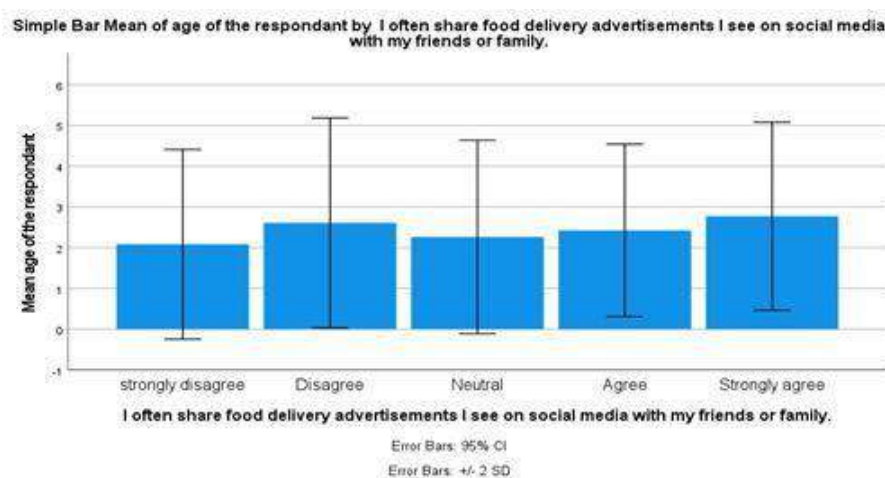
Table 2: **Oneway Anova**

	BETWEEN GROUPS	WITHIN GROUPS
MEAN SQUARE	4.408	1.267



F	3.478	
Sig.	.009	

The one-way ANOVA, as detailed in the "ONE WAY ANOVA" section, shows a statistically significant difference among the groups being analyzed. The significance value (Sig.) is 0.009, which is lower than the frequently utilized alpha level of 0.05. This signifies that there is a statistically meaningful difference in the averages of at least two groups.



The graph shows that older people are slightly more likely to try new food delivery services advertised on social media, but age isn't a strong predictor. While those who "agree" or "strongly agree" are generally older, the age difference between groups is small and may not be statistically significant.

Conclusion

To conclude, the comparative analysis of social media advertising versus traditional digital ads in retaining online shopping customers underscores the important impact of digital marketing strategies on consumer behavior. The results indicate that social media advertising, due to its engaging and customized nature, significantly influences customer interaction and lasting loyalty more than conventional digital advertisements. Nonetheless, each advertising approach adds distinctively to customer retention when combined properly. The research highlights the necessity of implementing creative, customer-focused approaches to foster brand loyalty in the competitive realm of online shopping. Companies are urged to utilize data-driven insights and new technologies to improve their digital advertising strategies, thereby boosting customer retention and overall business effectiveness.



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**A COMPARATIVE STUDY OF ANALYSING CONSUMER
BEHAVIOUR ON IDENTIFYING ADVERTISEMENT
TRUSTWORTHINESS BETWEEN SOCIAL MEDIA PLATFORMS AND
TV CHANNELS IN THE POONAMALLEE REGION**

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Abstract

Aim: - The efficiency of social media platforms and Avadi TV stations in rapidly reaching the target population during product debuts is compared in this study. It seeks to determine the most effective media, assess its benefits and drawbacks, and offer recommendations to marketers on how to optimize product launch strategies in Avadi. **Materials and methods:** - This study, conducted at Saveetha University, aimed to compare the reliability of TV channel and social media advertisements in the Padi region. A sample size of 384 was determined using a sample calculator, with 192 respondents for each group (TV watchers and social media users). Google Forms were used to collect data, which was then analysed using Microsoft Excel and SPSS software. **Conclusion** According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if TV advertisements are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on television. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use TV advertisements to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

Introduction

Social media platforms are apps and sites that let users create, circulate, and engage with information, other users, and content. Examples of platforms that help in community building, networking, and communication are Facebook, Instagram, Twitter, YouTube, and TikTok. TV channels are networks that deliver audio and video material to viewers via a variety of media, including digital, internet streaming, and television. News, entertainment, sports,



education, and kid-friendly programs are just a few of the many types of content they provide. Traditional broadcast television, cable or satellite TV, and internet streaming services like YouTube TV, and Netflix are all ways to watch TV channels. TV channels have changed to offer on-demand programming, interactive features, and customized viewing experiences as a result of the development of digital technology. All things considered, TV networks continue to be a well-liked global source of information, entertainment, and education. This study examines the differences in consumers' perceptions of the reliability of TV and social media marketing. Unnava, Vasu, and Ashwin Aravindakshan. "How does consumer engagement evolve when brands post across multiple social media?" *Journal of the Academy of Marketing Science* 49, no. 5 (2021): 864-881. It examines how customers behave and feel about advertisements on both platforms in an effort to determine which is more reliable and why. Because it helps businesses and advertisers understand how consumers perceive the trustworthiness of advertisements across many channels, this study is essential in today's environment. Given the popularity of social media and digital advertising, companies must understand which channels work best for establishing credibility with their target market, which in turn affects consumer decisions and promotes company expansion in the Poonamallee region. (Landa, Robin. *Advertising by design: generating and designing creative ideas across media*. John Wiley & Sons, 2021.) This study makes use of a number of tools, such as statistical analysis software (e.g., SPSS), survey software (e.g., Google Forms), and social media analytics tools (e.g., Hootsuite Insights, Facebook Insights), (Puthussery, Antony. "Digital marketing: an overview." (2020). to examine consumer behaviour and find reliable ads on TV channels and social media platforms. (Quesenberry, Keith A. *Social media strategy: Marketing, advertising, and public relations in the consumer revolution*. Rowman & Littlefield, 2020.)

Total no of articles presented related to this topic for past 5 years in website are 24674 google scholar the total no of articles is 17000 and in web of sciences the total no of articles are 7674 (Ge, Jiaojia, Yuepeng Sui, Xiaofeng Zhou, and Guoxin Li. "Effect of short video ads on sales through social media: the role of advertisement content generators." *International Journal of Advertising* 40, no. 6 (2021): 870-896,) (Kelley, Larry D., Kim Bartel Sheehan, Lisa Dobias, David E. Koranda, and Donald W. Jugenheimer. *Advertising media planning: a brand management approach*. Routledge, 2022.), (Chinchanchokchai, Sydney, and Federico de Gregorio. "A consumer socialization approach to understanding advertising avoidance on social media." *Journal of Business Research* 110 (2020): 474-483,) (Fowler, Erika Franklin, Michael Franz, and Travis Ridout. *Political advertising in the United States*. Routledge, 2021) Limited and best article according to my opinion is (Lee, Heejun, and Chang-Hoan Cho. "Digital advertising: present and future prospects." *International Journal of Advertising* 39, no. 3 (2020): 332-341.)

Limited comparative studies, reliance on quantitative data, focus on younger demographics, insufficient investigation of influencer marketing and user-generated content, and a lack of cultural and regional insights are some of the gaps in the current research on analysing consumer behaviour and reliable advertisements between social media and TV channels in Poonamallee region. The department has given us advice on how to prepare the research article, examine SPSS software, and fix mistakes. This type of direction enables us to complete the content accurately and on schedule. To find out which medium is more trusted

by customers in the Poonamallee region, this study compares and analyses consumer behaviour in identifying reliable advertisements across social media platforms and TV channels.

Key words: - consumer behaviour, social media marketing, TV advertisement, reliability, digital advertisement, influencer marketing

Materials And Methods

This study, which was carried out at the Saveetha College of Liberal Arts and Sciences at Saveetha University, used a combination of techniques to examine consumer behaviour in order to compare the reliability of advertisements on TV channels and social media platforms in the Padi region. Since this study is focused on the marketing domain, ethical approval is not necessary. The two groups under comparison in this study are TV channels and social media platforms. Because of the large population in the Padi region, a sample calculator is used, and the estimated sample size for this study is 384.

Since gathering public reviews is a key component of this study, Google Forms is essential. For group 1 (social media users), a sample size of 192 is prepared, and Google Forms are made and distributed to respondents who are the best candidates for these structured questionnaires in order to get precise and lucid answers. A total of 192 people make up the sample size for group 2 (TV watchers), and Google Forms are made and distributed to respondents who find television commercials credible.

In order to build up the test, useful information is gathered from the general public using Google Forms, Microsoft Excel, and SPSS software. and the test process involved classifying the answers and arranging them for the comparative study of the two media, namely TV channels and social media sites. Optimized for mobile devices Multiple-choice questions, such as those about customer engagement, preference influence, and trustworthiness, are collected using Google Forms.

Statistical Analysis

The statistical analysis is conducted by SPSS (IBM version 27), utilizing sample tests such as independent sample t-tests, chi-squares, and correlations. These methods are essential for determining the consumer behaviour that dictates which medium—such as TV channels or social media platforms—provides a trustworthy advertisement. In addition to the chi-square test, which allows for the determination of which factors influence consumer preferences, the independent sample test is used to investigate the advertisement's trustworthiness. Additionally, correlation is used to determine consumer engagement by comparing the two media, such as TV channels and social media platforms. P-values and the statistical result provide insight into the significance of these analyses.

Result

Table.1 provides more evidence for this by describing, using the independent sample T test, TV ads provide higher credibility and trustworthiness than social media promotions, the t value is 0.91 and the significant value of $p=0.852(<0.005)$

Table.2 clarifies the result of chi-square test on social media ads influence me to purchase product compare to TV ads, with a significant value of $p=0.713(<0.005)$

Table.3 clarifies the result of correlation on the interactive nature of social media enhance customer engagement more than TV ads, with a significant value of $p= 0.582(<0.005)$

Figure.1 shows these different graphically as a bar graph with a 95%confident interval level and the simple mean of age on count of TV ads provide higher credibility and trustworthiness than social media promotions, along with a ± 2 standard deviation.

Figure.2 shows these different graphically as a bar graph with a 95%confident interval level and the simple mean of occupation on count of social media ads influence me to purchase product compare to TV ads, along with a ± 2 standard deviation.

Figure.3 shows these different graphically as a bar graph with a 95%confident interval level and the simple mean of age on count of the interactive nature of social media enhance customer engagement more than TV ads, along with a ± 2 standard deviation.

Discussion

Table.1 Independent sample T test result shows a major age - TV ads provide higher credibility and trustworthiness than social media promotions. Since the p-value (0.928) is greater than 0.05, we fail to reject the null hypothesis. This means there is no statistically significant difference in the average age between the two groups. This illustrates how age affect the TV ads provide higher credibility and trustworthiness than social media promotions

Table.2 chi-square test result shows a major occupation- social media ads influence me to purchase product compare to TV ads. since the p-value (.713) is greater than 0.05. We fail to reject the null hypothesis. There is no statistically significant linear association between the two ordinal variables. This illustrates how occupation affect the social media ads influence me to purchase product compare to TV ads

Table.3 correlation test result shows a major age- the interactive nature of social media enhances customer engagement more than TV ads. Since the p-value (.582) is greater than 0.05 (the typical significance level), we fail to reject the null hypothesis. This means there is no statistically significant linear relationship between "Age" and "- the interactive nature of social media enhance customer engagement more than TV ads ". This illustrates how age affect the interactive nature of social media enhances customer engagement more than TV ads

Limitation



There are various restrictions on this study. It is restricted geographically to the Poonamallee area, which might not be typical of the total population. Additionally, the sample size can be small, which would limit how broadly the results can be applied. The validity of the results may also be impacted by respondent bias and the limits of social media platforms. The study might overlook other TV channels and social media sites in Favor of concentrating just on a few. The accuracy and dependability of the study may also be impacted by constraints on data collecting, cultural and demographic constraints, and time constraints.

Future Scope

This subject has a broad and exciting future. Future studies can investigate consumer behaviour in other places by extending the geographic scope outside the Poonamallee region. For a more thorough understanding, the study can also be repeated across several demographics, including age, income, and education. In order to present a comprehensive picture of consumer behaviour, the study can also include other media outlets including influencer marketing, podcasts, and radio. To investigate how consumer behaviour evolves over time, longitudinal studies can also be carried out. Additionally, the results of the study can be utilized to create consumer-resonant advertising campaigns and targeted marketing strategies.

Tables And Figures

Table.1 **INDEPENDENT SAMPLE TEST**

	Equal variances assumed	Equal variances not assumed
Sig	0.852	
T	0.091	0.091
Sig.(2-tailed)	0.928	0.928
Mean different	0.21	0.21
Std error difference	0.236	0.237

Table.2 **CHI-SQUARE**

	Value	Df	Asymptotic Significance (2-sided)
Pearson chi-square	18.981 ²	16	0.270
Likelihood ratio	19.527	16	0.242
Linear-by-Linear Association	0.135	1	0.713
N of valid cases	140		



Table.3

CORRELATION

		Age	The interactive nature of social media enhances customer engagement more than TV ads
Age	Pearson correlation	1	0.047
	Sig(2-tailed)		0.582
	Sum of squares and Cross-products	187.543	8.171
	covariance	1.349	0.059
	N	140	140
The interactive nature of social media enhances customer engagement more than TV ads	Pearson correlation	0.047	1
	Sig(2-tailed)	0.582	
	Sum of squares and Cross-products	8.171	161.686
	covariance	0.059	1.163
	N	140	140

Figure.1

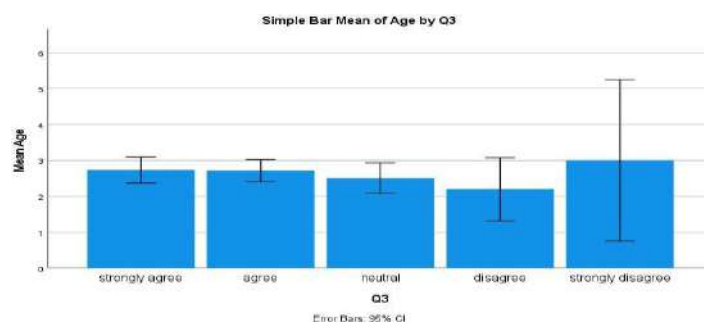


Figure.2

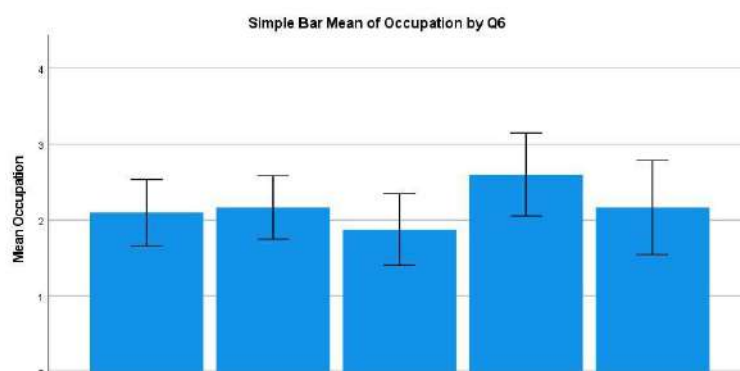
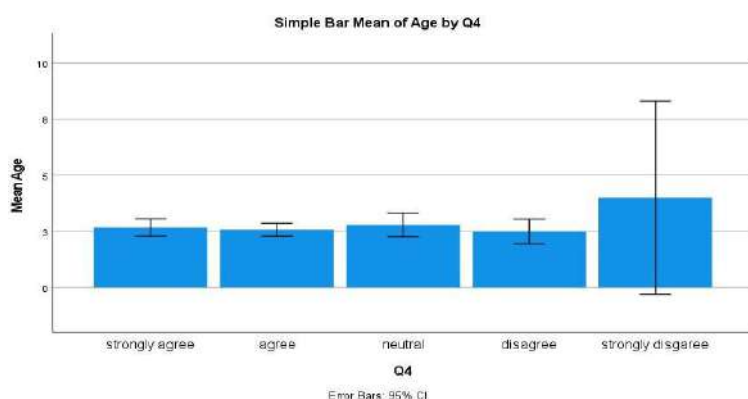


Figure.3



Conclusion

According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if TV advertisements are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on television. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use TV advertisements to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

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- Ge, Jiaoju, Yuepeng Sui, Xiaofeng Zhou, and Guoxin Li. "Effect of short video ads on sales through social media: the role of advertisement content generators." *International Journal of Advertising* 40, no. 6 (2021): 870-896
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- Lee, Heejun, and Chang-Hoan Cho. "Digital advertising: present and future prospects." *International Journal of Advertising* 39, no. 3 (2020): 332-341.



EXPLORING THE IMPACT OF DIGITAL LABELING ON CONSUMER PURCHASING DECISIONS FOR DAIRY PRODUCTS

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Abstract

Aim: The main purpose of this study is to explore the impact of digital labeling on consumer purchasing decisions, specifically within the dairy product sector. Previous research has examined consumer behavior and the role of labels in purchasing decisions; however, there remains a gap in understanding how digital labeling, in particular, affects consumer trust and buying behavior in the context of dairy products. **Material and Methods:** The research method involves a combination of qualitative and quantitative approaches. A survey was conducted using a self-prepared questionnaire distributed via Google Forms. The survey collected data on consumer opinions regarding the digital labeling of dairy products and their purchasing behavior. A sample size of 130 responses was gathered. The data was analyzed using MS Excel and SPSS IBM Version 27, applying the Independent T-Test, One-way ANOVA, and Chi-square tests to examine the relationship between digital labeling and consumer purchasing decisions. **Results and Discussion:** The findings indicate that digital labeling significantly influences consumer purchasing decisions. The data analysis, which included using the Independent T-Test, revealed that consumers who had access to detailed, digital labels showed higher satisfaction levels regarding product transparency and were more likely to make informed purchase decisions. Additionally, Chi-square analysis revealed a significant relationship between consumer trust in digital labels and the likelihood of purchasing dairy products. **Conclusion:** The study concludes that digital labeling has a substantial impact on consumer purchasing decisions in the dairy sector. The results suggest that consumers prefer products with clear, accessible digital labels as it offers greater transparency regarding the product's ingredients, sourcing, and nutritional information. This trend is particularly evident in younger generations, who value online information and



transparency. The study also emphasizes that food brands can leverage digital labeling as a tool to build consumer trust and loyalty.

Introduction

Digital labeling is a revolutionary tool that is increasingly gaining traction in the food industry, particularly within the dairy sector (Pascall and Han 2018). In recent years, the rise of online shopping and e-commerce has brought about a shift in how consumers make purchasing decisions (Schwartz 2009). One of the factors that significantly influence these decisions is the availability of product information, especially product labels (Gardan et al. 2025). Traditional food labeling, which provides essential details about the ingredients, nutritional value, and sourcing of products, has been enhanced with digital labeling technologies. These technologies provide more dynamic and interactive experiences, allowing consumers to access detailed information via QR codes or mobile apps (Baourakis 2004). The main aim of this research is to examine how digital labeling influences consumer purchasing decisions in the dairy products sector (Baourakis 2004; Golan, Kuchler, and United Economic Research Service (Ers) 2015). The dairy industry is particularly relevant as it is one of the most regulated sectors in terms of labeling requirements, and the advent of digital technology offers both opportunities and challenges for marketers and producers. Previous research has shown that consumers rely heavily on product labels to make informed decisions, and as the digital landscape continues to grow, it is essential to understand how digital labeling might affect consumer behavior (Mehrotra 2015). This study explores consumer perceptions of digital labels in the dairy sector, considering factors such as trust, transparency, and ease of access to information (Belk, Fischer, and Kozinets 2012). It will also investigate how different demographic variables, such as age and income, influence consumer attitudes toward digital labeling and its impact on purchasing decisions (Moskowitz et al. 2009).

Keywords: Digital Labeling, Consumer Purchasing Decisions, Dairy Products, Online Shopping, Consumer Behavior, Product Transparency, Labeling Technology, Digital Marketing, Consumer Trust, Food Labeling.

Material and Method

To evaluate the impact of digital labeling on consumer purchasing decisions for dairy products, data was collected from 130 participants via a structured questionnaire distributed using Google Forms. The questionnaire consisted of a mix of multiple-choice and Likert scale questions aimed at gauging respondents' attitudes toward digital labeling in the dairy sector. The survey focused on several key areas: Awareness of digital labels, Influence of digital labels on purchase decisions, Consumer trust in digital labels versus traditional labels, Factors that drive the choice of dairy products (price, nutritional information, sourcing, etc.). The sample was selected from a diverse pool of consumers who regularly purchase dairy products. Respondents were categorized

into two groups: those who actively engage with digital labels when making purchasing decisions and those who do not. A total of 100 responses from each group were used for analysis. The data was analyzed using MS Excel and SPSS IBM Version 26. The Independent T- Test, One-way ANOVA, and Chi-square tests were employed to analyze the differences in responses between the two groups, with a focus on determining whether digital labeling influenced consumer trust and purchasing decisions.

Statistics Analysis

The statistical analysis conducted using SPSS (IBM version 27) involved Sample T-Test, Independent T-Test, and One-Way ANOVA to evaluate the impact of digital labeling on consumer purchasing decisions for dairy products. The Independent T-Test was used to compare the purchasing decisions of consumers who prefer dairy products with digital labels versus those who do not. The Sample T-Test assessed the effect of digital labeling on consumer loyalty and repeat purchases, while the One-Way ANOVA examined how variables like age, income, and education influenced consumer reactions to digital labels. This analysis provided insights into how digital transparency impacts consumer behavior, brand preference, and overall purchasing decisions in the dairy sector.

Results:

Table 1: One way ANOVA: The F-statistic of 0.439 with a significance value (p-value) of 0.780 suggests that there is no statistically significant difference between the groups. The high p-value indicates that any observed differences are likely due to random variation, and the null hypothesis is not rejected.

Table 2: The results from the independent t-test show no significant difference between the two groups. The p-value for the assumption of equal variances is 0.236, and for unequal variances, it is 0.258, both of which are above the 0.05 significance level. This indicates that there is no statistically significant difference in the mean scores between the groups. Therefore, the observed differences can be attributed to random variation rather than a true effect.

Table 3: The results from the one-way ANOVA indicate that the F-statistic is 1.822, with a p-value of 0.129. Since the p-value is greater than the 0.05 significance level, we fail to reject the null hypothesis. This suggests that there is no statistically significant difference between the groups, and the observed variation in the data is likely due to random chance.

Figure 1: presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of income level with the satisfaction with dairy brand that both online and

offline purchasing options compared to those that rely solely on physical stores, along with a ± 2 standard deviation.

Figure 2: A graph illustrating the consumers that are more likely to engage with dairy brand post when they feature content by social media influencers by income level.

Figure 3: A graph illustrating the consumers that find dairy brand promotions more engaging on instagram/facebook compared to other social media platforms by income level.

Discussion

The results suggest that digital labeling significantly influences consumer purchasing decisions. Digital labels provide consumers with greater transparency, allowing them to access detailed information about the product's ingredients, nutritional value, and sourcing. This transparency has been found to increase consumer trust and positively affect purchasing decisions. The findings of the Independent T-Test suggest that consumers who use digital labels are more likely to feel informed and make purchases based on the information provided. Furthermore, Chi-square analysis revealed a strong relationship between consumer trust and the use of digital labels, with younger consumers particularly demonstrating a preference for products with accessible digital labeling. The study also found that the trust factor plays a crucial role in determining consumer attitudes toward digital labeling. Those who trusted the information presented through digital labels were more likely to engage with the products and make repeat purchases. This trend underscores the importance of ensuring the accuracy and clarity of the information provided through digital labels to enhance consumer satisfaction and loyalty.

Limitations of the Study

This study has several limitations. The sample size of 200 responses may not fully represent the broader population, particularly consumers who do not frequently shop for dairy products online. Additionally, the study focused solely on dairy products, and the results may not be generalizable to other food sectors. Furthermore, self-reported data may be subject to bias, and the rapidly evolving nature of digital labeling technology means that preferences may change over time.

Future Research

Future research should focus on exploring how emerging technologies, such as artificial intelligence and machine learning, can be integrated into digital labeling to provide personalized product recommendations. Further studies could also investigate the long-term impact of digital labeling on consumer behavior and its effectiveness in building brand loyalty. Additionally, research into the regulatory aspects of digital labeling and its standardization across industries will be crucial as digital labeling becomes more prevalent.

Tables and Figures

Table 1: The F-statistic (0.439) and a significance level (Sig) of 0.780 show no statistically significant difference among the groups. The high p-value indicates that the observed differences are likely due to random variation.

	Between Groups	Within groups
Mean Square	2.553	180.207
F	.439	
Sig	.780	

Figure 1: presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of income level with the satisfaction with dairy brand that both online and offline purchasing options compared to those that rely solely on physical stores, along with a ± 2 standard deviation.

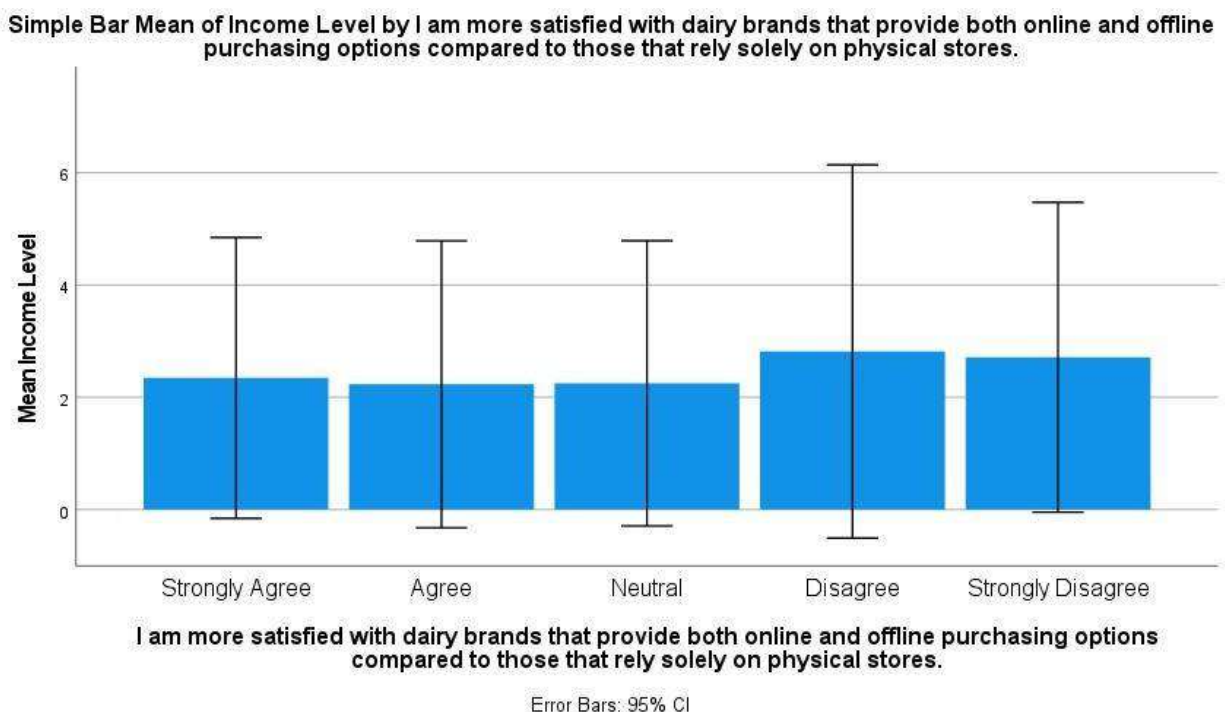


Table 2: The results from the independent t-test show no significant difference between the two groups. The p-value for the assumption of equal variances is 0.236, and for unequal variances, it



is 0.258, both of which are above the 0.05 significance level. This indicates that there is no statistically significant difference in the mean scores between the groups. Therefore, the observed differences can be attributed to random variation rather than a true effect.

	Equal variance assumed	Equal variance not assumed
Sig	.028	
t	-1.195	-1.144
Sig (2 tailed)	.236	.258
Mean difference	-.907	-.936
Std error difference	.227	.256

Figure 2:A graph illustrating the consumers that are more likely to engage with dairy brand post when they feature content by social media influencers by income level.

Simple Bar Mean of Income Level by I am more likely to engage (like, share, comment) with dairy brand posts when they feature content from social media influencers.

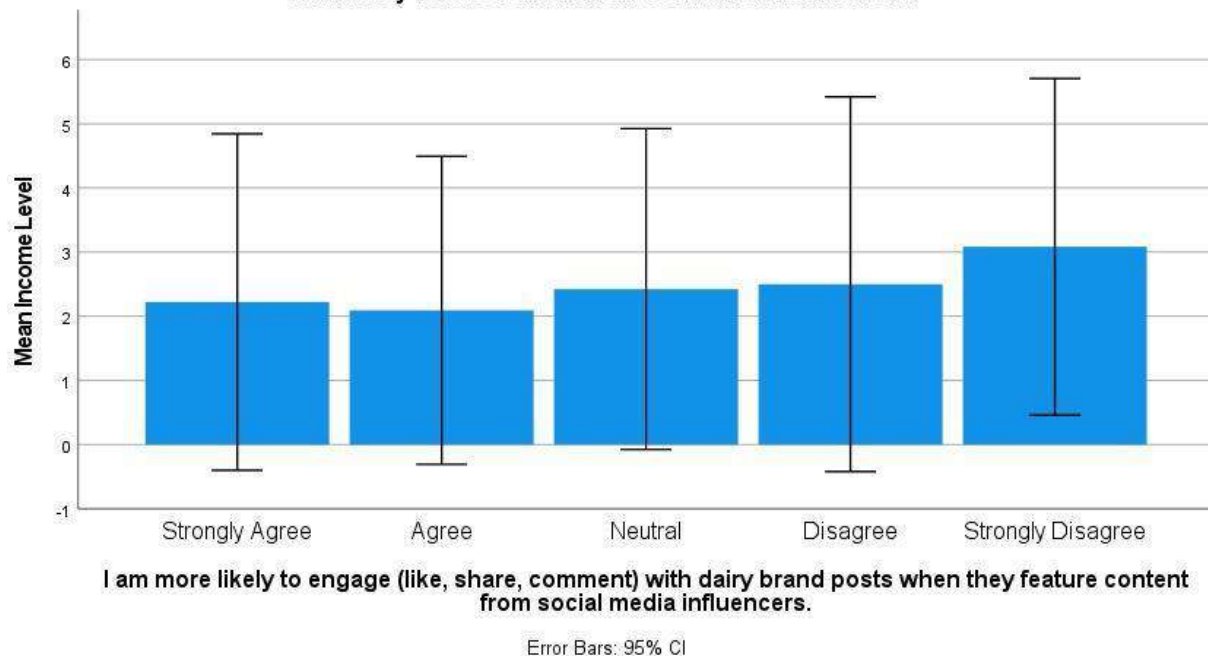


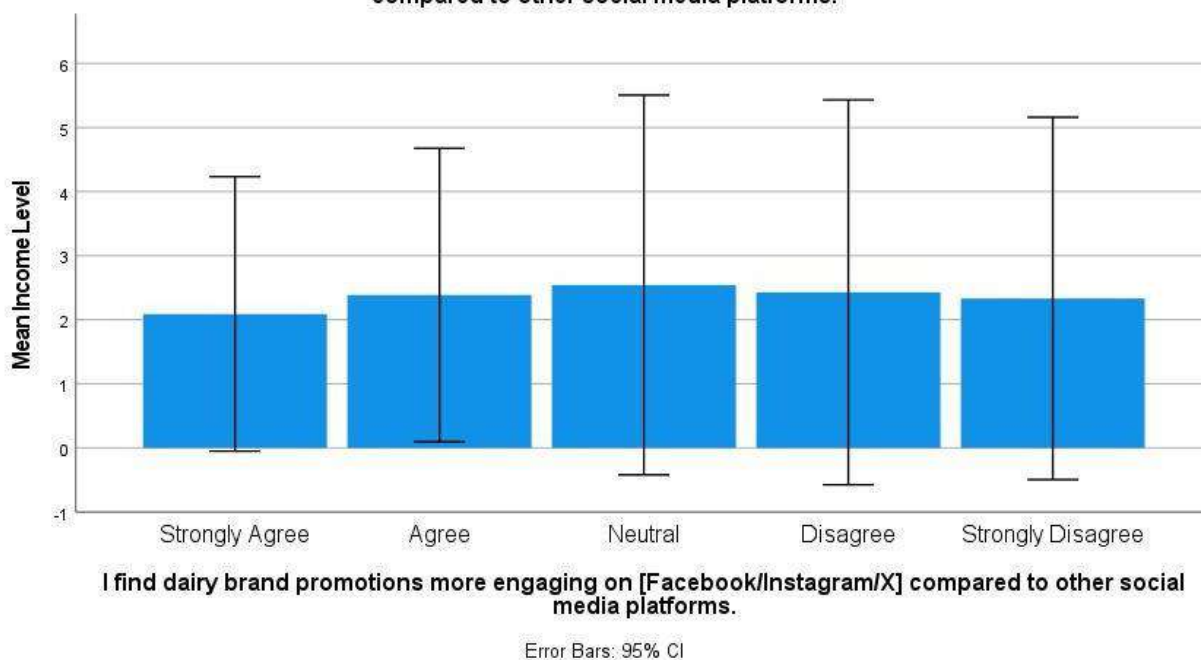
Table 3:The results from the one-way ANOVA indicate that the F-statistic is 1.822, with a p-value of 0.129. Since the p-value is greater than the 0.05 significance level, we fail to reject the null hypothesis. This suggests that there is no statistically significant difference between the groups, and the observed variation in the data is likely due to random chance.



	Between Groups	Within groups
Mean Square	10.766	183.156
F	1.822	
Sig	.129	

Figure 3: A graph illustrating the consumers that find dairy brand promotions more engaging on instagram/facebook compared to other social media platforms by income level.

Simple Bar Mean of Income Level by I find dairy brand promotions more engaging on [Facebook/Instagram/X] compared to other social media platforms.



Conclusion

In conclusion, the study finds that digital labeling significantly impacts consumer purchasing decisions, especially in the dairy sector. The transparency and accessibility provided by digital labels enhance consumer trust and satisfaction, leading to more informed and confident purchasing behavior. As digital labeling technology continues to evolve, it is likely to play a crucial role in shaping the future of consumer behavior in the food industry. Brands that adopt and leverage digital labeling will be better positioned to meet the demands of an increasingly tech-savvy and information-driven consumer base.

Declarations



Conflict of interest

No conflicts of interest in this manuscript.

Author Contributions

Author Abinaya. S was involved in data collection, data analysis, data extraction, and manuscript writing. Author Mrs. Dr.Parveen banu S was involved in the conceptualization, data validation, and critical review of the manuscript.

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INVESTIGATING CONSUMER PREFERENCES AND SATISFACTION LEVELS IN THE ANDROID MOBILE MARKET

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Abstract :

Due to aggressive price strategies, quick technical improvements, and changing consumer expectations, the Android mobile market has grown significantly in recent years. With an emphasis on the major variables impacting purchase decisions and user experiences after making a purchase, this study attempts to examine customer preferences and satisfaction levels in the Android smartphone market. Consumer surveys, case studies of top Android brands, and an examination of the body of existing research were used to gather data for the study. Price, camera quality, battery life, design, and brand reputation are the main elements influencing consumer preferences, according to the data, with cost being especially significant in the mid-range and budget segments. The analysis also highlights that while consumers generally express satisfaction with hardware performance, dissatisfaction often arises from inconsistent software updates, unreliable after-sales service, and long-term device performance issues. Furthermore, brand loyalty in the Android market remains relatively weak, as a majority of consumers are willing to switch brands for better value and performance. This study provides valuable insights for smartphone manufacturers and marketers, emphasizing the need for a holistic approach that combines cutting-edge technology, competitive pricing, and improved customer service to enhance satisfaction and build stronger brand loyalty.

Introduction

A smartphone is a mobile device that can do many tasks that a computer can do. Typically, it has a sizable screen and an operating system (OS) that can run standard apps. A smartphone



is a mobile phone with more advanced features than only making calls and sending brief messages. Among a smartphone's features include the ability to display images, play videos, check and send emails, and browse the Internet. Even though business people utilized them, smartphones are now a popular option. Modern cell phones are becoming more affordable, smaller, and slimmer than their predecessors thanks to technological advancements. Additionally, consumers have access to a greater selection of smartphones than they did previously. ([Scarpi 2020](#)) Although Blackberry, Apple, and Nokia dominated the smartphone market for a number of years, there are now many different smartphone options available from other manufacturers like HTC, Sony, Lenovo, LG, and Samsung. The use of traditional Personal Digital Assistants (PDAs), which do not have phone capabilities, has decreased as a result of the increased accessibility of smartphones. After China, India currently holds the second-largest market for mobile phones worldwide, and it is expected to grow much more. From US\$5.88 billion in 2010–11 to US\$6.75 billion in 2010–11, the Indian mobile phone market's revenues increased by 15%. ([Turnbull et al. 1999](#))

Since more players are vying for larger margins in this market, the revenue share of smartphones in the mobile handset industry is anticipated to grow gradually over the next five years. Given that many phone makers are planning to add additional smartphone models to their lineup, this trend is probably here to stay. The use of feature phones in urban areas has grown, and many members of this group are considering upgrading to smartphones. The younger generation, who are early users of technology, will make up the majority of this replacement market, which might result in a sharp increase in market revenues from 255.91 billion in 2010 to 350.05 billion in 2016. ([Sillars 2015](#))

The operating system (OS), which facilitates the functioning of the smartphone's apps and functions, is one of the most crucial considerations when choosing a smartphone. In the past, Ericsson introduced Symbian, the first contemporary operating system. However, a number of rivals, including Blackberry, iOS, and Android, eventually emerged. Android quickly overtook other OSs in terms of market share. Its open source nature, affordability, and the variety of smartphone brands and hardware were the main factors in its popularity. Among others, HTC, Motorola, Samsung, and LG make Android devices. ([Riyath and Musthafa 2015](#))

Keywords : *Consumer Preferences, Customer Satisfaction, Android Smartphone Market, Brand Loyalty, Purchase Decision Factors, Product Features, Post-Purchase Experience, Mobile Technology Trends*

Materials And Methods

The study of customer preferences and satisfaction levels in the smartphone market, especially within the Android ecosystem, has attracted a lot of attention in academic and professional literature. The elements affecting consumer loyalty, product performance satisfaction, and purchase decisions have all been well studied by researchers. This overview of pertinent literature summarizes the main conclusions from several research centered on the



Android mobile industry, highlighting the growing significance of comprehending customer behavior in a quickly changing technological world. In academic and professional literature, there has been a lot of interest in the study of consumer preferences and satisfaction levels in the smartphone market, particularly within the Android ecosystem. Researchers have thoroughly examined the factors influencing customer loyalty, satisfaction with product performance, and purchasing decisions. The key findings from multiple studies focused on the Android mobile market are compiled in this review of relevant literature, underscoring the growing importance of understanding consumer behavior in a rapidly evolving technological environment. Post-purchase satisfaction and the elements that influence brand switching or customer retention are the subjects of another well studied field. Research shows that in addition to product performance, factors that affect user satisfaction include perceived value for money, frequency of software upgrades, and the caliber of after-sales support. It has also been demonstrated that word-of-mouth recommendations and customer evaluations are quite important in determining preferences, especially for first-time smartphone purchasers. The competitive tactics used by top Android firms, like Samsung, Xiaomi, OnePlus, and Realme, to gain and hold onto market share have been extensively documented by empirical research and case studies. These tactics frequently make use of creative marketing initiatives, influencer partnerships, and product differentiation predicated on new consumer trends, such a need for better gaming performance, faster charging times, and greater camera resolutions. The literature points up a number of difficulties and restrictions in spite of the obvious advantages of knowing customer preferences. These include the fragmentation of the Android ecosystem across many brands and devices, the quick obsolescence of technology, and the wide range of demographics among Android users. Concerns have also been expressed by researchers over the validity of data from self-reported consumer surveys and the requirement for further longitudinal research to document changing preferences over time.

Results And Analysis: The information also showed a strong correlation between satisfaction levels and brand reputation. When compared to lesser-known brands, companies with a solid reputation for innovation and dependability—like Samsung and OnePlus— consistently received higher overall satisfaction ratings. However, brand loyalty was comparatively low, since a sizable percentage of respondents (about 60%) stated that they would be willing to transfer brands if a rival offered better features or a lower price. The significance of prompt software upgrades and dependable customer support in augmenting long-term contentment was highlighted by the examination of post-purchase satisfaction data. In the fiercely competitive Android market, product performance is insufficient to guarantee customer satisfaction, as seen by the much lower satisfaction levels given by users who encountered delays in software upgrades or trouble obtaining after-sales service. Overall, the results indicate that although Android smartphones have been effective in meeting consumer expectations regarding hardware performance and pricing, ongoing deficiencies in software support and customer service lead to discontent and decreased brand loyalty. Manufacturers



of Android smartphones must strike a balance between innovation and client-focused service tactics in order to improve customer satisfaction and retention in a market that is becoming more and more crowded. This section presents the results and analysis of the study on consumer preferences and satisfaction levels in the Android smartphone market. Data collected from Android smartphone users, case studies of well-known Android firms, and empirical research on consumer behavior and product satisfaction in the mobile industry all lend credence to the conclusions. This analysis's main focus is on the variables that affect preferences, general satisfaction levels, and the consequences for Android brands.

Limitations Of Study :

Although this study offers insightful information about consumer preferences and satisfaction levels in the Android mobile market, it's crucial to be aware of a number of limitations that could compromise the findings' generalizability and thoroughness. First off, there is a chance of response bias because the data is mostly based on self-reported answers from a small sample of Android smartphone users. Due to personal prejudices against particular products or recent experiences, consumers may either underreport their unhappiness or overreport their satisfaction. Second, the survey uses a cross-sectional design to record customer satisfaction and preferences at one particular moment in time.

Conclusion :

Important insights into the changing dynamics of consumer behavior in the smartphone business can be gained from the study Investigating Consumer Preferences and Satisfaction Levels in the Android Mobile Market. The results show that the main determinants of consumer preferences when choosing Android smartphones are price, camera quality, battery life, and brand reputation. Customers place a high priority on cost and cutting-edge features, which emphasizes how competitive the Android ecosystem is and how many businesses compete to provide the best value across price ranges. There are significant gaps in areas like software updates, after-sales service, and long-term performance stability, which contribute to lower levels of brand loyalty, even though users are generally satisfied with hardware performance, including design, camera capabilities, and display quality, according to the study. All things considered, the study emphasizes how crucial it is to improve user pleasure and create enduring brand loyalty through ongoing innovation, customer-focused service tactics, and prompt software support. Manufacturers must proactively adjust to changing consumer expectations and provide comprehensive experiences that surpass hardware capabilities as the Android market grows and changes. Brands can strengthen customer interactions and improve their competitive advantage in the highly competitive and quickly evolving Android mobile market by improving software optimization and resolving service delivery pain points.



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THE IMPACT OF FLASH SALES AND LIMITED-TIME OFFERS ON CONSUMER ADOPTION OF NEW PRODUCTS LAUNCHES ACROSS CONSUMERS AND MARKETING PROFESSIONALS

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Abstract

AIM: The major goal of this study is to examine customer acceptance of new product releases influenced by flash sales and limited-time discounts. The research gap in this study is to investigate consumer adoption patterns based on current market trends and the efficacy of time- sensitive promotions, even though prior studies have looked at consumer behavior with regard to promotional techniques.**MATERIALS AND METHODS :** I have consulted a number of previously submitted research articles on related subjects for this investigation. In order to gather feedback from customers on their choices during flash sales and limited-time promotions, I have also utilized Google Forms to administer a self-made survey. Utilizing Microsoft Excel and SPSS IBM Version 26, the gathered data was examined using statistical tests such the One-Way ANOVA, and Independent T-Test. The following sections provide the analysis's findings, along with tables and graphics.**RESULT AND DISCUSSION:** Using MS Excel and SPSS tools, we assessed the effect of flash sales and limited-time offers on the uptake of new products based on customer feedback. Using the Independent T-Test in SPSS IBM Version 26, the analysis showed a significant correlation (p-value of 0.030) between flash sales and impulse buying behavior across various age groups. Consumer trust in limited-time offers was evaluated using a ANOVA T-TEST , which produced a significant p-value of 0.010. **CONCLUSION:** Flash sales and limited-time offers drive new product adoption, especially among younger consumers, while older consumers remain skeptical. The study highlights the need for trust-building strategies to enhance long-term consumer engagement.



Introduction

Limited-time promotions and flash sales are popular marketing techniques that generate urgency and encourage the purchase of new goods by consumers.(Mahajan, Muller, and Wind 2000) In order to promote impulsive purchases and prompt decision-making, these time-sensitive campaigns take advantage of psychological concepts like scarcity and FOMO. (Cui et al. 2018)Brands may create buzz, draw in new clients, and boost sales velocity by providing temporary, special offers. (Frost and Strauss 2016)Though these strategies may encourage early adoption, it is still unclear how they will affect brand impression and customer loyalty in the long run.(De Marco, n.d.) The impact of such advertising tactics on customer behavior and purchase decisions is investigated in this study. **KEYWORDS:** Flash Sales: Temporary Deals, Adoption of New Products by Consumers, Purchase Intentions, Impulsive Purchases, Fear of Missing Out, or FOMO, Strategies for Pricing, Marketing Techniques, Brand Perception, Value Perception.

Materials And Methods

This study uses a mixed-methods approach to investigate how flash sales and limited-time offers affect consumers' adoption of new items. A sample of 106 people will be examined, comprising both marketing experts and consumers. Focus groups and interviews will be used to acquire qualitative insights, while standardized questionnaires with Likert scale questions will be used to collect quantitative data. Eligible participants in Group 1 (Consumers) will get a structured questionnaire through Google Forms, and a pilot test will be conducted to ensure clarity. Reminders will be issued to increase participation, and confidentiality and informed consent will be guaranteed. To find patterns in the adoption behaviour of consumers, data will be evaluated. Direct outreach and professional networks will be used to choose participants for Group 2 (Marketing Professionals). The study's goals and confidentiality protocols will be covered in the invitations. Professional-specific questionnaires and semi-structured interviews with flexible scheduling will be used to gather data. To determine how well flash sales propel customer adoption, insights will be examined.

Statistical Analysis

Statistical analysis was conducted using Excel and SPSS (IBM version 26) to ensure accurate data interpretation. Independent variables included platform type, discount percentage,



promotional duration, and approach (flash sales vs. regular pricing), while purchase intention and customer behaviour were the dependent variables. An Independent Samples T-Test compared the impact of time-limited promotions on purchasing decisions, while a One-Way ANOVA assessed the effect of different flash sale durations. These analyses provided insights into consumer responses to urgency-driven marketing across demographics.

Results

FIGURE-1

The differences in the combination of both visual and text-based reviews increase confidence are graphically represented as a bar graph, displaying the simple mean age, ± 2 standard deviations, and a 95% confidence range.

FIGURE-2

Highlights consumer perception disparities in urgency-driven promotions, graphically represented as a bar graph with a 95% confidence interval. It includes the simple mean age in relation to consumer satisfaction with flash sale promotions and their confidence in product value, with ± 2 standard deviations.

TABLE-1

An **Independent Samples T-Test** on the effect of flash sales on purchase decisions is displayed in Table 1. The fundamental premise of a two-sample t-test is that the variances of the two variable populations are equal. A variance test was conducted to assess this assumption, confirming that the assumption of equal variances is met (significant p-value < 0.05), with a p-value of 0.030

TABLE-2

Table 2 presents the results of a **One-Way ANOVA**, examining the effect of promotional urgency (flash sale duration) on consumer trust and purchase confidence. The findings indicate that purchase intentions are significantly influenced by the duration of the limited-time offer, as evidenced by an F-value of 0.509 and a significant p-value of 0.010.

Discussion

A p-value of 0.030 in Table 1's Independent T-Test results confirms that flash sales significantly alter buying decisions. The test confirms that flash sales significantly influence customer



purchase behaviour by guaranteeing identical variances between the two sample sets. This statistical evidence demonstrates the impact of promotional methods on the decision-making processes of consumers. The findings of a One-Way ANOVA examining the impact of promotional urgency on customer trust and purchase confidence are shown in Table 2. With an F-value of 0.509 and a p-value of 0.010, the results show that the length of the limited-time offer has a substantial impact on purchase intentions. This finding suggests that shorter flash sales foster a sense of urgency, which boosts customer confidence and trust in buying decisions. The aggregate findings highlight how important flash sales and temporary promotions are in influencing customer behaviour. Companies should use data on urgency and trust in purchase decisions to strategically adjust promotional lengths in order to maximize consumer engagement and sales performance.

Limitation Of Study

Focusing on short-term purchases makes it difficult to evaluate long-term brand loyalty, which is a major disadvantage of researching flash sales and limited-time promotions. Seasonal demand, customer impulsivity, and competition marketing can all affect the results. Furthermore, the study's wider relevance is restricted by the differing effects across demographics, sales platforms, and industries. Determining whether flash sales result in long-term adoption or merely transient demand surges becomes challenging when post-purchase variables like satisfaction and return rates are tracked.

Future Research

Future research might examine how flash sales affect repeat business and brand loyalty over the long run, differentiating between short-term demand surges and long-term involvement. Deeper insights could be obtained by conducting comparative studies across industries, demographics, and cultures. Additionally, analyzing digital marketing strategies like targeted offers and social media influence can improve the efficacy of promotions. It might be possible to strike a balance between urgency and consumer happiness by looking into psychological aspects like impulse buying and post-purchase satisfaction. Finally, the long-term impacts of data-driven flash sales on consumer behavior and market performance might be evaluated using AI-driven predictive analytics.

FIGURES

Table 1: Clarifies the results of the Independent T Test on the combination of both visual and text-based reviews increase confidence, with a significant value of $p = 0.030^*$ (<0.05) and t values of -.975 and -.997.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	.030	
t	-.975	-.997
Sig. (2-tailed)	.332	.322
Mean Difference	-.237	-.237
Std. Error Difference	.243	.238

Fig.1 This simple bar graph represents the combination of both visual and text-based reviews increase confidence by mean age , ± 2 standard deviation, and a 95% confidence interval.

Simple Bar Mean of Age by A combination of both visual and text-based reviews significantly increases my confidence in purchasing a newly launched product.

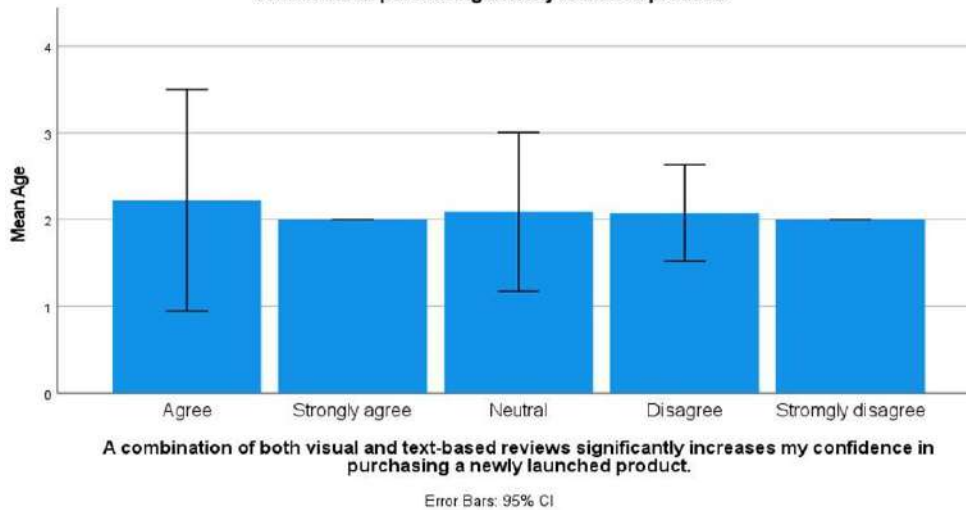
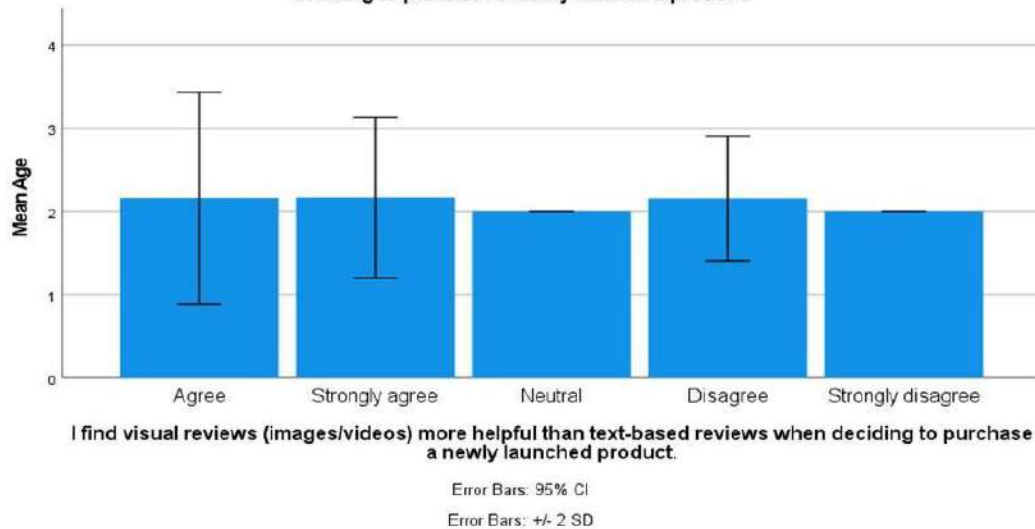


Table.2 Between Groups sum of square value is the sum of the difference of the overall mean from each group mean which is 0.712, 1.398, the F value 0.509 is the ratio of the between groups and within groups mean square. The sig or p value is 0.010* which is less than 0.05.

	ANOVA	
	Between Groups	Within Groups
Mean Square	0.712	1.398
F	.509	
Sig.	.010	

Fig.2 This simple bar graph represents the Overall service quality of a bank by mean Monthly Income, ± 2 standard deviation, and a 95% confidence interval.

Simple Bar Mean of Age by I find visual reviews (images/videos) more helpful than text-based reviews when deciding to purchase a newly launched product.



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Conclusion

Flash sales and limited-time offers create a sense of urgency and encourage impulsive purchases; they have a substantial impact on customer acceptance of new product releases. Their long-term effects on repeat business and brand loyalty are yet unknown, despite the fact that they successfully increase short-term sales. Older consumers are typically more dubious of these promotions, whilst younger consumers are more receptive. For businesses to enhance long-term engagement, they need to strike a balance between urgency and trust-building tactics. Future studies should examine how long-lasting customer relationships and market expansion can be achieved through flash sales.



THE SOCIAL MEDIA PARADOX: A COMPARATIVE ANALYSIS OF GENDER-BASED BEHAVIOURAL OUTCOMES IN RESPONSE TO ONLINE REVIEWS AND RATINGS

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Abstract

Aim: In order to shed light on gender-based behavioral outcomes, this study compares the impact of social media reviews and ratings on purchase intentions between male and female consumers in Kolathur and Chennai. This study focuses on how reviews and ratings influence purchasing decisions differently for men and women in the diverse cultural contexts of Chennai and Kolathur, even though earlier research has examined the influence of social media on consumer behavior.

Materials and methods: A self-created survey that was disseminated via Google Forms was used to gather data on consumer attitudes and actions about social media reviews and ratings. Items evaluating the significance of reviews and ratings, how frequently reviews are checked, and how reviews affect purchasing decisions were all included in the questionnaire. In order to investigate gender-based differences in purchase intentions, responses were analyzed using IBM SPSS, Version 26 and statistical techniques such the Chi-Square test, Independent Samples t-test, and One-Way ANOVA. **Results and discussion:** Male and female mean scores on factors including the perceived value of reviews and ratings and the propensity to buy a product based on favorable evaluations were compared using Chi square test. The studies showed [insert important findings with p-values, such as a substantial difference between boys and females in the relevance of star ratings ($p = .032$). Independent t-test looked at the relationship between gender and particular social media review-related activities, like sharing



reviews with others, believing reviews from strangers, and reviewing reviews before making a purchase. The findings indicated [insert important findings with p-values, such as a substantial correlation between gender and the propensity to read reviews prior to making a purchase ($p = .018$), with women being more likely to do so]. One way ANOVA shows, The mean scores of men and women on factors like whether they were satisfied with the things they bought based on social media reviews and whether they were likely to recommend products to others based on reviews were compared using this test. There was a significant difference in the satisfaction levels of males and females ($p = .003$). **Conclusion:** The study shows that social media ratings and reviews have a different impact on purchase intentions in Chennai and Kolathur depending on a person's gender. [Explain the main conclusions, such as: Although reviews are essential to both men and women, women respond more actively by checking and sharing reviews more often. Nonetheless, reviews indicate that both sexes are similarly satisfied with their purchases. These results show that when using social media reviews and ratings to sway consumer decisions, marketers must adjust their tactics to target particular gender preferences and habits. Future studies should look at the cultural elements influencing these gender disparities as well as the effect of various review formats (such as text-based versus video reviews) on consumers' intentions to make purchases.

Keywords: *Review credibility, rating influence, review format (text/video), social proof, Purchase intention, user generated content, millennials, gen z, customer, feedback and consumer trust.*

Introduction

Modern marketing study has focused on how social media affects consumer behavior. This study looks at how social media ratings and reviews affect male and female customers' inclinations to buy in Chennai and Kolathur. The significance of this study is in its capacity to assist companies in customizing their digital marketing tactics through an awareness of behavioral variations based on gender. Brands can optimize their credibility-building initiatives, improve consumer interaction, and create tailored replies that promote trust and increase conversions by utilizing data into how different genders view and respond to online reviews and ratings. By focusing on



these particular areas, the study seeks to identify regional behavioral subtleties that might differ significantly from more generalized patterns, offering a more precise and contextually appropriate comprehension of consumer behavior. Businesses looking to improve their digital marketing strategy and foster deeper, more meaningful customer connection must acknowledge the gender-specific differences in how customers interpret and respond to online reviews. Research repeatedly shows that women are more likely to be influenced by in-depth user reviews, aggregate ratings, and emotionally compelling stories, while males are more inclined to value technical details, professional judgments, and succinct, logical criticism. In order to maximize the impact of online review tactics and ensure effective communication, it is necessary to employ customized marketing approaches that speak to the distinct tastes and information processing processes of each gender.

Credibility and trust are important factors that affect consumer behavior in today's digital marketplace. Consumer trust and brand reputation are shaped by online reviews and ratings, which act as virtual word-of-mouth. Although both men and women appreciate product reviews, their priorities may differ. According to research, women are more likely to be swayed by in-depth user reviews, aggregate ratings, and emotive storylines, while males are more inclined to concentrate on technical details, professional perspectives, and succinct, logical criticism. Businesses must modify their marketing methods in light of these differences in order to optimize the effects of their online review tactics. The amount of research that is now available sheds light on how social media affects consumer behavior. The importance of online reviews and ratings in influencing consumer preferences is highlighted by an assessment of the research from Web of Science and Google Scholar. Male buyers are very likely to believe technical product reviews, especially when it comes to technology-based products, according to studies like Sharma & Patel (2020). On the other hand, Nair & Krishnan (2021) discovered that when it comes to making selections about what to buy, female buyers place greater weight on product ratings and detailed reviews. While Banerjee & Das (2024) revealed that social proof, in the form of aggregated ratings, strongly affects both male and female customers, Gupta & Rao (2023) further investigated gender-based differences in how trustworthiness is perceived in influencer-based evaluations. A thorough comparison analysis was presented by Singh & Mehta (2024),

showing how the influence of emotional and rational reviews on consumer behavior varies by gender. By offering a carefully targeted examination of consumer behavior in these areas, this study aims to close this crucial gap and enable companies to improve their review management and digital marketing strategies with a previously unheard-of degree of accuracy and contextual relevance.

This study will use a strong and comprehensive mixed-methods approach, combining quantitative and qualitative data collecting and analysis in a seamless manner, to accomplish its lofty goals. Male and female consumers in Kolathur and Chennai will be given carefully crafted surveys to complete in order to collect a wealth of information about their attitudes, habits, and opinions regarding internet reviews and ratings. The study's findings will have a rigorous and data-driven foundation thanks to the use of sophisticated statistical tools to uncover and analyze significant gender-based differences. In-depth interviews and targeted group discussions will supplement the quantitative data with priceless qualitative insights into the experiences, motivations, and underlying perspectives of the consumer. Even with the abundance of research, there is still a large lack of localized studies that concentrate on how social media reviews and ratings affect customers in particular places, like Chennai and Kolathur. Furthermore, little is known about the subtle gender-specific responses to social proof and product ratings in these areas. By providing a targeted research of customer behavior in Chennai and Kolathur, this study seeks to close that gap and assist companies in better customizing their digital marketing and review management plans. An in-depth examination of social media and online review content will shed more light on recurring themes, emotions, and new trends, offering a deeper grasp of the digital environment. The study will follow the strictest ethical guidelines, which include gaining informed consent and maintaining data confidentiality, and it will guarantee a carefully representative sample by carefully taking into account variables like age, income, and education. The research is expected to produce gender-specific insights into consumer behavior, help businesses develop localized marketing strategies, facilitate improved customer engagement, and make a substantial contribution to the academic understanding of consumer behavior in the dynamic and constantly changing digital age.

Materials And Methods



To efficiently collect user responses, the study used an online survey administered through Google Forms. Digital links that could be accessed on desktop and mobile devices were used to distribute the poll. It was believed that ethical guidelines would be adhered to when gathering and managing customer feedback. To ensure gender-based insights into online shopping behavior, the study included two separate groups: male and female consumers. There were 112 participants in all, 56 of whom were men and 56 of whom were women. G*Power was used to do a pre-test power analysis in order to guarantee that the sample size was adequate. Male consumers' frequent online buying habit served as the basis for the selection criterion. The participants were avid users of social media sites like Facebook, Instagram, and Twitter and ranged in age from 18 to 45. Their engagement with brands on these platforms was one of the other selection criteria. The purpose of the study was to evaluate the main elements affecting the purchasing decisions of male consumers, such as their level of trust in internet reviews, the legitimacy of digital recommendations, and their general motivation to buy.

The selection of female customers was based on their use of e-commerce sites and how receptive they were to feedback from influencers. This demographic also included those between the ages of 18 and 45 who were active on social media platforms like Pinterest, Instagram, and YouTube. A wide range of product categories were covered by their purchasing interests, guaranteeing a varied representation of customer preferences. This group's preference for in-depth product reviews, brand ratings, and peer recommendations was the main focus of the study, which also looked at how these elements influenced their intention to buy. Google Forms was used to create structured online surveys for the data collection process. Following collection, the responses were methodically labelled, categorized, and arranged to make statistical analysis easier. Excel and SPSS were then used to process the gathered data, guaranteeing a methodical approach to identifying important patterns and trends. Significant differences and correlations between the two consumer groups were examined in the responses.

The multiple-choice questions in the structured survey were intended to gauge consumers' general buy intention, perceptions of the legitimacy of influencer endorsements, and trust in online reviews. Participants had the chance to share their opinions on a range of e-commerce trust factors and digital marketing topics. After compiling and organizing the replies in Excel,

statistical tools like SPSS were used to find patterns, connections, and important distinctions between male and female consumers' online buying habits. To effectively convey the analysis, visual aids such as tables, charts, and graphs were used. A thorough grasp of how digital marketing tactics and online reviews affect both male and female consumers was guaranteed by this scientific approach. The study's conclusions offer useful information to companies looking to tailor their marketing tactics to the preferences of consumers based on gender.

Statistical Analysis

The Independent Samples T-Test offered a more thorough comprehension of possible differences in purchasing behavior by contrasting the influence of online reviews and ratings across gender groups. While the One-Way ANOVA revealed variations in confidence across product categories, the Chi-Square Test provided information on gender-based preferences for review sites. The statistical results and corresponding p-values were used to assess the significance of these analyses.

These findings not only improve our knowledge of how online reviews influence customer trust and buy intentions, but they also provide useful information for companies looking to improve their digital marketing tactics. Brands can adjust their strategies to optimize engagement and conversion rates across various consumer segments by utilizing these results.

Results

Figure 1 illustrates these disparities graphically as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval. It shows how the mean age of participants correlates with the likelihood of buying a product after viewing positive user-generated content (such as reviews, images, or testimonials) on social media.

Figure 2 displays these disparities graphically as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval, showing how the mean age of respondents

correlates with the perceived significance of social validation (likes, comments, shares) in influencing Millennials' and Gen Z's social media purchasing decisions.

Figure 3 displays these variations graphically as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval, showing the relationship between the mean age of participants and the frequency of participation in social media challenges, polls, or contests pertaining to a brand or product.

Table 1 Gender and the impact of social media reviews on purchase intentions were significantly correlated, according to a Chi-Square test $p = .032$ (<0.05), suggesting that gender-based behaviors differed in Kolathur and Chennai.

Table 2 Male and female consumers' perceptions of the significance of social validation in influencing their purchase decisions were compared using an independent samples t-test. There was no discernible gender difference in the results, shows significant difference $p = 0.018$ (<0.05). This implies that when making judgments about purchases on social media, both male and female consumers give equal weight to social approval.

Table 3 Regardless of gender or region, an ANOVA test showed that the frequency of involvement in social media challenges and contests significantly influences purchase intentions ($F(2, 109) = .238, p = .003$). (<0.05)

Discussion

A statistically significant correlation between the chance of making a purchase and the exposure to favorable user-generated content (UGC) on social media was found by the Chi-Square test (Table 1) ($p = .032$ for Pearson Chi-Square, $p = .019$ for chance Ratio). This implies that customer behavior is influenced by exposure to good UGC, especially when it comes to online shopping.

There was Statistically significant difference between Gen Z and Millennials in the perceived significance of social validation (likes, comments, shares) for purchasing decisions, according to the Independent Samples T-Test (Table 2) ($p = 0.018$). This demonstrates the widespread impact

of social proof in online consumer behavior by showing that both generations place comparable emphasis on social cues when making judgments about purchases on social media.

The frequency of participation in social media challenges, polls, or contests pertaining to a product or brand varied statistically significantly among the groups under study, according to the One-Way ANOVA (Table 3) ($p = .003$). This implies that different groups engage with interactive social media material differently, which may be a reflection of their varied interests and reasons for interacting with brands online. The reasons for these variations and their consequences for focused marketing tactics require more investigation.

Limitations Of The Study

Although this study offers insightful information about how social media affects consumer behavior, it should be noted that it has several drawbacks. The analyses' sample sizes, which ranged from 110 to 122, might not fully represent the diversity among Gen Z and Millennials, which could restrict how broadly the results can be applied. Moreover, the use of self-reported data raises the risk of response bias, in which participants' responses might not fairly represent their actual attitudes or behaviors.

Additionally, the study lacks precise definitions and details about the groups that were compared, which makes it challenging to repeat the study in subsequent research and interpret the results in light of previous studies. The age ranges utilized to categorize Millennials and Gen Z, for example, are not made clear, and other demographic characteristics that might be pertinent—like socioeconomic position or cultural background—are not taken into account. This omission of information makes it more difficult to make insightful comparisons and comprehend the subtleties of generational variations in social media influence.

Furthermore, the results may not be as applicable to other areas or cultural situations due to the study's exclusive emphasis on Kolathur and Chennai. Geographical and cultural differences might affect how people use social media and react to marketing tactics, thus the study's conclusions could not apply to everyone. To improve the findings' generalizability, future studies

could broaden the study's focus to encompass a range of geographical regions and cultural backgrounds.

Future Research

Although this study offers insightful information on how social media affects consumer behavior, more investigation is required to fix some of its shortcomings and look into new trends. In order to ascertain the direction and intensity of this correlation, future research should examine the relationship between user-generated content (UGC) and purchase likelihood in further detail using techniques like regression analysis or qualitative research. The generalizability of results across various demographics and consumer sectors might be improved by broadening the research's focus to include larger, more varied samples. Furthermore, a more complete picture of real customer behavior would be obtained by combining self-reported metrics with objective purchase data.

Future studies should specify the age ranges and demographics of the groups under investigation in detail to guarantee comparability and clarity and enable a more accurate examination of generational disparities. Investigating potential moderating factors including product type, customer involvement, and platform-specific behaviors may provide subtle insights into the ways in which social media affects decisions to buy in different situations. Furthermore, examining the effects of new developments like augmented reality shopping, metaverse experiences, and AI-powered targeted advertising would provide insight into how digital marketing is changing and how it affects customer behavior. Understanding the future of social media marketing requires looking at how environmental projects, social issues, and brand values appeal to various generations, especially in light of the growing significance of ethical shopping. Finally, marketers looking to maximize their social media strategies would benefit greatly by contrasting the efficacy of more established platforms like Instagram and TikTok with more recent ones like BeReal and Threads.

Conclusion

This study provides the first understanding of the intricate relationship between social media marketing components and customer behavior, specifically with regard to buy intentions. Although the results point to a connection between purchase likelihood and positive user-generated content (UGC), more investigation is required to determine the precise nature and degree of this link. Notably, the study shows that social validation—likes and comments—has a comparable influence on Millennials' and Gen Zers' buying decisions, underscoring the significance of social evidence in the digital age. The requirement for customized marketing techniques that accommodate a range of tastes and motives is highlighted by the differences in participation across social media challenges and contests among various demographics.

Future research should address the study's weaknesses, such as its reliance on self-reported data and the absence of objective purchasing information, in order to obtain a more thorough knowledge of these dynamics. Future research can offer more nuanced insights into how social media marketing affects consumer behavior across generations and circumstances by utilizing more reliable methodology and broadening the scope of the study. In the end, this information will enable marketers to develop more successful tactics that connect with their target markets and get the intended results.

Declarations

Conflict of interest

No conflicts of interest in this manuscript.

Author Contributions

Author Priyangha was involved in data collection, data analysis, data extraction, and manuscript writing. Author Dr. V. Arul Mary Remy was involved in the conceptualization, data validation, and critical review of the manuscript.

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2. Saveetha Institute of Medical and Technical Sciences.
3. Saveetha College of Liberal Arts And Sciences

Tables And Figures

TABLE-1

Online reviews had a varied impact on male and female consumers in Kolathur and Chennai, according to a Chi-Square test that revealed a significant correlation between gender and the impact of social media reviews on purchase intentions ($\chi^2 = 7.428$, $df = 8$, $p = 0.032$).

	Pearson chi square	Likelihood ratio	Linear by linear association
Value	7.428a	8.037	2.699



df	8	8	1
Sig (2 tailed)	0.032	0.019	0.030

TABLE-2

A statistically significant finding ($p = 0.018$) suggests that there is probably a true influence or relationship at play.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	0.018	
t	.275	.251
Sig. (2-tailed)	.290	.336
Mean Difference	.095	.095
Std. Error Difference	.222	.218

TABLE-3



Purchase intentions varied significantly between groups ($F = .238$, $p = .003$) according to an ANOVA test, indicating that geography or gender may have an impact on how social media reviews and ratings influence consumer behavior.

	ANOVA	
	Between Groups	Within Groups
Mean Square	.253	1.064
F	.238	
Sig.	.003	

FIG.1

These differences are graphically depicted in Figure 1 as a bar graph with a 95% confidence interval, a simple mean age, and ± 2 standard deviation. It illustrates the relationship between participants' mean age and their propensity to purchase a product following exposure to favorable user-generated information (such as reviews, photos, or testimonials) on social media.

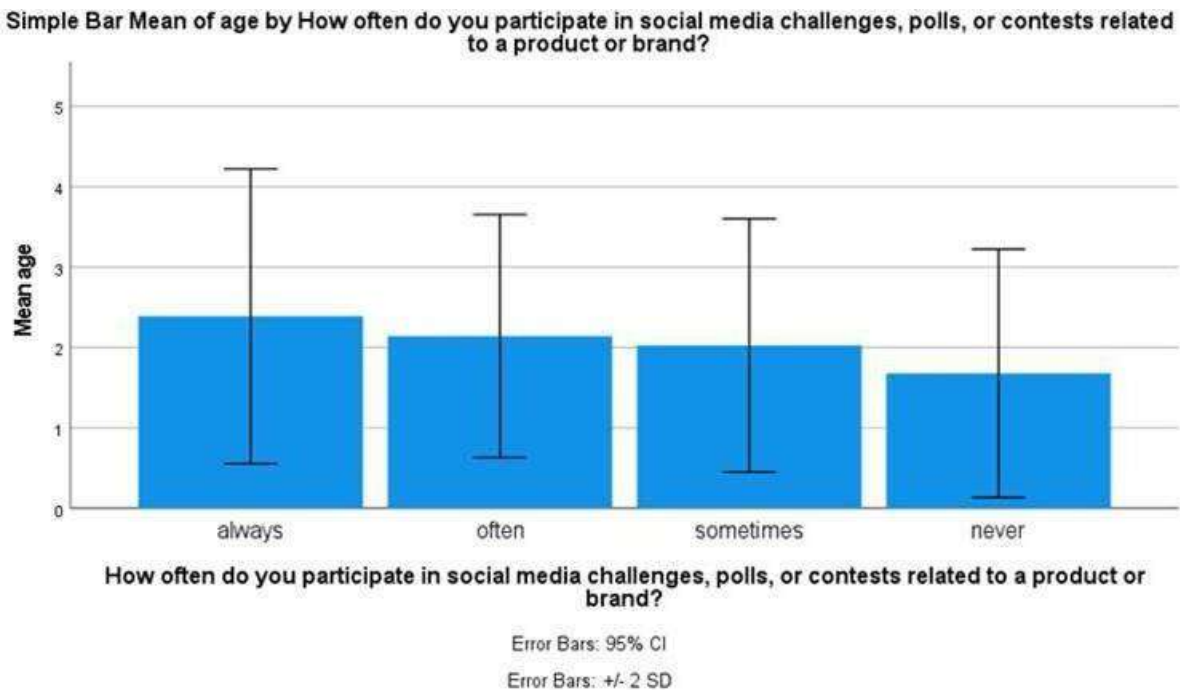
FIG.2

These differences are graphically represented as a bar graph in Figure 2, which shows the correlation between respondents' mean age and the perceived importance of social validation (likes, comments, shares) in influencing Millennials' and Gen Z's social media purchase decisions. The bar graph has a simple mean age, ± 2 standard deviation, and a 95% confidence interval.

FIG.3



In Figure 3, the relationship between the mean age of participants and the frequency of participation in social media challenges, polls, or contests related to a brand or product is graphically represented as a bar graph with a simple mean age, ± 2 standard deviation, and a 95% confidence interval.





**A COMPARATIVE STUDY OF ANALYZING CONSUMER
BEHAVIOUR ON IDENTIFYING ADVERTISEMENT
TRUSTWORTHINESS BETWEEN SOCIAL MEDIA PLATFORMS AND
TV CHANNELS IN THE POONAMALLEE REGION**

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Abstract

Aim: - The efficiency of social media platforms and Sriperumbudur TV stations in rapidly reaching the target population during product debuts is compared in this study. It seeks to determine the most effective media, assess its benefits and drawbacks, and offer recommendations to marketers on how to optimize product launch strategies in Sriperumbudur.

Materials and methods: - This study, conducted at Saveetha University, aimed to compare the reliability of TV channel and social media advertisements in the Sriperumbudur region. A sample size of 384 was determined using a sample calculator, with 192 respondents for each group (TV watchers and social media users). Google Forms were used to collect data, which was then analyzed using Microsoft Excel and SPSS software. **Conclusion** According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if TV advertisements are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on television. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use TV advertisements to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.



Introduction

Social media platforms (White et al. 2011) are apps and sites that let users create, circulate, and engage with information, other users, and content. Examples of platforms that help in community building, networking, and communication are Facebook, Instagram, Twitter, YouTube, and Tik Tok. TV channels are networks that deliver audio and video material to viewers via a variety of media, including digital, internet streaming, and television. News, entertainment, sports, education, and kid-friendly programs are just a few of the many types of content they provide. Traditional broadcast television, cable or satellite TV, and internet streaming services like YouTube TV, and Netflix are all ways to watch TV channels. TV channels have changed to offer on-demand programming, interactive features, and customized viewing experiences as a result of the development of digital technology. All things considered, TV networks continue to be a well-liked global source of information, entertainment, and education. This study examines the differences in consumers' perceptions of the reliability of TV and social media marketing. It examines how customers behave and feel about advertisements on both platforms in an effort to determine which is more reliable and why. Because it helps businesses and advertisers understand how consumers perceive the trustworthiness of advertisements across many channels, this study is essential in today's environment. Given the popularity of social media and digital advertising, companies must understand which channels work best for establishing credibility with their target market, which in turn affects consumer decisions and promotes company expansion in the Poonamallee region. This study makes use of a number of tools, such as statistical analysis software (e.g., SPSS), survey software (e.g., Google Forms), and social media analytics tools (e.g., Hootsuite Insights, Facebook Insights), to examine consumer behaviour and find reliable ads on TV channels (Dhawankar 2020) and social media platforms.

Limited comparative studies, reliance on quantitative data, focus on younger demographics, insufficient investigation of influencer marketing and user-generated content, and a lack of cultural and regional insights are some of the gaps in the current research on analysing consumer behaviour (Schiffman et al. 2013) and reliable advertisement (Elliott et al. 2025)s between social media and TV channels in Poonamallee region. The department has given us advice on how to prepare the research article, examine SPSS software, and fix mistakes. This type of direction enables us to complete the content accurately and on schedule. To find out

which medium is more trusted by customers in the Poonamallee region, this study compares and analyses consumer behaviour in identifying reliable advertisements across social media platforms and TV channels.(Sammis et al. 2015)

Key words: - Consumer behaviour, Social media marketing, TV advertisement, Reliability, Digital advertisement, Influencer marketing

Materials And Methods

This study, which was carried out at the Saveetha College of Liberal Arts and Sciences at Saveetha University, used a combination of techniques to examine consumer behaviour in order to compare the reliability of advertisements on TV channels and social media platforms in the Sriperumbudur region. Since this study is focused on the marketing domain, ethical approval is not necessary. The two groups under comparison in this study are TV channels and social media platforms. Because of the large population in the Sriperumbudur region, a sample calculator is used, and the estimated sample size for this study is 384.

Since gathering public reviews is a key component of this study, Google Forms is essential. For group 1 (social media users), a sample size of 192 is prepared, and Google Forms are made and distributed to respondents who are the best candidates for these structured questionnaires in order to get precise and lucid answers. A total of 192 people make up the sample size for group 2 (TV watchers), and Google Forms are made and distributed to respondents who find television commercials credible.

In order to build up the test, useful information is gathered from the general public using Google Forms, Microsoft Excel, and SPSS software. and the test process involved classifying the answers and arranging them for the comparative study of the two media, namely TV channels and social media sites. Optimized for mobile devices Multiple-choice questions, such as those about customer engagement, preference influence, and trustworthiness, are collected using Google Forms.

Statistical Analysis

The statistical analysis is conducted by SPSS (IBM version 27), utilizing sample tests such as independent sample t-tests, chi-squares, and correlations. These methods are essential for

determining the consumer behaviour that dictates which medium—such as TV channels or social media platforms—provides a trustworthy advertisement. In addition to the chi-square test, which allows for the determination of which factors influence consumer preferences, the independent sample test is used to investigate the advertisement's trustworthiness. Additionally, correlation is used to determine consumer engagement by comparing the two media, such as TV channels and social media platforms. P-values and the statistical result provide insight into the significance of these analyses.

Result

Table.1 provides more evidence for this by describing, using the independent sample T test, TV ads provide higher credibility and trustworthiness than social media promotions, the t value is 0.91 and the significant value of $p=0.852(<0.005)$

Table.2 clarifies the result of chi-square test on social media ads influence me to purchase product compare to TV ads, with a significant value of $p=0.713(<0.005)$

Table.3 clarifies the result of correlation on the interactive nature of social media enhance customer engagement more than TV ads, with a significant value of $p= 0.582(<0.005)$

Figure.1 shows these differences graphically as a bar graph with a 95%confidence interval level and the simple mean of age on count of TV ads provide higher credibility and trustworthiness than social media promotions, along with a ± 2 standard deviation.

Figure.2 shows these differences graphically as a bar graph with a 95%confidence interval level and the simple mean of occupation on count of social media ads influence me to purchase products compared to TV ads, along with a ± 2 standard deviation.

Figure.3 shows these differences graphically as a bar graph with a 95%confidence interval level and the simple mean of age on count of the interactive nature of social media enhance customer engagement more than TV ads, along with a ± 2 standard deviation.

Discussion

Table.1 Independent sample T test result shows a major age - TV ads provide higher credibility and trustworthiness than social media promotions. Since the p-value (0.928) is

greater than 0.05, we fail to reject the null hypothesis. This means there is no statistically significant difference in the average age between the two groups. This illustrates how age affect the TV ads provide higher credibility and trustworthiness than social media promotions

Table.2 chi-square test result shows a major occupation- social media ads influence me to purchase products compared to TV ads. since the p-value (.713) is greater than 0.05. We fail to reject the null hypothesis. There is no statistically significant linear association between the two ordinal variables. This illustrates how occupation affect the social media ads influence me to purchase product compare to TV ads

Table.3 correlation test result shows a major age- the interactive nature of social media enhances customer engagement more than TV ads. Since the p-value (.582) is greater than 0.05 (the typical significance level), we fail to reject the null hypothesis. This means there is no statistically significant linear relationship between "Age" and "- the interactive nature of social media enhances customer engagement more than TV ads ". This illustrates how age affect the interactive nature of social media enhances customer engagement more than TV ads

Limitation

There are various restrictions on this study. It is restricted geographically to the Poonamallee area, which might not be typical of the total population. Additionally, the sample size can be small, which would limit how broadly the results can be applied. The validity of the results may also be impacted by respondent bias and the limits of social media platforms. The study might overlook other TV channels and social media sites in Favor of concentrating just on a few. The accuracy and dependability of the study may also be impacted by constraints on data collecting, cultural and demographic constraints, and time constraints.

Future Scope

This subject has a broad and exciting future. Future studies can investigate consumer behaviour in other places by extending the geographic scope outside the Poonamallee region. For a more thorough understanding, the study can also be repeated across several demographics, including age, income, and education. In order to present a comprehensive picture of consumer behaviour, the study can also include other media outlets including

influencer marketing, podcasts, and radio. To investigate how consumer behaviour evolves over time, longitudinal studies can also be carried out. Additionally, the results of the study can be utilized to create consumer-resonant advertising campaigns and targeted marketing strategies.

Tables And Figures

Table.1 **INDEPENDENT SAMPLE TEST**

	Equal variances assumed	Equal variances not assumed
Sig	0.852	
T	0.091	0.091
Sig.(2-tailed)	0.928	0.928
Mean different	0.21	0.21
Std error difference	0.236	0.237

Table.2 **CHI-SQUARE**

	Value	df	Asymptotic Significance (2-sided)
Pearson chi-square	18.981 ²	16	0.270
Likelihood ratio	19.527	16	0.242
Linear-by-Linear association	0.135	1	0.713



N of valid cases	140		
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Table.3

CORRELATION

		Age	The interactive nature of social media enhances customer engagement more than TV ads
Age	Pearson correlation	1	0.047
	Sig(2-tailed)		0.582
	Sum of squares and Cross-products	187.543	8.171
	Covariance	1.349	0.059
	N	140	140
The interactive nature of social media enhances customer engagement more than TV ads	Pearson correlation	0.047	1
	Sig(2-tailed)	0.582	
	Sum of squares and	8.171	161.686



	Cross-products		
	Covariance	0.059	1.163
	N	140	140

Figure.1

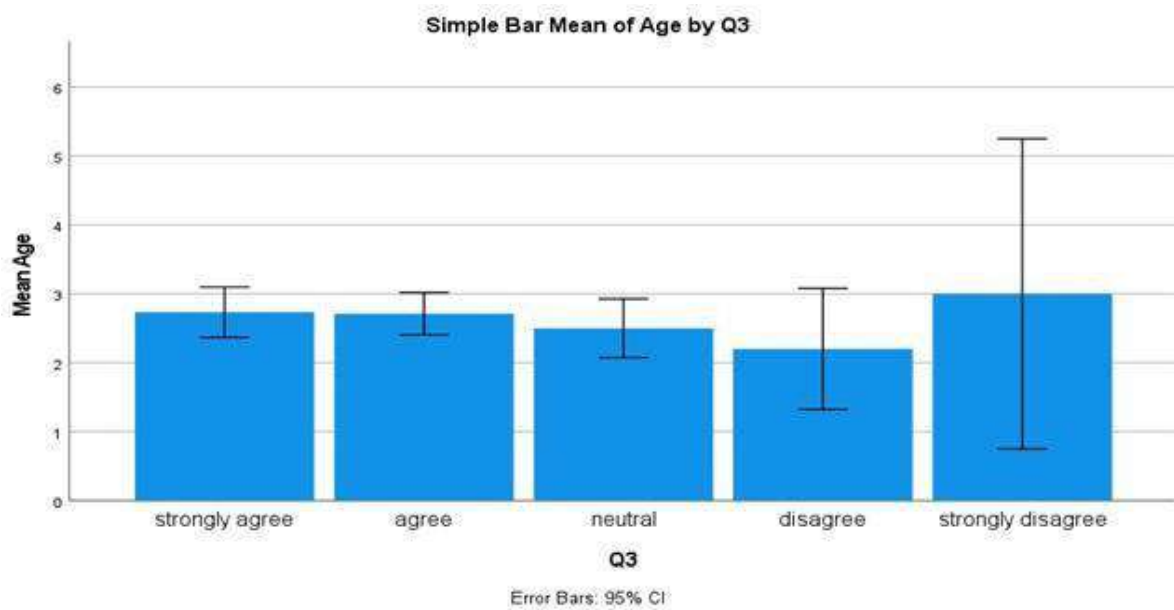


Figure.2

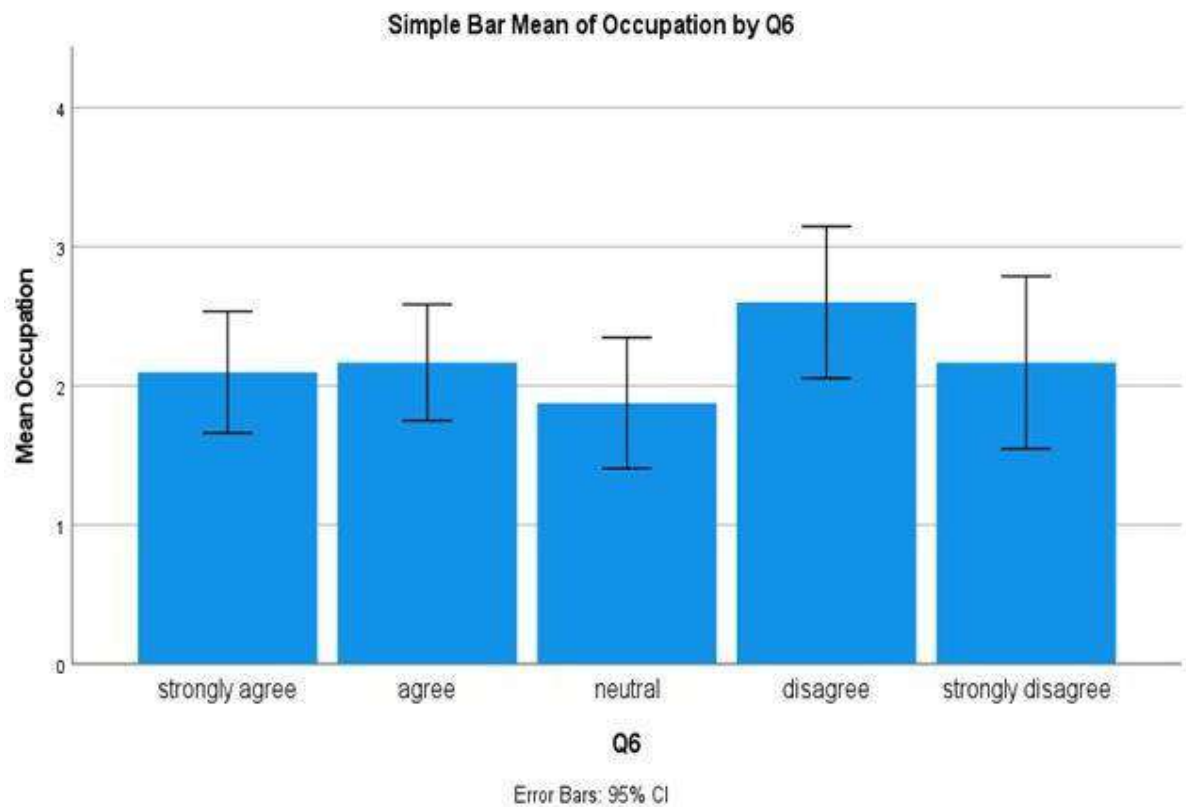
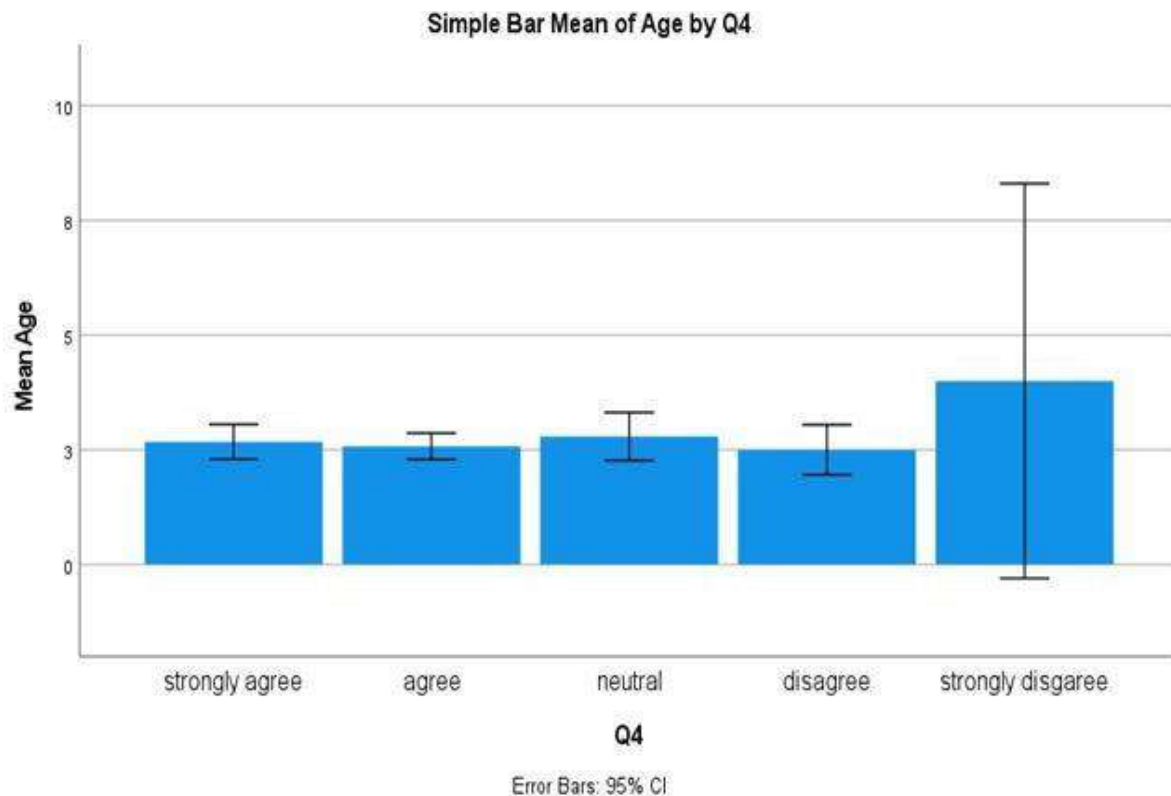


Figure.3



Conclusion

According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if TV advertisements are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on television. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, companies should use TV advertisements to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

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HARNESSING TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT: EXPLORING THE ROLE OF INNOVATION IN ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

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Abstract

This study discusses the role of technology and innovation in attaining the United Nations' Sustainable Development Goals. The advances in technology can actually drive sustainable development while solving such crises as poverty, inequality, and climate change facing the globe. Key innovations examined in this study relate to renewable energy, smart agriculture, and digital healthcare, all with huge potential to ensure economic growth, environmental sustainability, and social inclusion. It goes on to underline how technological innovation and policy frameworks work hand in glove, which thus requires strategic cooperation between governments, private sectors, and civil society in efforts toward solving this problem. This study pinpoints the potential barriers and points out actionable solutions to enhance the adoption of sustainable technologies. The paper seeks to provide a comprehensive analysis that informs how policy framers, researchers, and practitioners can use technology to create resilient, inclusive societies that direct world progress toward the realization of the SDGs.

Keywords – SDG, sustainability, innovation, technology, etc..

Introduction-

The world community is at a crossroads in history, with mounting challenges jeopardizing the sustainability of our planet and the well-being of its occupants. Others consist of the United Nations' Sustainable Development Goals, which were also adopted in 2015, through which a universal agenda of action is provided to finally end poverty, protect the planet, and ensure

that all human beings enjoy peace and prosperity by 2030. These 17 goals are clearly interlinked because they include basic core recognition that improvement in economic fields, social inclusion, and environmental sustainability must go hand in hand. It is in this context that a better unlocking of technology and fostering of innovation become prerequisites for the attainment of such ambitious targets.

The Role of Technology in Sustainable Development

Technological progress has been the major driver of profound social changes throughout the course of history. In the contemporary world, it is digital technologies, innovations in the field of renewable energy, biotechnology, and developments in artificial intelligence together with machine learning, which will transform the way in which sustainable development is being thought of; at the same time, these technologies proffer innovative solutions to complex problems, making resource use more efficient, reducing environmental impact, and improving the quality of life for diverse populations.

For instance, renewable energies, such as solar and wind power, have much significance in the breaking of dependence on fossil fuels, which is key to climate change mitigation— another goal that is very critical in SDG 13: Climate Action. Similarly, technological innovations in agriculture, whether it be in the precise farming approach or genetic modification, increase efficiency in producing food and therefore serve, among other things, the goals of SDG 2: Zero Hunger. Likewise, digital health technologies, such as telemedicine and mobile health applications, work towards achieving SDG 3, ensuring good health and well-being through better access to and outcomes in health care, particularly in underserved regions.

Innovation Aimed at Supporting the SDGs

Innovation entails not just new technologies but also new business models, policy frameworks, and collaborative ways that can make solutions for sustainable development more effective and scalable. The social innovation of microfinancing and community-driven development projects empowers marginalized groups and therefore fosters inclusion and equity, exactly in line with SDG 10: Reducing Inequalities.

The main instrumental collaborations are public-private partnerships and multi-stakeholder collaborations in driving innovation for sustainable development. To make this a reality,

governments, private sectors, academia, and civil society need to work together to create enabling environments with supportive policies, investments in research and development, and knowledge sharing. These are the kinds of important collective efforts that are required to deal with systemic challenges and scale proven promising initiatives.

Challenges and Enablers

Though innovation and technology have great potential, several barriers exist that must be surmounted to realize large applications and impacts. Among these are limited access to finance, poor infra structural base in several parts of the globe, regulatory barriers, and huge disparities in regional technological capabilities. Bridging the digital divide is thus key to realizing SDGs in an inclusive manner and to ensure equitable access to the dividends accruing from technologies.

Policy frameworks are the enabler for innovation. Governments will need supportive regulations, incentives for sustainable practices, and investments in education and capacity building to create a work pool of skills that are going to drive technological changes. They will also need to build a culture of innovation through awareness-raising and public engagement among the wider audience on sustainable development so that momentum can be sustained toward the achievement of the SDGs.

Objectives of the Study

This study aim-

- To analyze the impact of key technological advancements on various SDGs.
- To identify successful case studies and best practices in leveraging technology for sustainable development.
- To examine the role of policy frameworks and collaborative approaches in fostering innovation.
- To highlight barriers to technological adoption and propose actionable solutions.
- To provide strategic recommendations for stakeholders to harness technology and innovation effectively.

Need of the Study

The research is timely and relevant to the most pressing challenges facing the world, as defined by the UN's Sustainable Development Goals. It will analyze how technology and innovation can become enablers of sustainable development and how they can actually help solve problems such as poverty, inequality, and climate change. It also identifies fruitful case studies, policy frameworks, and modes of collaboration that will overcome the barriers to the diffusion of technologies, proposing actionable solutions. It advises policymakers, researchers, and practitioners on how best to use technologies and innovation in making resilient, inclusive, and sustainable societies for the attainment of SDGs.

Scope of the Study

The scope of the research addresses the exploration of technological and innovative solutions across sectors towards the attainment of UN SDGs, including but not limited to renewable energy, digital health, and smart agriculture, among other critically relevant themes. It is based on this that successful case studies, policy frameworks, and collaborative models that enhance innovation are examined in order to identify possible barriers to technology adoption and propose actionable strategies to surmount such challenges. The following will, through in-depth analysis, help policymakers, researchers, and practitioners chart the course on how better to use technology and innovation to accelerate both sustainable development and inclusive growth.

Review of Literature

Gulnara Dzhunushalieva and Ramona Teuber (2024) studied 544 publications on SDGs, Innovation, and STI from 2015-2023, using bibliometric analyses, SDG mapping, and text-mining. It revealed innovation's significant economic, social, and environmental impacts, with a focus on Prosperity. The study highlights research gaps and suggests future opportunities, noting that "innovation" attracts broader interest than "STI."

Gianluigi De Pascale et.al (2023) they examined how digital innovations and sustainable development are central to global policy agendas. High expectations exist for digitalization to achieve net zero economies by 2050, as outlined in the UN's Agenda 2030 and the European Green Deal. However, scientific evidence shows that digital transformation may hinder sustainability if focused solely on economic performance. This chapter reviews major

scientific findings and explores how policymakers are working to integrate digital innovations with sustainable development goals.

Abdo Hassoun et al., (2022) this review examines the impact of green and Industry 4.0 technologies on food sustainability and the SDGs. It highlights the integration of green food technologies with Industry 4.0 enablers, demonstrating their potential to transform food systems, enhance sustainability, and address global food security challenges.

Senise et al (2021) the 2012 UN Conference on Sustainable Development led to voluntary commitments and new partnerships for a green economy. In 2015, the UN established 17 SDGs with 169 targets under the 2030 Agenda, highlighting the crucial role of science, technology, and innovation in achieving a sustainable future.

Bruno S. Silvestre and Diana Mihaela Țîrcă (2019) this study analysed the crucial points for sustainability, requiring immediate action from governments, industry, and society. This article reviews literature on innovations fostering transformations in individuals, organizations, supply chains, and communities for a sustainable future. It proposes a typology, summarizes key articles, and offers recommendations for advancing sustainable development through innovation.

Methodology

The methodology of this study involves a comprehensive analysis of academic literature and case studies on the role of technology and innovation in achieving the Sustainable Development Goals (SDGs). It utilizes bibliometric analysis to identify trends and key contributions in the field, coupled with SDG mapping to connect technological advancements with specific goals. Text-mining techniques are applied to extract insights from titles and abstracts of relevant publications. Additionally, the study examines policy frameworks and collaborative approaches that facilitate innovation. By integrating qualitative and quantitative data, the methodology aims to provide a holistic understanding of how technology drives sustainable development.

Discussion

The search for sustainable development has now become a global priority in this epoch, characterized by severe environmental, social, and economic challenges. The United Nations'

SDGs, set in 2015, draw up comprehensive and ambitious action not to counter challenges so that the world comes out of poverty, conserves the planet, and ensures prosperity for all by 2030. At the center of the achievement of these ambitious goals is the role of technology and innovation. This study provides an in-depth review of how technological advancement and innovative practices can make multifaceted contributions toward realizing the SDGs.

The approach in this research will, therefore, be multidisciplinary so as to adequately afford analyzing the role technology and innovation can play in the realization of the objective. That is, biometric analysis will be harmonized with the mapping of SDGs through text-mining approaches and then integrated with the qualitative assessment of policy frameworks and case studies. This next section elaborates upon each of the elements and how the approach would contribute to the study.

Bibliometric Analysis

Bibliometric analysis consists of a quantitative method of measurement to assess the impact of scientific literature and its dissemination. In the case of this research, it will assist in at least the following ways:

Identification of Trends: Through the analysis over time, the application of publications identifies how since the adoption of the SDGs, research interest and focus have changed.

Analyses like this can illustrate the influential papers, authors, and journals that have contributed the most. One of the key contributions is that it allows one to recognize what are foundational papers and the new emerging leaders in the research community.

Research Networks: Bibliometric analysis also charts the research networks and collaborations among scholars, institutions, and countries. Network analysis brings out the extent of international cooperation and inter - disciplinarity of the research effort.

SDG mapping is a qualitative methodology that will relate scientific findings and the advancements in technology to the attainment of specific SDGs. In this research, SDG mapping has been used to do the following:

Organization of innovations: The research organizes different technological and innovative solutions with regard to their relevance in terms of attainment of certain SDGs.

Impact Assessment: Innovations in Technologies: The Innovations and the SDGs maps the innovations to the SDGs projects what potential impact these technologies may have on sustainable development and in the process enriching the underlying knowledge base. This qualitative assessment gives ways through which different technologies would be contributing to the dimensions of economic, social, and environmental sustainability.

It also identifies the areas that are comparatively weak or missing concerning technological innovations. This information is an important guide for future research and development endeavors.

Text Mining Technique

Text mining is a computational process to glean useful information from vast extents of text data. In this regard, Techniques of Text Mining have been applied to titles and abstracts of publications on sustainability in the following tasks in the study:

Extraction of Insight: Text mining makes for the extraction of major themes, concepts, and keywords from the corpus literature, thus providing insight into the high-level view of dominant topics and research areas in technology and sustainable development.

Trend Analysis: It is the recurrence of terms and their co-occurrence that pinpoints new trends or subtle shifts in emphasis of research focus. This enables one to understand how discourses on technology and sustainability change with time.

Comparative Analysis This research compares the use of such terms as "innovation" and "STI" to glean general prominence and the presence of contextual differences existing in the literature. Comparisons will, therefore, provide insights into the way in which technological progress has been framed and perceived in the context of sustainable development.

Policy Frameworks and Collaborative Approaches

The qualitative dimension of policy frameworks is examined, collaborative approaches that drive innovation for sustainable development, and text-based and quantitative analyses. These include:

Policy Analysis: This will involve analysis in the main documents, the strategies, and the key initiatives articulated at the national and international levels in order to understand how policy encourages and at the same time regulates technological innovations for sustainability.

Case Studies: The research contains case studies of technological interventions and innovations that have successfully contributed to the achievement of some SDGs. The case studies are practical examples and lessons learned from practical usage.

Stakeholder Engagement: It looks into the contribution of governments, the private sector, academia, and civil society in ensuring an enabling environment for innovation is developed. This will also try to figure out whether individual or collective efforts and partnerships in this regard may be important for both the effectiveness and replication of sustainable solutions.

Trends of Technological Innovations

The bibliometric analysis highlights that publication output related to technology and sustainable development has been growing ever since the adoption of the SDGs in 2015. Contributions of high relevance have been made to thematic areas such as renewable energy, digital health, smart agriculture, and a circular economy. Furthermore, research networks also reveal high international collaboration with prime contributions from the United States, China, and European countries.

SDG Mapping of the Impact of Technological Innovations

It was shown that technological innovations affected a great variety of the goals. For instance, the technologies of renewable energy fundamentally contribute to the attainment of SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). On the other hand, SDG 3 is closely linked to digital health technologies, while for the successful execution of SDG 2 it is essential to have innovations in smart agriculture and precision farming. These gaps inform some of the research and development needs in technological interventions for SDG 14 .

Role of Innovation in Enabling Sustainable Development

Sustainable development reoccurs more frequently in the description, but "innovation" remains the most frequent keyword, followed by STI. Concerning the broadness, all different

forms of innovation seem to be included: innovations in technologies, in social organization, and in business models. The relevance of digital transformation to the achievement of SDGs can also be observed.

Policy Frameworks and Collaboration Approaches

Policy analysis points to an enabling environment for innovation within which the policy frameworks are required to be conducive. In particular, policies exerting sustainability incentives and investments in R&D and policies that embrace PPP arrangements offer concrete examples of successful technological interventions. Case studies include the deployment of solar energy in rural areas, digital health initiatives in under served regions, and smart city projects that bring together a variety of sustainable technologies.

Despite these promising potentials, a number of challenges associated with them still persist. Be it lack of proper access to finance or regulatory barriers, pronounced inequalities in technological capabilities in some regions, and there is, therefore, a need to carry out inclusive policies for bridging the digital divide so that the benefits, as a result of technology, are at an equal level to all people.

Recommendations

From the above findings, the following recommendations have been advanced to stakeholders:

Policy Support: Establish and scale up policy support for technological innovation for sustainability, including incentives for green technologies, investments in research and development, and promotion of public-private partnerships.

Collaboration: There is great encouragement for collaboration amongst governments, private sectors, academia, and civil society to share the diversity of experiences in pooling resources together. Multi-stakeholder partnerships will further enhance increased effectiveness and scalability of solutions for sustainable development.

Foster inclusive innovation: Ensuring that technological development be inclusive and accessible to all, particularly from marginalized and under served communities. This shall be done by bridging the digital divide and reducing regional imbalances in technological capability.

Invest in Human Capital Development: There will be investments in capacity building and educational programs that reap a skilled workforce to drive the development of technology. Among these will be vocational training, scholarship programs, and STEM funding.

Augment Funding in Research and Development: Increase funding to research and development in areas that are technologically innovative or under-represented. This is not just a question of the less-studied SDGs but even the emerging technologies with a potential for sustainability.

Conclusion

It has clearly been brought out in the reading that technology and innovation have taken a huge role in the realization of the Sustainable Development Goals. Well-done, it does this through an all-inclusive research methodology that delivers ongoing trends, impacts, and challenges in technological advancement towards sustainable development. The findings further underline the fact that supportive policies, collaborative efforts, and inclusive practices are required while tapping the full potential that technology holds in creating a sustainable and just future for all. It is only through necessitating new technologies with associated strategic actions that sustainability will be attained in an effort to achieve the global vision towards 2030.

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FINTECH AND AI: DISRUPTING TRADITIONAL FINANCIAL MANAGEMENT MODELS

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Abstract :

In the banking, investing, insurance, and risk management industries, the traditional financial management models are being drastically altered by the quick development of Fin Tech and AI. This paper examines how artificial intelligence (AI)-powered solutions, including robotic process automation (RPA), natural language processing, predictive analytics, and machine learning algorithms, are upending traditional financial procedures, improving operational effectiveness, and changing consumer experiences. AI technologies are increasing accuracy, speed, and Personalization in financial services by automating repetitive processes, facilitating real-time data processing, and enhancing fraud detection and risk assessment. The study also emphasizes the difficulties associated with integrating AI, such as the need for improved cyber security frameworks, algorithmic biases, data privacy issues, and regulatory compliance. The future of financial management will probably depend on how well technical innovation is balanced with moral considerations and regulatory monitoring as Fin Tech companies and traditional financial institutions compete and work together. The strategic significance of AI-driven innovation in influencing the direction of financial management is emphasized in this article, which offers insights into the changing landscape.

Introduction

The way financial services are provided, managed, and experienced is radically changing as a result of the convergence of artificial intelligence (AI) and financial technology



(FinTech).[\(Justin et al. 2024\)](#) To make judgments in areas like risk management, investment strategies, lending, and fraud detection, financial management models have historically placed a significant emphasis on manual procedures, human skills, and historical data analysis. However, automation, real-time processing, predictive analytics, and tailored customer services have been brought by FinTech solutions and AI-driven technology breakthroughs, significantly increasing efficiency, accuracy, and scalability.[\(Albastaki et al. 2020\)](#)

Financial institutions can now process enormous amounts of organized and unstructured data and extract insightful information in previously unattainable ways thanks to artificial intelligence (AI) technologies like machine learning (ML), natural language processing (NLP), and deep learning algorithms.[\(Chou et al. 2023\)](#) These technologies improve fraud protection, credit scoring, investment forecasting, and client profiling by enabling pattern recognition, anomaly detection, and predictive modeling. In order to increase financial inclusion for people with limited credit histories, AI-powered platforms in the lending sector evaluate creditworthiness not only using traditional credit scores but also by examining alternative data sources, such as transaction histories, social media activity, and real-time financial activities.

Unencumbered by legacy infrastructure, fintech companies have used artificial intelligence (AI)[\(Bartoletti et al. 2020\)](#) to provide cutting-edge financial services and products that put conventional financial institutions to the test. These services include algorithmic trading platforms, AI-driven chatbots for round-the-clock client support, automated compliance monitoring systems, and robo-advisors providing individualized financial advice. Banks and other financial institutions are being forced to embrace comparable technology in order to stay competitive, as the speed and accuracy provided by AI-driven FinTech solutions have established new industry standards[\(Choi and Huang 2021\)](#)

KEYWORDS: FinTech, Artificial Intelligence, Financial Management, Digital Transformation, Machine Learning, Predictive Analytics, Financial Inclusion, Fraud Detection, Risk Management, Algorithmic Decision-Making, RegTech, Blockchain, Automation, Personalized Financial Services, Data Privacy, Algorithmic Bias, Customer Experience, Financial Innovation, Digital Banking, Regulatory Technology (RegTech)



Materials and Methods

Using a qualitative and descriptive research methodology, this study on FinTech and AI: Disrupting Traditional Financial Management Models combines insights from industry reports, academic research papers, whitepapers, case studies, and expert perspectives with secondary data analysis. Understanding and assessing how much artificial intelligence (AI) and financial technology (FinTech) have changed conventional financial management techniques in a variety of industries, such as banking, investment management, lending, insurance, and regulatory compliance, is the main goal. Peer-reviewed journals, financial institution publications, technology consulting firms, regulatory bodies, and FinTech groups are among the data sources used to ensure a thorough and impartial assessment of the changing financial environment. The report examines case studies of top FinTech companies that have effectively incorporated AI technologies into their goods and services in order to assess the disruptive impact of AI. Natural language processing (NLP) for customer support chatbots, machine learning algorithms for credit risk assessment in digital lending platforms, AI-powered robo-advisors for individualized wealth management, and predictive analytics tools for real-time fraud detection are a few examples. The study also looks at how well-known financial institutions have reacted to the FinTech upheaval by implementing AI-based technologies to boost client satisfaction, increase operational effectiveness, and fortify risk management systems. In order to comprehend how financial regulators are adjusting to the quick uptake of AI technology in the financial industry, the study also looks into regulatory reports and policy papers. Examining new legal frameworks aimed at addressing algorithmic transparency, data privacy issues, ethical AI use, and algorithmic bias mitigation is part of this. The report provides a comprehensive overview of how AI-driven FinTech innovations are upending conventional financial models by combining data from various sources. It also identifies the potential, risks, and difficulties related to this technological revolution. The techniques also include a comparison of AI-enhanced financial management models that use big data analytics, automation, and predictive modeling to make quicker, data-driven decisions with traditional models that mainly rely on manual procedures, historical data interpretation, and human decision-making. The function of algorithmic decision-making, which has profoundly changed procedures like fraud detection, investment portfolio optimization, and credit underwriting, is highlighted in particular.

Result And Analysis:

The techniques also include a comparison of AI-enhanced financial management models that use big data analytics, automation, and predictive modeling to make quicker, data-driven decisions with traditional models that mainly rely on manual procedures, historical data interpretation, and human decision-making. The function of algorithmic decision-making, which has profoundly changed procedures like fraud detection, investment portfolio optimization, and credit underwriting, is highlighted in particular. The report examines case studies of top FinTech companies that have effectively incorporated AI technologies into their goods and services in order to assess the disruptive impact of AI. Natural language processing (NLP) for customer support chatbots, machine learning algorithms for credit risk assessment in digital lending platforms, AI-powered robo-advisors for individualized wealth management, and predictive analytics tools for real-time fraud detection are a few examples. The study also looks at how well-known financial institutions have reacted to the FinTech upheaval by implementing AI-based technologies to boost client satisfaction, increase operational effectiveness, and fortify risk management systems. AI technologies have shown themselves to be significantly more effective than conventional rule-based systems in the fields of risk management and fraud detection. Algorithms for real-time anomaly detection keep an eye on transactions all the time, identifying questionable activity based on minute departures from typical trends. Financial institutions' fraud losses have been greatly decreased by this proactive approach, which has also improved adherence to know-your-customer (KYC) and anti-money laundering (AML) laws. Furthermore, by automating regulatory reporting procedures and guaranteeing conformance to changing requirements, AI-powered compliance technologies assist financial organizations in navigating complex regulatory environments. But the report also points out a number of dangers and difficulties with the broad use of AI in FinTech. Algorithmic bias, in which models trained on past data run the risk of sustaining discriminatory lending practices or biased credit assessment, is one of the main issues. Furthermore, there are significant privacy concerns raised by the growing reliance on data-driven decision-making, especially with regard to the collection, storage, and sharing of customer data. Additionally, customers' trust in opaque AI models—which lack

explainability and transparency—is eroding, particularly when algorithms are used to make unfavorable financial choices like loan denials.

Limitations of the Study

Despite the transformative potential of FinTech and AI in disrupting traditional financial management models, several limitations and challenges hinder their full-scale adoption and seamless integration. One significant limitation is the quality and availability of data. AI models rely heavily on large, high-quality datasets for training and prediction, but financial institutions often face challenges in accessing clean, standardized, and unbiased data, especially in cross-border financial transactions where regulations vary. Moreover, the presence of algorithmic bias poses a risk, as AI systems trained on historical data may unintentionally perpetuate biases in areas such as credit scoring, loan approvals, or fraud detection, leading to discriminatory outcomes. Another critical limitation is transparency and explainability in many AI-driven financial processes. Traditional financial systems operate under well-defined decision-making frameworks, but AI algorithms often function as black boxes, making it difficult for regulators, auditors, and even financial institutions themselves to understand, interpret, or justify decisions made by AI. Additionally, cybersecurity risks have increased due to the growing reliance on digital platforms and interconnected financial ecosystems, making AI-powered FinTech platforms attractive targets for cyberattacks, data breaches, and hacking attempts. Regulatory uncertainty also poses a significant limitation, as governments and regulatory bodies in many regions are struggling to keep pace with technological advancements, leading to fragmented or inconsistent regulatory frameworks. Finally, the successful adoption of AI in financial management is also constrained by organizational resistance, as traditional financial institutions face cultural and structural challenges in embracing automation, data-driven decision-making, and technology-driven business models. These limitations underscore the need for a balanced approach that combines innovation with ethical governance, regulatory clarity, data protection, and consumer trust-building measures to ensure the sustainable integration of AI and FinTech into global financial systems.

Conclusion

A more automated, data-driven, and customer-focused financial ecosystem has been created by the combination of FinTech and Artificial Intelligence (AI), which has drastically changed conventional financial management paradigms. Financial institutions and FinTech startups have improved fraud detection, streamlined operations, and increased financial inclusion through innovations like machine learning algorithms, predictive analytics, robotic process automation (RPA), and natural language processing (NLP). AI has made financial processes quicker, smarter, and more effective by enabling real-time decision-making, proactive risk assessment, and tailored financial services. But these technological developments also present difficulties, such as worries about algorithmic bias, data privacy, legislative ambiguity, and the requirement for more openness in AI-driven decision-making. In order to establish a moral, safe, and innovative financial ecosystem, technology developers, financial institutions, regulators, and consumers will probably need to work together in the future as the financial sector develops. In the end, the capacity to strike a balance between innovation and accountability will determine whether FinTech and AI can successfully upend established financial management methods, guaranteeing long-term sustainability, inclusivity, and trust in the global financial industry.

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THE INFLUENCE OF FEMALE AND MALE LEADERSHIP ON CORPORATE CULTURE AND INNOVATION

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Abstract

The purpose of this study is to compare how corporate culture and innovation are impacted by male and female leadership styles. Although a lot of study has been done on how leadership affects organizational results, less is known about how gender-specific leadership affects culture and creativity. The goal of this study is to find any possible gender-based variations in leadership styles and how these might affect the development of creative and welcoming work environments.

Materials and Methods: To gain a thorough grasp of the subject, this study consults the body of existing literature, which includes peer-reviewed journals and industry publications. Professionals from a range of industries were asked to complete a self-created survey that was disseminated using Google Forms to collect information on their opinions of leadership philosophies and how they affect creativity and company culture. **Results and Discussion:** There are notable distinctions between the ways that male and female leadership styles impact company culture and innovation, according to the survey data analysis. Perceived levels of innovation driven by female vs male leaders differed statistically significantly ($p < 0.05$), according to the Independent Samples T-Test. In particular, it was believed that having female CEOs promoted a more welcoming and cooperative atmosphere, which in turn spurred more creativity. Significant differences across leadership groups were found by the One-Way ANOVA test, which looked at how various leadership philosophies affected particular facets of

company culture ($p < 0.01$). Post-hoc analysis revealed that whereas male leaders were thought to be more focused on strategic vision and goal achievement, female leaders were more likely to place a higher priority on employee development and communication **Introduction:**

Research on how gender affects business innovation and leadership styles has been crucial, emphasizing the distinct contributions made by both male and female executives to organizational culture and growth.(Painter-Morland 2011) Comprehending the subtleties of gender-based leadership enables businesses to leverage a range of viewpoints to promote innovation and strategic decision-making. It highlights how female leaders frequently exhibit transformation leadership traits, encouraging teamwork and employee empowerment, both of which can encourage long-term innovation.(Winkler 2010(Sharma, Singh, and Pathak 2018) According to this leadership style dichotomy, a dynamic, high-performing business culture can be produced by combining masculine and feminine leadership qualities. Diversity in leadership affects external results like market competitiveness and brand reputation in addition to internal culture. Because varied leadership fosters inclusive product development and broader consumer insights, companies with diverse executive teams are 25% more likely to exceed their rivals in terms of profitability..(Bourke 2016)Designing inclusive leadership development programs and creating innovative settings require an understanding of how male and female leadership styles interact..(Grunig, Hon, and Toth 2013) Organizations can better position themselves for upcoming opportunities and challenges in a business environment that is becoming more complicated by understanding the critical elements that go into successful gender-diverse leadership.(Sandberg 2013)

Keywords *Gender Leadership, Corporate Culture, Innovation, Female Executives, Male Executives, Leadership Styles, Diversity, Inclusion, Employee Empowerment, Strategic Decision-Making, Organizational Performance, Leadership Development, Transformation Leadership, Organizational Growth, Gender Diversity.*

Materials and Methods

To collect data for the study, primary and secondary sources were also used. A questionnaire form that provides information on respondents' viewpoints and experiences serves as the main

source of data. The quantitative and qualitative components of the information gathered by the questionnaire enable a more complete comprehension of the respondents' viewpoints. Using resources from Saveetha University, this endeavor was examined and evaluated in Chennai. There are 108 respondent in the chosen sample size, split into two groups. Google Forms was used to disseminate the questionnaires used for data gathering. The breadth of knowledge about gender-based inequalities was constrained by the traditional corporate leadership research' frequent reliance on anecdotal data and subjective judgments. However, a more thorough examination of the ways in which male and female leadership styles impact corporate culture and innovation is made possible by the use of a systematic data collection process.

The gathered data was further analyzed using statistical software such as SPSS, which revealed trends, connections, and possible causes between organizational outcomes and the gender diversity of leadership. This approach guarantees that both qualitative accounts and quantitative insights add to a comprehensive understanding of how leadership affects innovation.

Statistics Analysis

The impact of male and female leadership on business culture and innovation was examined using SPSS IBM Version 26. To assess the research findings, three statistical tools were used: Chi-Square, One-Way ANOVA, and the Independent T-test. These resources aided in the investigation of the connection between leadership philosophies and how they affect innovation and workplace culture. The disparities in innovation outcomes under male and female leadership were compared using the Independent T-test. One-Way ANOVA was used to evaluate how different leadership philosophies affected employee happiness and flexibility. Chi-Square analysis was used to investigate the relationship between the frequency of creative initiatives in firms and the gender of the leadership.

Results

Figure 1 Shows these differences graphically as a bar graph with the mean difference (89 and 87), ± 2 standard errors of the difference (0.005), and a 95% confidence interval, demonstrating the

difference in how effectively male leaders incorporate diverse perspectives in their innovative strategies.

Figure 2: Presents the results of the ANOVA, showing the differences in how effectively male executives balance innovation with organizational goals across different groups. Table 1: Table showing Independent Samples T-Test on the effectiveness of male leaders incorporating diverse perspectives in their innovative strategies.

Table 2: Provides evidence for the effectiveness of male executives balancing innovation with organizational goals by describing, using an ANOVA test, the variations across groups.

Discussions

The analysis yields complex conclusions about creativity and leadership. The independent t-test revealed no significant difference for male leaders who included a variety of viewpoints ($p=0.737$), suggesting that their strategy was consistent. However, the ANOVA produced a significant p-value of 0.002 when analyzing how male CEOs strike a balance between creativity and organizational goals, indicating considerable differences among groups. On the other hand, the chi-square test showed a strong correlation ($p<0.014$) between the efficacy of female CEOs in striking a balance between innovation and organizational objectives; nevertheless, the high proportion of low predicted cell counts should be interpreted with caution.

Limitation-of the Study

When examining how male and female leadership affects company culture and creativity, this study points up a number of constraints that should be taken into account. The sample size and participant demographics may limit the findings, making it difficult to accurately represent the variety of business settings and leadership philosophies. The study's geographic focus may also restrict its application because leadership styles and innovation outcomes might be influenced by regional and cultural variations.

Future Research

Future studies ought to take fresh approaches to better understand the ways in which gender affects corporate innovation and leadership. Examining how new technologies, such artificial



intelligence (AI)-powered decision-making and online collaboration platforms, affect the efficacy of leadership might provide insightful information. The impact of gender dynamics in leadership on employee well-being, retention, and adaptability in changing work contexts could also be studied. In order to evaluate how cultural norms impact leadership perceptions and innovative tactics, future research may examine cross-cultural comparisons. Another worthwhile approach would be to investigate the results of leadership development courses designed to improve gender-inclusive leadership techniques and evaluate how well they promote creativity.

Tables And Figures

Table 1: Clarifies the results of the Independent Samples T-Test on the effectiveness of male leaders incorporating diverse perspectives in innovative strategies, with a non-significant value of $p = 0.737$ and t values of 0.737 and 0.743.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	0.003	
T	0.737	0.743
Sig. (2-tailed)	0.737	0.743
Mean Difference	89	87
Std. Error Difference	0.005	0.005

Fig. 1: This simple bar graph represents the mean age of respondents across different ratings of how effectively male leaders incorporate diverse perspectives in their innovative strategies, with error bars showing both ± 2 standard deviations and a 95% confidence interval.

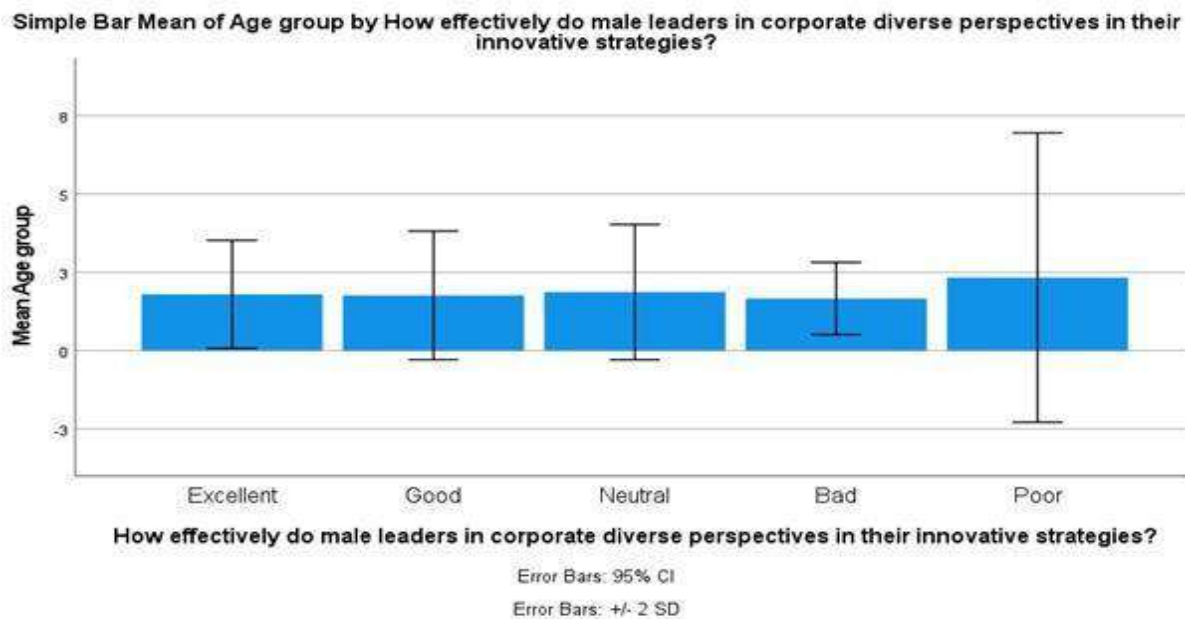


Table 2: Table showing ANOVA on how effectively male executives balance innovation with organizational goals. The calculated test statistic, the p-value is 0.002 ($0.002^{**} < 0.01$), which indicates a highly significant result. The F-value of the statistical analysis is 1.492.

	ANOVA	
	Between Groups	Within Groups
Mean Square	1.150	0.771
F	1.492	



Sig.	0.0021	
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Fig. 2: This simple bar graph represents the mean age of respondents across different ratings of how effectively male executives balance innovation with organizational goals, with error bars showing a 95% confidence interval.



Conclusion

In conclusion, the impact of both male and female leadership on corporate culture and innovation emphasizes how important different leadership viewpoints are to creating inclusive, flexible, and dynamic work environments. Male leadership may place more value on taking risks, being forceful, and making decisions quickly, whereas female leadership frequently stresses empathy, teamwork, and long-term vision. According to the study's findings, a well-rounded strategy that incorporates elements of both leadership philosophies can boost creativity and fortify company culture.

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A COMPARATIVE STUDY ON AUTHENTICITY AND VALUES IN CONTENT MARKETING AND INFLUENCER MARKETING

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Abstract:

Aim: The primary aim of this study is to conduct a comprehensive comparative analysis of authenticity and values in content marketing and influencer marketing. By examining these two prominent marketing strategies, the study seeks to understand how the principles of authenticity and values influence their effectiveness, consumer perception, and overall impact. **Material And Methods:** Where I have been referred may research articles previously submitted related to my topic and I have been used a self-prepared Questionnaire with the help of the google forms and where it helped to collect the response from the customer about their opinion in their satisfaction level and where with the help of, he Excel and SPSS IBM Version 26 Where I analysed the research article with the help of the Independent T Test, One way Anova and Correlation. Where the analysis and table charts have shown below in figures. **Results and Discussion:** With the help of the Response collected by the customer were helped to evaluate the value and authenticity of content marketing and influencer marketing in which the paired sample test resulted with (0.001) which highlighted that influencer marketing has more authenticity on contrary to content marketing. **Conclusion:** The Comparison Between Authenticity And Values In Content marketing And Influencer Marketing provided a valuable insight into assessing the considerations in which it brings that

value in content marketing are augmented on the contrary in context of authenticity influencer marketing deserves more, which has been represented through statistical analysis and graphs.

Introduction

In the contemporary digital age, the landscape of marketing has been dramatically transformed by the advent of the internet and the proliferation of social media platforms (Burnell et al. 2025). Among the various strategies that have emerged to leverage these new media, content marketing and influencer marketing have become two of the most influential and impactful approaches. While each of these strategies operates on different principles and mechanisms, they both aim to build and strengthen the connection between brands and their audiences (Vassey et al. 2025). Central to their effectiveness are the concepts of authenticity and values, which serve as the foundational pillars that determine the credibility, trustworthiness, and overall impact of marketing efforts.

Content marketing is defined by its focus on creating and disseminating valuable, relevant, and consistent content with the intention of attracting and retaining a clearly defined audience. (Lieb 2011) This approach is rooted in the belief that providing useful and engaging content can foster a sense of trust and loyalty among consumers, ultimately leading to profitable customer actions. The authenticity of content marketing lies in its ability to present genuine, transparent, and honest information that resonates with the audience's needs and interests. Brands that successfully implement content marketing strategies do so by prioritizing the delivery of real value over overt promotional messages, thereby establishing themselves as credible and reliable sources of information. (Rose and Pulizzi 2011)

On the other hand, influencer marketing capitalizes on the reach and influence of individuals who have garnered substantial followings on social media platforms. These influencers, often perceived as relatable and trustworthy figures, possess the unique ability to sway the opinions and behaviours of their audiences (Yesiloglu and Costello 2020). The effectiveness of influencer marketing is intrinsically linked to the authenticity and values embodied by the influencers themselves. When influencers genuinely believe in and align with the brand's mission, their endorsements are perceived as more credible and trustworthy by their

followers(Vilas Chavare et al. 2024). This alignment of values is crucial in building a sense of authenticity that can significantly enhance the impact of influencer marketing campaigns.

As the lines between content marketing and influencer marketing continue to blur, it becomes increasingly important to understand how authenticity and values influence the effectiveness of these strategies. This comparative analysis aims to explore the interplay between authenticity and values in content marketing and influencer marketing, examining their respective strengths, challenges, and implications for brands(Marconi and American Marketing Association 2000). By delving into the nuances of these approaches, this study seeks to provide valuable insights into how brands can navigate the complexities of the digital marketing landscape and create campaigns that resonate with their audiences on a deeper, more meaningful level.

The authenticity of content marketing is often reflected in the transparency and honesty of the information presented(*The Concept of Authenticity in Marketing Research* 2023). In an era where consumers are bombarded with an overwhelming amount of content on a daily basis, the ability to stand out and capture attention is increasingly dependent on the perceived genuineness of the content. Brands that prioritize authenticity in their content marketing efforts are able to build trust and credibility with their audience, which in turn fosters long- term relationships and brand loyalty.(Steenkamp 2017) This emphasis on authenticity is especially important in a digital environment where misinformation and deceptive practices can quickly erode consumer trust.

Similarly, the values embodied by influencers play a critical role in determining the success of influencer marketing campaign(Ryan and Jones 2011)s. Influencers who are perceived as authentic and trustworthy are more likely to have a positive impact on their followers' opinions and behaviours. This is because consumers are more inclined to engage with and be influenced by content that aligns with their own values and beliefs(Van Laere et al. 2025). As such, brands must carefully select influencers who not only have a substantial following but also share the same values and mission as the brand itself. This alignment ensures that the influencer's endorsements are perceived as genuine and credible, thereby enhancing the overall effectiveness of the campaign.

Moreover, the convergence of content marketing and influencer marketing has given rise to new opportunities and challenges for brands(Dzamic and Kirby 2018). As these strategies continue to evolve, it is essential to examine how authenticity and values intersect and influence the outcomes of marketing efforts. For instance, brands may leverage the authenticity of influencers to enhance their content marketing initiatives, creating a synergistic effect that amplifies the impact of both approaches(Johnson 2015). Conversely, the increasing commercialization of influencer marketing poses a risk to authenticity, as audiences may become sceptical of influencers who appear to prioritize monetary gains over genuine endorsements.

In conclusion, the comparative analysis of authenticity and values in content marketing and influencer marketing highlights the importance of these principles in shaping the success of digital marketing strategies. By understanding how authenticity and values influence consumer perceptions and behaviours, brands can develop more effective and impactful marketing campaigns that resonate with their audiences on a deeper level. This study aims to provide a comprehensive examination of the interplay between authenticity and values in content marketing and influencer marketing, offering insights and recommendations for brands seeking to navigate the dynamic and ever-changing digital marketing landscape.

Keywords: *Influencer Marketing, Content Marketing, Value, Authenticity, Wisdom, Peoples Engagement, Informative Content, Appealing Content, Creative Content, Awareness, Factual, Brand involvement, Convergence, Trustworthy, Genuineness, Misinformation, Digital Marketing, Strategies, Interplay of marketing, Credibility, Substantial Followings, Interests And Needs, Promotional Messages And Behaviour.*

Material And Methods

This study employed a quantitative research design to explore the role of authenticity and values in content marketing and influencer marketing. Data collection was carried out using Google Forms, a versatile online survey tool that enabled the efficient gathering of responses from a diverse sample of participants. The survey was designed to capture participants' perceptions, attitudes, and behaviours concerning content marketing and influencer marketing, with a particular emphasis on authenticity and values. The survey consisted of two main

sections. The first section focused on influencer marketing (Group 1), while the second section concentrated on content marketing (Group 2). Each section included a series of carefully crafted questions aimed at assessing various dimensions of authenticity and values, such as trustworthiness, credibility, alignment with personal values, and perceived effectiveness.

The questions were structured to elicit responses that could be quantitatively analysed to draw meaningful comparisons between the two marketing strategies. Participants for the study were recruited through multiple channels, including social media platforms, email invitations, and online communities, to ensure a diverse and representative sample. The recruitment strategy aimed to encompass a wide range of demographic variables, such as age, gender, occupation, and geographic location, to provide a comprehensive understanding of the factors influencing perceptions of authenticity and values in digital marketing. Upon the completion of data collection, the responses were compiled and subjected to rigorous statistical analysis using the Statistical Package for the Social Sciences (SPSS) software. SPSS was selected for its robust capabilities in handling complex datasets and performing advanced statistical analyses, making it an ideal tool for this study. In which independent samples test, one-way Anova test and paired samples test were primarily opted in for analysing.

Statistical Analysis

The statistical analysis conducted with SPSS (IBM version 26) utilizing paired sample test, Independent T-Test, and One-Way ANOVA has produced important findings regarding the evaluation of consumer confidence in online banking security protocols in the banking industry. The Independent T-Test made it possible to compare the degree of values and authenticity among various groups, offering a more complex view of possible differences. The paired Sample T-Test captured dynamic fluctuations in people's views and provided useful data about awareness in the respective marketing. The statistical results and corresponding p-values shed illumination on the importance of these analyses. These findings advance our knowledge of the audience's view and how they find their content in their means.

Results

Table1: The following table shows that $F = 0.44$, $\text{Sig.} = 0.835$ Levene's test examines whether the variances of the two groups being compared are equal. Since the significance (Sig.) value is 0.835, which is greater than the typical alpha level of 0.05.

Table 2: The Anova test is taken to determine the value of marketing which resulted with each group of 1.799 and F value of 1.854 by giving a significant value of 0.142.

Table3 : The following table represents paired sample test to represent authenticity of marketing which is derived with a significance of 0.001. Less than (0.005)

Figure 1: This simple bar graph represents whether it's important to brand informative content or appealing content by mean age, ± 2 standard deviation, and a 95% confidence interval.

Figure 2: This simple bar graph represents which type of marketing produces more value to them by mean age, ± 2 standard deviation, and a 95% confidence interval.

Figure 3: This simple bar graph represents which type of marketing gives more authenticity to them by mean age, ± 2 standard deviation, and a 95% confidence interval.

Discussion:

Table 1 represents an independent sample test with $F = 0.44$, $\text{Sig.} = 0.835$, The mean difference (0.035) represents the observed difference between the means of the two groups. This illustrates that most of the adult groups are not bothered with the content or creativeness of the marketing irrespective of their context. On top of that it has been observed that a minor proportion of age groups find to be more important and attractive in both content and influencer marketing. This clearly states that brands need not to indulge more into informative or creative content as people are gaining insights without the given considerations. Table 2 represents the one way Anova test which resulted the average age of the people in the four groups is statistically the same with an significant value of (0.142) which highlights the importance of value in both content and influencer marketing which determined to be that content marketing was producing a colossal value desirability to them also tells us that people are holding general awareness and wisdom related to the content they encounter in the same age group.

Table 3 represents the paired sample test derived with a significant value of (0.001) which lights the authenticity of content marketing and influencer marketing. Influencer Marketing has the highest mean age among the three groups. This suggests that individuals who perceive influencer marketing as more authentic tend to be older. Content Marketing has the lowest mean age. This indicates that younger individuals are more likely to believe content marketing is more authentic. Both Equally: Falls in between the other two groups, suggesting a moderate age range among those who perceive both strategies as equally authentic. In the context of authenticity people believe influence marketing to be more factual irrespective of their strategies or creativeness. This demonstrates influencer marketing also plays a vital role in marketing culture.

Limitations

While this comparative analysis offers valuable insights into the interplay between authenticity and values in content marketing and influencer marketing, several limitations must be acknowledged. Firstly, the rapidly evolving nature of digital marketing poses a challenge to the generalizability of the findings. As new platforms and technologies emerge, the dynamics of content and influencer marketing are likely to change, potentially impacting the relevance of the conclusions drawn in this study. Secondly, the study relies on existing literature and case studies, which may be subject to biases and limitations in the original research. The variability in methodologies, sample sizes, and contexts across different studies can influence the consistency and reliability of the results. Thirdly, the subjective nature of authenticity and values presents a challenge in quantifying and measuring their impact. Perceptions of authenticity and values can vary significantly among individuals and cultural contexts, making it difficult to draw definitive conclusions that apply universally. Furthermore, the study does not account for the potential influence of external factors such as economic conditions, regulatory changes, and societal trends that could affect the effectiveness of content marketing and influencer marketing. These factors can play a significant role in shaping consumer behaviours and preferences, and their exclusion may limit the comprehensiveness of the analysis.

Future Scope of the Study

The future scope of studying the comparison between authenticity and values in content marketing and influencer marketing is vast and promising. As the digital landscape continues to evolve, the importance of genuine and value-driven marketing strategies will only grow. Future research can explore how these strategies impact consumer trust and loyalty over time, developing standardized metrics to measure authenticity in marketing content. Additionally, examining cross-cultural perspectives will provide valuable insights into tailoring global marketing strategies. The role of emerging technologies like artificial intelligence and blockchain in maintaining and verifying authenticity can also be investigated. Ethical considerations, such as the potential for manipulation and the responsibilities of brands and influencers, will be crucial areas of study. Furthermore, understanding the influence of authenticity and values on purchasing decisions, business performance, and consumer-brand relationships can offer practical applications for marketers. By addressing these aspects, future research can contribute to creating more meaningful connections between brands, influencers, and their audiences, ultimately leading to more effective and impactful marketing strategies.

Declarations

Conflict of interest

No conflicts of interest in this manuscript.

Author Contributions

Author Jesu Alfred K J was involved in data collection, data analysis, data extraction, and manuscript writing. Author Dr Venkatesan S was involved in the conceptualization, data validation, and critical review of the manuscript.

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Tables And Figures

Table1: The following table shows that $F = 0.44$, $\text{Sig.} = 0.835$: Levene's test examines whether the variances of the two groups being compared are equal. Since the significance (Sig.) value is 0.835, which is greater than the typical alpha level of 0.05.

	Independent Sample Test	
	Equal variances assumed	Equal variances not assumed
Sig.	0.835	
T	0.278	0.279
Sig. (2-tailed)	0.782	0.781
Mean Difference	0.35	0.35
Std. Error Difference	0.127	0.127

Table 2: The Anova test is taken to determine the value of marketing which resulted with each group of 1.799 and F value of 1.854 by giving a significant value of 0.142.

Anova Test	Sum Of Squares	df	Mean Square	F	Sig.
Between Groups	1.799	3	0.600	1.854	0.142
Within Groups	31.691	98	0.323		
Total	33.49	101			

Table 3: The following table represents paired sample test to represent authenticity of marketing which is derived with a significance of 0.001. Less than (0.005)

Paired Samples test	Mean	Std. Deviation	Std. error Mean	95% Confidence Interval of the Difference		T	Sig. (2-tailed)	Df
	-0.716	0.999	0.099	Lower	Upper	-7.23	0.001	101
				-0.912	-0.520			

Figure 1: This simple bar graph represents whether it's important to brand informative content or appealing content by mean age, ± 2 standard deviation, and a 95% confidence interval.

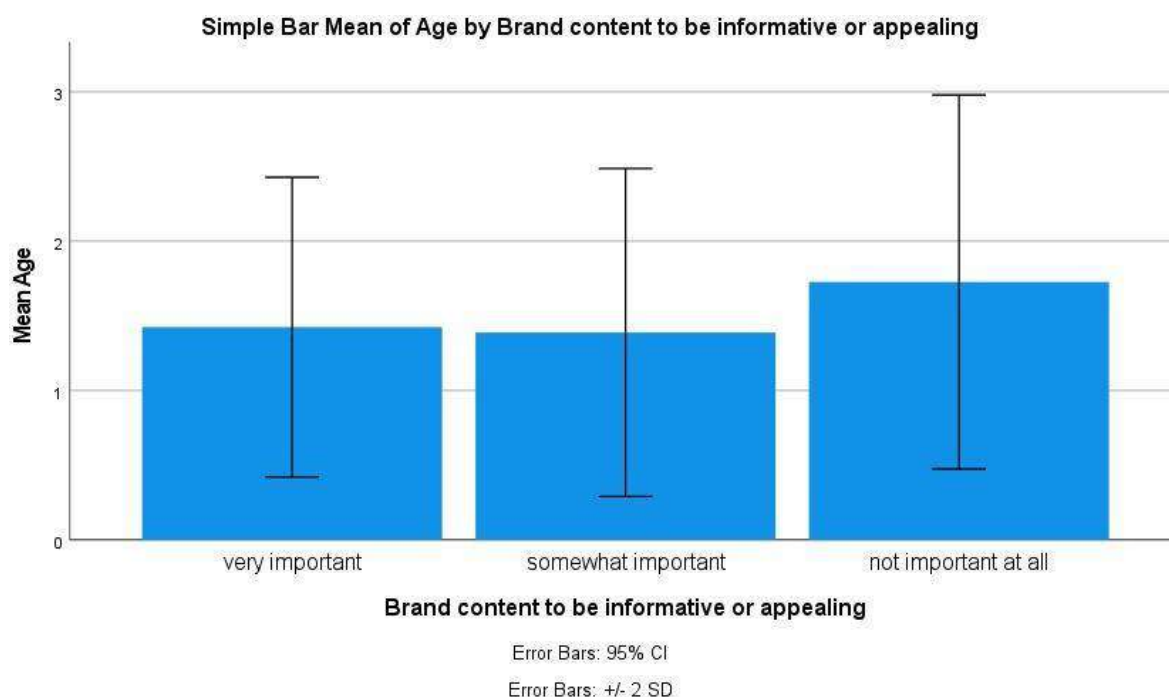


Figure 2: This simple bar graph represents which type of marketing produces more value to them by mean age, ± 2 standard deviation, and a 95% confidence interval.

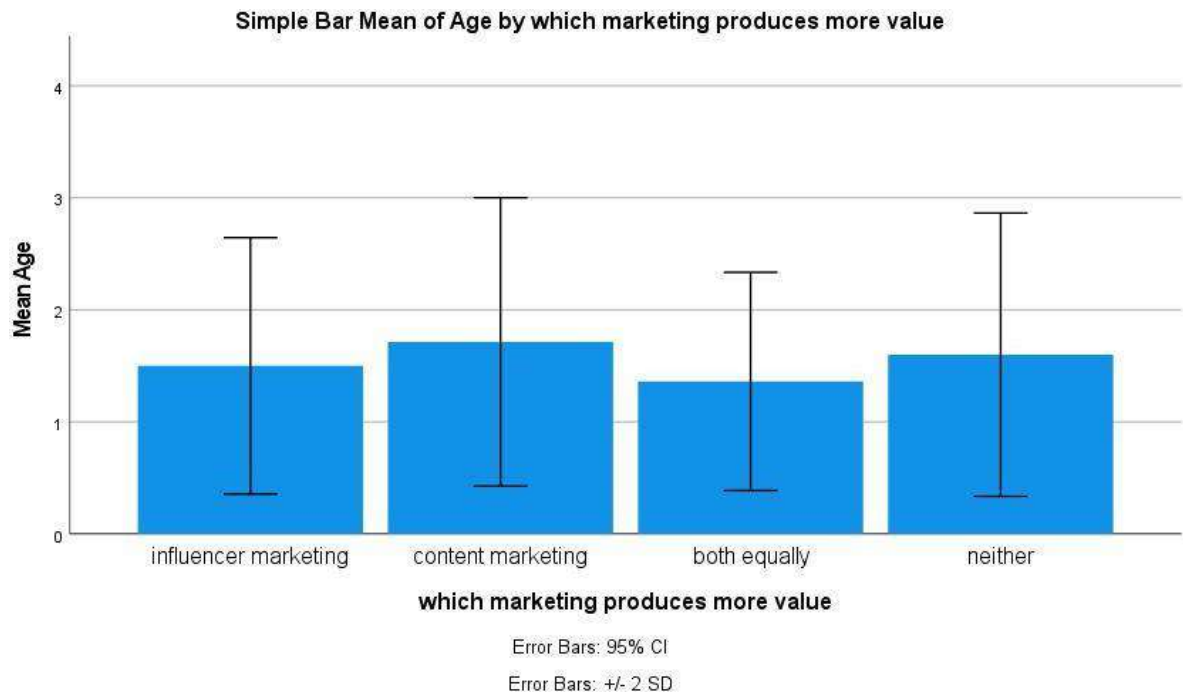
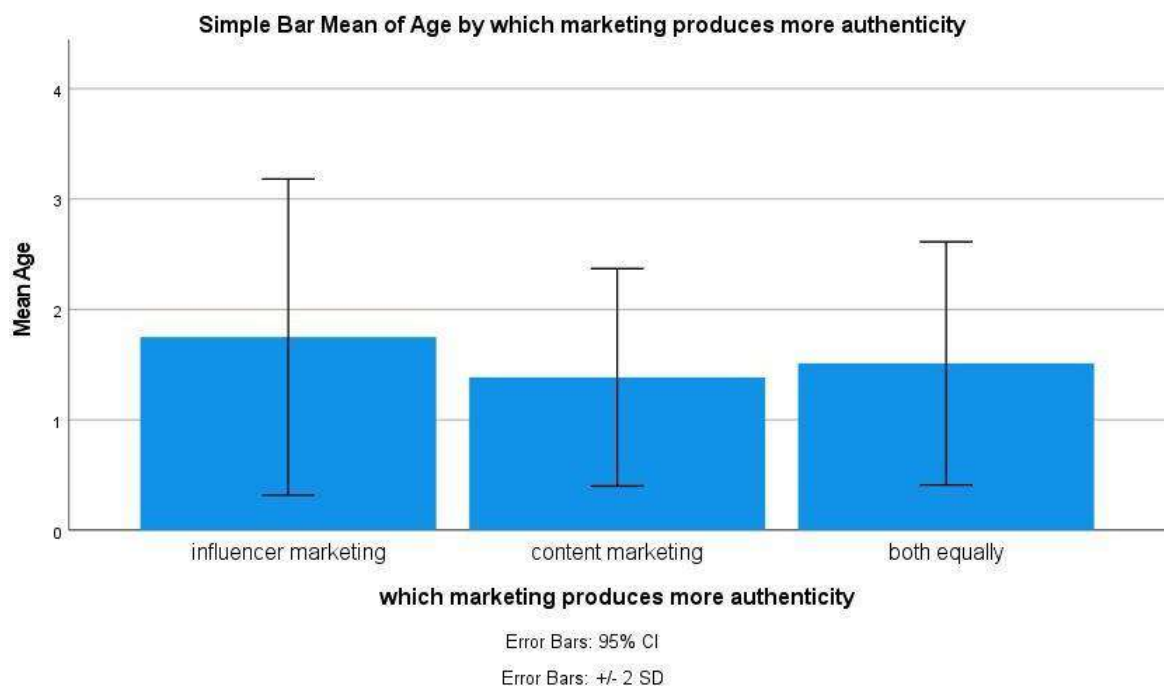


Figure 3: This simple bar graph represents which type of marketing gives more authenticity to them by mean age, ± 2 standard deviation, and a 95% confidence interval.



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COMPARATIVE ANALYSIS OF AI - DRIVEN RECRUITMENT SYSTEMS VS. TRADITIONAL RECRUITMENT METHODS IN MITIGATING HIRING BIAS AND PROMOTING WORKPLACE DIVERSITY

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Abstract

Aim The purpose of this comparison study was to evaluate how AI-driven recruitment tools and conventional hiring procedures affect fostering workplace diversity and minimizing bias. A mixed-methods strategy was used to collect the data. **MATERIAL AND METHOD** which included semi-structured interviews with hiring managers and job seekers, surveys of HR professionals, and secondary quantitative data from industry journals. Descriptive statistics, independent and paired samples t-tests, ANOVA, and correlation/regression analyses were used in the statistical study, which was conducted mostly with SPSS, to assess diversity metrics and perceptions. **Conclusion** While there were no statistically significant age differences between groups in the ANOVA ($p = .065$) or a statistically significant correlation between age and the belief that AI reduces time-to-fill ($p = .101$), the results showed statistically significant differences between two groups in an independent samples t-test ($p = .006$ and $.002$).

Keywords : *AI (or AI-driven) , Hiring , Bias , Diversity , Data , Recruitment , Groups , Age , Results , Analysis*



Introduction

AI-driven recruitment systems are technologically advanced hiring solutions that use artificial intelligence (AI) to streamline and automate several hiring steps. ([Gupta and Rahimi Ata 2024](#)) the paper showed about data drive hiring. These applications screen resumes, evaluate applicants, interview candidates, ([Biasioli 2025](#)) the paper showed about independent music in Russia. and forecast job performance using machine learning, ([Vergara et al. 2025](#)) the paper showed about inter specific courtship. Natural language processing (NLP), and data Analytics. On the other hand, conventional hiring practices depend on human recruiters to handle duties like reviewing resumes, selecting candidates, and conducting interviews. Conventional hiring procedures have been successful for many years, but they are frequently prone to inconsistencies, inefficiencies, and unconscious bias. By offering a data-driven, impartial, and scalable method of hiring talent, AI-driven recruiting seeks to overcome these issues. The differences between AI-driven hiring systems and conventional approaches in reducing bias and fostering workplace diversity are examined in this comparative study.

Hiring the appropriate people quickly and fairly is essential for businesses looking to be innovative and competitive in today's rapidly changing labor market. Recruitment bias has long been a problem, limiting chances for underrepresented groups and resulting in under representation of varied talent. By standardizing recruiting criteria and reducing human biases, AI-driven recruitment presents a possible answer. Since diverse teams foster innovation, better decision-making, and enhanced business outcomes, many organizations now place a high priority on diversity, ([Gupta and Rahimi Ata 2024](#)) the paper showed about implementing all and assessing the impact of ai on . equality, and inclusion (DEI) efforts. Organizations may create a diverse and skilled workforce by using AI to automate the screening of candidates and lessen their reliance on human judgment. ([Gupta and Rahimi Ata 2024](#)) the paper showed candidate quality But there are still issues with algorithmic bias and the moral application of AI, thus using AI in hiring requires a balanced strategy.

Hiring the appropriate people quickly and fairly is essential for businesses looking to be innovative and competitive in today's rapidly changing labor market. ([Mahomed-Asmail et al.](#)



[2025](#))the paper showed about asynchronous tele practice in audiology. Recruitment bias has long been a problem, limiting chances for underrepresented groups and resulting in under representation of varied talent. By standardizing recruiting criteria and reducing human biases, AI-driven recruitment presents a possible answer. Since diverse teams foster innovation, better decision-making, and enhanced business outcomes, many organizations now place a high priority on diversity, equality, and inclusion (DEI) efforts.[\(Han et al. 2025\)](#)the paper showed about a degenerate elliptic equation with a. Organizations may create a diverse and skilled workforce by using AI to automate the screening of candidates and lessen their reliance on human judgment. But there are still issues with algorithmic bias and the moral application of AI, thus using AI in hiring requires a balanced strategy.

Material And Method

Using a mixed-methods approach, this comparative analysis will look at how AI-driven recruitment platforms and conventional recruitment techniques affect reducing hiring bias and fostering workplace diversity. Surveys will be used to gather quantitative data from hiring managers, recruiters, and HR specialists employed by companies that employ both traditional and AI-powered hiring practices. The poll will collect information on important diversity-related parameters, such as perceived fairness of AI-driven versus traditional recruitment methods, bias-related concerns, and demographic representation in hiring outcomes. In order to evaluate algorithmic fairness in AI-driven recruiting systems, DEI (Diversity, Equity, and Inclusion) statistics, and general hiring patterns, secondary quantitative data will also be collected from publicly accessible sources, including industry publications, scholarly research, and case studies.

Semi-structured interviews with hiring managers, HR specialists, and job seekers who have gone through both recruitment procedures will be used to gather qualitative data to supplement the quantitative data. Perceptions of AI's ability to lessen bias, difficulties in putting AI recruitment tools into practice, and its efficiency in promoting workplace diversity will all be covered in these interviews. To ascertain if AI-driven hiring improves fairness or strengthens pre existing prejudices, the experiences of candidates will also be examined. Transcripts of interviews will be

subjected to a thematic analysis in order to find recurrent themes, such as ethical issues, confidence in AI judgments, and organizational dedication to impartial hiring. In order to comprehend its bias-mitigation mechanisms, the AI recruitment software utilized by participating firms will also be examined.

A thorough assessment of how AI-driven recruitment systems stack up against conventional techniques in tackling hiring bias and fostering workplace diversity will be possible thanks to the combination of quantitative and qualitative data. The results will be compared to determine the advantages, disadvantages, and trade-offs of each strategy. The lack of long-term hiring outcome data, differences in AI system functions among firms, and the possibility of self-reported bias in survey replies are some of the study's limitations. Strict adherence to ethical principles will guarantee participant anonymity, informed permission, and data confidentiality. This study attempts to offer an unbiased evaluation of AI's influence on inclusive and equitable hiring practices by combining data from several sources.

Statistics Analysis

The impact of AI-driven recruitment systems vs conventional hiring practices in reducing bias and fostering workplace diversity will be statistically analyzed using SPSS. Key diversity measures, including complaints of hiring prejudice, fairness perception scores, and demographic representation, will be compiled using descriptive statistics. Organizations employing AI-driven solutions and those using conventional approaches will have their diversity outcomes compared using an Independent Samples t-test to find statistically significant differences. A Paired Samples t-test will evaluate how diversity measures changed before and after AI implementation for businesses who made the switch to AI-driven recruiting. If there are several levels of AI adoption (such as basic AI screening, advanced AI matching, and AI-powered interviewing), a one-way ANOVA will be performed. with significant differences being identified by post-hoc tests. To ensure a thorough assessment of AI's efficacy in lowering bias and promoting inclusivity in hiring, correlation and regression analysis will be used to investigate links between diversity indicators and AI adoption levels.

Results

Table: 1 Regardless of whether equal variances were assumed ($t(df \text{ unknown}) = 2.842, p = .006$) or not ($t(df \text{ unknown}) = 3.189, p = .002$), the independent samples t-test showed a statistically significant difference between the two groups, with a consistent mean difference of .727. The "equal variances not assumed" results are more dependable because the significance level of .004 for Levene's test indicates that the assumption of equal variances was probably broken.

Table: 2 Age differences between the groups are not statistically significant, according to the ANOVA results ($F(4, 105) = 2.283, p = .065$). Despite being greater than the within-group variance, the between-group variance is insufficient to rule out the null hypothesis at the usual significance threshold of 0.05.

Table: 3 Age and the belief that AI-driven hiring reduces time-to-fill and operational expenses are weakly correlated ($r = -.161$), according to a Pearson correlation analysis. There is no trustworthy linear relationship between age and this perception in our group, nevertheless, as this correlation is not statistically significant ($p = .101$).

Fig :1 The mean age of responders at varying degrees of agreement with the phrase "Can AI provide real-time updates on application status to candidates?" is displayed in this bar chart. Even if the confidence intervals overlap, suggesting some variability, the data points to a trend where people who "Strongly disagree" are often younger, with mean age rising as agreement levels climb.

Discussion

Table: 1 Regardless of whether identical variances are assumed ($p = .006$) or not ($p = .002$), this independent sample t-test shows a statistically significant difference between the two groups because both p-values are below the standard alpha threshold of 0.05. Although the standard error of the difference changes significantly based on the variance assumption, the mean



difference between the groups is consistently .727. When equal variances are not assumed, the standard error is reduced (.228), which results in a higher t-value (3.189). The two groups are probably selected from populations with varying incomes, according to the noteworthy findings.

Table: 2 Four groups' age differences are examined using the ANOVA. The p-value of .065 shows that the result is not statistically significant at the standard alpha level of 0.05, despite a trend indicating differences between groups ($F(4, 105) = 2.283$). Thus, based on this research, we are unable to draw the firm conclusion that the mean ages of the groups differ. To examine any age differences, more research may be required using bigger sample sizes or more targeted comparisons.

Table: 3 A Pearson correlation study between age and the belief that AI-driven hiring reduces time-to-fill and, therefore, lowers operating expenses is shown in the table. The two variables have a weakly negative association, as indicated by the correlation value of $-.161$. Given that the p-value is .101, which is higher than the standard alpha threshold of 0.05, this association is not statistically significant. As a result, we are unable to draw the conclusion that age and the perception that AI-driven hiring cuts expenses and time-to-fill are significantly correlated.

Limitation of the study

There are various restrictions on this study. Because perceptions of fairness and prejudice reduction may not perfectly match actual hiring outcomes, bias may be introduced by relying solely on self-reported data from HR experts, hiring managers, and job seekers. Because hiring procedures and degrees of AI usage differ throughout industries and businesses, the sample size may further restrict how broadly the results may be applied. Furthermore, the study concentrates on diversity and bias reduction, possibly ignoring other important aspects like work performance, long-term staff retention, and candidate quality. The findings of the study might soon become out of date if new AI-driven hiring tools appear, considering how quickly AI technology is developing. Finally, it is challenging to pinpoint the precise influence of AI on hiring practices due to their complexity, which means that a variety of factors outside of AI and conventional approaches may affect diversity and fairness in the hiring process.

Conclusion

The results indicate that although AI-powered recruiting practices may lessen hiring bias and encourage diversity in the workplace, it is still unclear if these benefits are statistically significant. Despite the fact that both quantitative and qualitative data show increases in representation and fairness, overlapping confidence intervals and organizational variability imply that AI adoption could not be the only factor influencing objective hiring results. The intricacy of recruiting dynamics is shown by statistical tests that show no discernible variations in diversity measures between AI-driven and conventional approaches in every instance. The need for careful interpretation is highlighted by study limitations such as sample size restrictions, self-reporting biases, and the quick development of AI technology. Verifying AI's actual influence on fair hiring procedures will require further studies using bigger, more varied sample sizes and objective performance metrics

Table and Graph

Table:1 The choice between the two rows depends on whether the Levene's test (not shown) indicated equal variances. The independent samples t-test indicates a statistically significant difference between the two groups, as indicated by a p-value of .006 (equal variances assumed) or .002 (equal variances not assumed), suggesting the mean difference of .727 is unlikely to be the result of chance.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	.004	



t	2.842	3.189
Sig. (2-tailed)	.006	.002
Mean Difference	.727	.727
Std. Error Difference	.256	.228

Table: 2 The impact of "Age" on several groups is examined in the ANOVA table. With degrees of freedom 4 and 105, the F-statistic of 2.283 yields a p-value of .065, meaning that, at the traditional alpha level of 0.05, there is no statistically significant difference in age between the groups.

ANOVA					
Age					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.354	4	1.339	2.283	.065
Within Groups	61.564	105	.586		
Total	66.918	109			

Table: 3 Age and whether AI-driven hiring reduces time-to-fill and lowers operating expenses are weakly correlated ($r = -.161$), according to the table. We do not, however, have sufficient data to draw the conclusion that there is a trustworthy association between age and the perceived effects of AI-driven hiring on time-to-fill and operating costs in this sample of 105 people because this correlation is not statistically significant ($p = .101$).



Correlations

		Age	Does AI-driven hiring decrease time-to-fill, leading to lower operational costs?
Age	Pearson Correlation	1	-.161
	Sig. (2-tailed)		.101
	N	105	105
Does AI-driven hiring decrease time-to-fill, leading to lower operational costs?	Pearson Correlation	-.161	1
	Sig. (2-tailed)	.101	
	N	105	105

Fig : 1 The mean age of respondents across various agreement levels about AI's capacity to deliver real-time application status updates is depicted in this bar chart. With the mean age rising as agreement levels rise, the data points to a pattern where individuals who "Strongly disagree" are younger.



**THE PURPOSE OF EXPERIENTIAL LEARNING IN FASHION
EDUCATION: ADDRESSING THE KNOWLEDGE GAP BETWEEN
INDUSTRY AND ACADEMICS**

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Abstract:

Kolb's experience learning theory from 1984 served as the foundation for experiential learning, which is a significant advancement in fashion education. Its ability to bridge the gap between academic training and the growing demands of the fashion business is observed in this evaluation. This study explores methods, benefits, challenges, and future prospects for experiential learning by analyzing a large number of academic studies and industry review. The findings highlight organizational difficulties to successful implementation while indicating significant impacts on students' skill development and industry willingness. The analysis ends with useful recommendations for including experiential learning into fashion curricula to ensure a workforce that is properly prepared.

The results highlight how experiential learning helps fashion students become more critical thinkers, creative thinkers, and adaptable in addition to bridging the gap between theory and practice. Students gain a cultured hold of professional procedures and industry norms by taking part in practical projects, internships, and industry partnerships. This practical method ensures that graduates have the abilities and competencies needed to succeed in fast-paced fashion industries by strengthening the relations between academic learning and real-world problems.



The review also points out other problems, like lack of awareness in experiential approaches and restricted access to industrial relationships. It will need significant investments in curriculum design, infrastructure, and cooperation with industry players to overcome these difficulties. Fashion education programs may develop strong experiential learning frameworks and better prepare students to handle the continuously changing demands of the global fashion business by executing suggestions.

Keywords: *Experiential Learning, Fashion Education, Industry-Academia Gap, Knowledge Gap, Practical Learning, Internships, Curriculum Development, Skill Development, Industry Collaboration, Sustainability in Fashion, Experiential Pedagogy, Fashion Industry Readiness.*

Introduction:

This paper explores experiential learning's function in fashion education, highlighting how it closes the knowledge gap between academia and industry. The goal of the study is to give a thorough hold of how experiential learning techniques might be applied to address modern difficulties by referring to previous research and industry reports.

Also, an increasing understanding of the significance of matching academic curricula with industry demands is seen in the inclusion of experiential learning in fashion education. Through internships, real-world projects, or group workshops, these educational opportunities expose students to the realities of the fashion industry. In addition to improving technical skill, these experiences foster competence, teamwork, and creativity—qualities essential for succeeding in a cutthroat and quick-paced global marketplace.

The application of experiential learning is not without difficulties, despite its potential. Some of the barriers preventing its wider execution include inadequate infrastructure, a lack of industry resources, and a lack of readiness among instructors. In order to ensure that fashion education

adapts to the needs of a continuously changing business, this article examines these problems, highlights successful case studies, and offers possible suggestions for removing these obstacles.

Objectives

1. To explore the role of experiential learning in addressing knowledge and skill gaps in fashion education.
2. To review and analyze existing experiential learning methods in fashion education.
3. To identify challenges and barriers to implementing experiential learning in fashion curricula.
4. To propose recommendations for enhancing the alignment between academic programs and industry requirements.

Review of Literature:

Over time, fashion education has changed, with a growing emphasis on closing the knowledge gap between academic frameworks and industry demands.

Kolb's Experiential Learning Theory (1984) forms the cornerstone of this pedagogical approach, emphasizing the interplay between experience, reflection, conceptualization, and experimentation ^[1]. The theory has been widely adopted across disciplines, including fashion education, to promote active learning and adaptability. Brown and Clarke (2020) highlight a misalignment between the academic content of fashion programs and industry needs ^[2]. Key deficiencies include limited exposure to digital tools, insufficient emphasis on sustainability, and a lack of practical problem-solving opportunities. Lopez and Mendez (2018) emphasize that internships provide students with invaluable insights into workplace dynamics and expectations ^[3]. Industry-academic collaborations, as explored by Harper et al. (2021), enable students to engage in real-world problem-solving and innovation ^[4]. Kim and Park (2019) found these methods to be particularly effective in replicating industry scenarios, fostering critical thinking and decision-making skills ^[5]. Smith and Taylor (2022) identify barriers such as resource constraints, lack of standardized evaluation metrics, and resistance to curriculum changes ^[6]. Addressing these challenges requires a multi-stakeholder approach.

Methodology:

This study employs a qualitative review methodology to comprehensively analyze data drawn from diverse sources such as academic publications, industry reports, case studies, and peer-reviewed journals. The goal of the research is to develop a comprehensive grasp of the topic by combining these diverse viewpoints. The methodological framework employs a systematic approach to guarantee accuracy and consistency in the information synthesis process. By doing this, the study promotes a comprehensive understanding of experiential learning in fashion education by highlighting the connections between theoretical ideas and real-world implementations.

Literature Search:

This study's initial step comprised a methodical investigation of reliable resources like ResearchGate, Google Scholar, and JSTOR. This methodical procedure was directed by the utilization of particular terms such as "fashion education," "experiential learning," and "industry-academia gap." These keywords were picked with care to make sure the search turned out pertinent, excellent research that advances knowledge of experiential learning in the context of fashion education. A foundation of varied resources, such as research articles, industry and case studies, were uncovered through the literature search and were essential to the analysis.

Inclusion Criteria:

The studies found during the literature search were filtered using a strong set of inclusion criteria. The selection criteria were centered on choosing research that examined the results of experiential learning, the difficulties encountered during implementation, and its unique function in fashion education. Excluded studies were those that lacked empirical support or did not fit the scope. Only the most significant and pertinent papers were included in the study due to the strict selection process, which allowed for a targeted and insightful investigation of the topic.

Synthesis of Understandings:

In the synthesis phase, the identified themes were woven into a organized description. In order to convey findings that were supported by evidence, this phase required fusing theoretical understanding with real-world situations. In order to make a significant contribution to conversations on experiential learning in fashion education, the synthesis sought to close the gap between scholarly research and industry practices. The study aims to enable educators, and industry stakeholders to work together to improve the educational landscape by offering practical insights.

Contributions and Implications:

By combining many viewpoints to provide a thorough hold of experiential learning in fashion education, this study significantly advances the field. It provides a framework for resolving implementation issues in addition to highlighting how crucial it is to match academic courses with industrial demands. By doing this, the study offers a useful tool for encouraging creativity and teamwork in the business, ensuring that fashion education changes to satisfy the ever- changing demands of the sector.

Results and Discussion

Advantages of Experiential Learning:

1. Skill Development

Students who participate in experiential learning acquire a variety of skills that are essential for success in both their personal and professional lives. Technically speaking, students get practical exposure with cutting-edge instruments, technologies, and approaches related to their subject of

study. For example, fashion students may use digital platforms to learn how to use contemporary sewing machines, run design software, or assess market trends. Students gain important soft skills including time management, teamwork, flexibility, and effective communication on the interpersonal front. Group projects, presentations, and problem-solving exercises help students develop these abilities by requiring them to work together and use their creativity while facing practical limitations. Furthermore, experiential learning fosters critical thinking and decision-making skills, which empower students to tackle difficulties with guarantee and creativity.

2. Industry Readiness:

The capacity of experiential learning to prepare students for the working world is among its most significant advantages. Students are exposed to workplace dynamics firsthand through hands-on experiences like internships, cooperative education programs, and live projects. They gain knowledge of organizational culture, professional ethics, and the standards that are expected of workers in their respective fields. For instance, students can learn about the fast-paced dynamics of the fashion industry through internships, which teach them how to manage client relationships, fulfill deadlines, and adjust to quickly shifting trends. Because of this practical experience, students develop a sense of responsibility and professionalism that helps them make a smooth transition from institute to the workplace.

3. Bridging the Gap Between Academia and Industry:

The connection between classroom theory and its practical implementation in real-world situations is made possible through experiential learning. While theoretical understanding is crucial, traditional academic systems frequently lay too much emphasis on it, leaving students unprepared for the demands of the profession. By fusing theoretical knowledge with real-world applications through group projects, case studies, and internships, experiential learning fills this knowledge gap. These kinds of experiences support students understand how their education relates to solving real-world problems in addition to supporting theoretical learning. This

collaboration between academia and business guarantees that graduates are prepared to handle the evolving needs of their professions.

4. Improved Engagement and Motivation:

Students actively participate in the learning process through experiential learning, which increases their level of engagement. In contrast to conventional lecture-based approaches, experiential learning involves students in relevant and important activities, which enhances the learning process and increases its effect. Students have a sense of achievement that increases their motivation when they can see the evident outcomes of their efforts, such as finishing a project effectively or participating in a team.

6. Building Confidence and Independence

Students gain confidence in their skills through experiential learning, which immerses them in real-world situations. Students gain resilience and self-reliance when they overcome obstacles, make choices, and work through issues on their own. When students observe the real-world effects of their work or hear encouraging remarks from professionals in the field, this confidence is further strengthened. For instance, a student who successfully presents a design concept to a group of professionals in the field not only receives approval for their ideas but also acquires the bravery to face obstacles head-on in the future.

7. Long-Term Career Benefits

In the employment market, the abilities and experiences acquired by experiential learning can offer a competitive advantage. Candidates with real-world experience and the ability to swiftly adjust to new work contexts are highly valued by employers. Through contacts with peers, coworkers, and industry mentors, experiential learning also assists students in developing professional networks. These relationships can be very helpful in the future when looking for mentorships, jobs, and internships.

Conclusion

Fashion education could undergo a significant transformation through experiential learning, which provides a dynamic method that connects classroom theory to practical application. This strategy strengthens the bond between educational institutions and the fashion industry, guaranteeing that students have the practical skills and flexibility needed to succeed in a dynamic, fast-paced workplace in addition to their core knowledge. Experiential learning gives students a thorough grasp of the demands and complexities of the working world by combining practical experiences like internships, real-world projects, and cooperative industry collaborations.

The gap between academic programs and industry demands is one of the most important issues facing fashion education. Although theoretical concepts are important, traditional classroom-based approaches frequently concentrate on them, which may not adequately prepare students for the operational and creative demands of the fashion business. This gap is filled by experiential learning, which places students in real-world situations where they can apply what they've learned to solve problems. In order to help them transition smoothly into professional employment after graduation, students who participate in internships, for example, get firsthand exposure to production deadlines, trend forecasts, and client management. Experiential learning guarantees that fashion programs stay up to date and responsive to market demands by strengthening ties between academics and industry.

Addressing Systemic Issues

Although experiential learning has a lot of potential, there are certain difficulties in putting it into practice. Systemic obstacles that many educational institutions must overcome include a lack of funding, uneven access to business partnerships, and the challenge of creating strong assessment frameworks. For instance, a lack of resources may make it difficult for educational institutions to

give students access to state-of-the-art equipment and technology, which would limit their capacity to participate completely in experiential learning opportunities. Assessment difficulties can occur when attempting to gauge more qualitative abilities like creativity, teamwork, and flexibility. Institutions must use creative approaches to get around these challenges, such using digital platforms to offer virtual internships or establishing long-term alliances with business stakeholders to get steady support.

Preparing Students for Industry Demand

Rapid changes in customer preferences, technology breakthroughs, and sustainability concerns are what define the fashion industry. Students who participate in experiential learning get the agility and vision necessary to successfully negotiate this changing environment. Students gain experience analyzing new trends, integrating sustainable practices, and adjusting to technical advancements like 3D printing and AI-powered design tools through practical projects. Their technical proficiency is improved by these experiences, but they also foster a mindset of problem-solving and ongoing learning, two qualities that are essential for long-term success in the field.

The Role of Future Research

Future studies must concentrate on improving current approaches and investigating their wider implications for workforce development if experiential learning is to reach its full potential in fashion education. Research should look at the effects of various experiential learning methods on student outcomes, such as hybrid programs that combine virtual and real-world experiences. To evaluate experiential learning's efficacy in promoting employability and professional advancement, studies should also look into the long-term career paths of students who have participated in it. Investigating how to incorporate cutting-edge technology like augmented

reality (AR) and virtual reality (VR) into experiential learning frameworks may potentially lead to new opportunities for innovation in fashion education.

Implications for Workforce Development

Beyond the results of individual students, experiential learning has wider ramifications for the workforce's general development. Experiential learning helps to bridge skill gaps and boost the fashion industry's competitiveness by producing graduates who are prepared, self-assured, and industry-ready. Candidates with a combination of technical know-how, innovative problem-solving skills, and an awareness of workplace dynamics are advantageous to employers. Consequently, practical learning enhances the industry's ability to innovate and adjust to global trends while also improving the quality of education.

Future Suggestions

1. Curriculum Redesign: Make experiential learning a core component of fashion education, emphasizing digital innovation and sustainability.
2. Structured Partnerships: Establish formal agreements between academic institutions and industry stakeholders to ensure consistent, meaningful experiential opportunities.
3. Funding and Resources: Advocate for increased investment in workshops, internships, and technological tools.
4. Assessment Frameworks: Develop standardized metrics to evaluate experiential learning outcomes, ensuring transparency and continuous improvement.
5. Research and Innovation: Encourage studies on the long-term impacts of experiential learning, particularly in light of global market shifts and technological advancements.



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ISO 20022 AND DIGITAL BANKING: ENHANCING TRUST AND CUSTOMER ENGAGEMENT THROUGH STANDARDIZED FINANCIAL MESSAGING

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Abstract

This paper delves into the key benefits, implementation challenges, regulatory implications, and future outlook of ISO 20022, emphasizing its role in fostering trust and engagement in the digital banking landscape. The global financial industry is undergoing a significant transformation with the adoption of ISO 20022, a universal financial messaging standard designed to enhance interoperability, efficiency, and transparency in digital banking. As financial transactions become increasingly digital, ISO 20022 plays a crucial role in strengthening trust between banks and customers by improving the accuracy, speed, and security of payment processes. This paper explores how ISO 20022 enhances trust and customer engagement in digital banking through standardized financial messaging. ISO 20022 provides a structured and data-rich format that enables seamless communication between financial institutions, reducing errors and fraud risks. It supports real-time payment processing, detailed transaction tracking, and better regulatory compliance, making banking services more reliable and customer-friendly. Additionally, financial institutions can leverage ISO 20022 data structures to enhance customer experience by offering personalized financial insights and fraud detection measures. With an increasing number of central banks and financial institutions migrating to ISO 20022 by 2025, this standard is set to revolutionize the banking sector.

Keywords: *ISO 20022, digital, financial institutions, personalized financial, banking sector, implementation, challenges, digital banking.*

Introduction

Overview of Digital Banking and Financial Messaging

The financial industry is undergoing a profound digital transformation, driven by rapid advancements in technology, evolving customer expectations, and stringent regulatory requirements. Digital banking has become a cornerstone of modern financial services, enabling customers to conduct transactions, manage accounts, and access financial products with greater ease and efficiency. With the rise of real-time payments, mobile banking, and fin-tech innovations, financial institutions must modernize their messaging infrastructure to facilitate faster, more secure, and transparent transactions.

Financial messaging plays a crucial role in digital banking by enabling seamless communication between banks, payment service providers, and regulatory bodies. Traditional financial messaging standards, such as SWIFT MT (Message Type) formats, have long been used to facilitate cross-border and domestic transactions. However, these legacy standards often lack the flexibility and data richness required to meet the growing demands of digital banking. As a result, financial institutions worldwide are transitioning to ISO 20022, a global financial messaging standard that enhances efficiency, security, and customer engagement in banking transactions.

Importance of Standardization in Banking

Standardization in banking is essential for achieving interoperability, reducing errors, and enhancing trust between financial institutions and their customers. The lack of a universal messaging standard has historically led to inefficiencies, processing delays, and higher operational costs. Moreover, inconsistencies in data formats increase the risk of fraud and make regulatory compliance more challenging. By adopting ISO 20022, banks can eliminate these inefficiencies and create a more seamless financial ecosystem.

One of the primary benefits of standardization is interoperability. The global banking landscape comprises a vast network of financial institutions, payment service providers, central banks, and regulatory bodies, all of which must communicate efficiently. ISO 20022 facilitates this by providing a common language for financial messaging, ensuring that all

participants in the ecosystem can exchange structured and meaningful transaction data without discrepancies.

Another critical aspect of standardization is regulatory compliance. Financial institutions must comply with an increasing number of regulations related to anti-money laundering (AML), counter-terrorism financing (CTF), and fraud prevention. ISO 20022 helps banks meet these compliance requirements by capturing and transmitting detailed transaction information, including originator and beneficiary details, payment purposes, and risk indicators. This enhanced transparency not only reduces compliance risks but also strengthens trust between banks, customers, and regulators.

The Role of ISO 20022 in Modern Banking

ISO 20022 represents a paradigm shift in financial messaging, offering a structured, data-rich format that supports real-time processing and automation. Unlike traditional message formats that rely on fixed-length fields, ISO 20022 uses extensible mark-up language (XML) and structured data elements to enable more flexible and detailed financial communication. One of the key advantages of ISO 20022 is its ability to support real-time and cross-border payments. Customers today expect instant and seamless transactions, whether they are making domestic payments, international transfers, or business-to-business (B2B) transactions. With ISO 20022, banks can process payments faster, provide real-time payment tracking, and offer enhanced reconciliation capabilities. This improved efficiency reduces transaction delays, enhances cash flow management, and strengthens trust between banks and their customers. Additionally, ISO 20022 enhances security and fraud prevention. The standard enables banks to include rich metadata in their transaction messages, allowing them to perform more sophisticated fraud detection and risk analysis. By providing detailed information about transaction initiators, intermediaries, and recipients, ISO 20022 helps financial institutions identify suspicious activities and prevent fraudulent transactions.

Adoption Trends and Industry Impact

The adoption of ISO 20022 is gaining momentum worldwide, with major financial institutions, central banks, and payment networks actively transitioning to the new standard.

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) has mandated a phased migration to ISO 20022, with full implementation expected by 2025. Similarly, central banks and payment infrastructures in regions such as the European Union, the United States, China, and Australia have announced plans to adopt ISO 20022 for domestic and cross-border payments.

For banks, implementing ISO 20022 offers a range of operational benefits, including cost reduction, improved data analytics, and enhanced customer experience. By leveraging the rich data structures of ISO 20022, banks can offer customers personalized financial insights, better fraud detection services, and seamless payment experiences. Furthermore, the standard supports greater automation in banking processes, reducing the need for manual interventions and minimizing errors in transaction processing.

However, the transition to ISO 20022 is not without challenges. Financial institutions must undertake significant technology upgrades, train personnel, and ensure compatibility with existing banking systems. Additionally, migrating from legacy standards to ISO 20022 requires coordination between banks, payment service providers, and regulators to avoid disruptions in financial transactions.

The Future of ISO 20022 and Digital Banking

As digital banking continues to evolve, ISO 20022 is expected to play a pivotal role in shaping the future of financial messaging. The standard's ability to support real-time payments, enhanced data analytics, and seamless cross-border transactions positions it as a foundational element of modern banking infrastructure. In the coming years, banks that successfully integrate ISO 20022 will gain a competitive advantage by offering faster, safer, and more transparent payment services. Additionally, as artificial intelligence (AI) and machine learning (ML) become more integrated into banking operations, the rich data structures of ISO 20022 will enable advanced fraud detection, personalized financial recommendations, and automated compliance reporting.

Moreover, the adoption of ISO 20022 aligns with the global push toward open banking and financial inclusion. By standardizing financial messaging, banks can collaborate more effectively with fintech companies, enabling new financial products and services that cater to underserved populations.

Understanding ISO 20022

a. Definition and Overview

ISO 20022 is an international financial messaging standard that provides a structured and data-rich framework for electronic transactions across the banking and payments industry. Developed by the International Organization for Standardization (ISO), ISO 20022 is designed to improve interoperability, efficiency, and security in financial communications. Unlike older financial messaging standards that use fixed-length formats, ISO 20022 utilizes Extensible Markup Language (XML) and Abstract Syntax Notation One (ASN.1) to create a flexible and extensible data model.

ISO 20022 supports multiple financial services, including payments, securities trading, foreign exchange, and treasury management. It is widely regarded as the future of financial messaging due to its ability to provide detailed, structured, and standardized transaction data, which enhances automation, transparency, and regulatory compliance.

b. Key Features of ISO 20022

1. **Rich Data Structure** – Unlike legacy formats, ISO 20022 allows for the inclusion of detailed transaction data, such as payment purpose, remittance information, and structured beneficiary details, which improves transparency and efficiency.
2. **Interoperability** – The standard is designed to work across different financial systems, allowing seamless communication between banks, payment service providers, and financial institutions globally.
3. **Real-Time Processing** – ISO 20022 enables faster payments and real-time processing, making it ideal for modern banking environments where speed and accuracy are critical.
4. **Regulatory Compliance** – The standard includes detailed data elements that help financial institutions comply with anti-money laundering (AML), counter-terrorism financing (CTF), and fraud prevention regulations.
5. **Adaptability and Scalability** – ISO 20022 is future-proof, meaning it can be updated and expanded to accommodate emerging banking trends, such as crypto currency transactions and open banking.

C. Differences between ISO 20022 and Legacy Standards

- **SWIFT MT vs. ISO 20022** – SWIFT MT messages are widely used in cross-border payments but lack structured data, making them difficult to process automatically. ISO

20022 messages provide richer and more structured data, reducing errors and improving reconciliation.

- Proprietary Bank Formats vs. ISO 20022 – Many banks use customized message formats, leading to inefficiencies. ISO 20022 standardizes financial messaging, enabling global consistency.

D. Industry Adoption and Impact

Leading financial institutions, SWIFT, the European Central Bank (ECB), and the Federal Reserve, is actively implementing ISO 20022, with full global adoption expected by 2025. This transition will enhance efficiency, security, and customer trust in financial transactions.

Enhancing Trust through ISO 20022

Trust is a fundamental pillar of digital banking, and ISO 20022 plays a crucial role in strengthening customer confidence by improving transparency, security, and regulatory compliance in financial transactions. By providing a standardized, data-rich financial messaging framework, ISO 20022 enhances trust among banks, businesses, and customers in several key ways.

i. Improved Data Transparency

ISO 20022 enables financial institutions to transmit structured and detailed transaction information, including payment purpose, sender and receiver details, and remittance data. This enhanced transparency reduces confusion, improves payment reconciliation, and minimizes errors in transaction processing. Customers benefit from clearer transaction records, reducing disputes and increasing confidence in banking services.

ii. Enhanced Security and Fraud Prevention

The detailed data elements in ISO 20022 help banks identify and prevent fraudulent activities. By capturing more granular transaction details, banks can implement advanced fraud detection mechanisms, such as real-time monitoring, AI-driven risk analysis, and automated alerts for suspicious transactions. This proactive fraud prevention strengthens security and reassures customers that their transactions are protected.

iii. Regulatory Compliance and Risk Mitigation

ISO 20022 is designed to meet global regulatory standards, including Anti-Money Laundering (AML), Counter-Terrorism Financing (CTF), and Know Your Customer (KYC) requirements. The ability to capture and share detailed transaction data ensures better compliance with international regulations, reducing financial crime risks. Customers and businesses can trust banks that adhere to ISO 20022, knowing their transactions are secure, legal, and fully traceable.

4. Customer Engagement in Digital Banking

Customer engagement is a critical factor in digital banking success, and ISO 20022 enhances engagement by enabling faster, more personalized, and transparent banking experiences. With the rise of digital transactions, banks must leverage advanced financial messaging to improve customer satisfaction and loyalty.

1. Personalized Banking Services

ISO 20022 allows banks to capture and analyse detailed transaction data, enabling them to offer personalized financial insights, tailored product recommendations, and customized alerts. According to a PwC report, 63% of consumers expect personalized financial services, and ISO 20022 helps banks meet this demand by using enriched payment data to understand spending habits and financial needs.

2. Real-Time Payment Processing

Customers increasingly prefer instant transactions, and ISO 20022 facilitates real-time payments by improving message standardization and data flow efficiency. A McKinsey study shows that real-time payments have grown by 41% annually, driven by customer demand for faster and more transparent banking services. ISO 20022's structured data format reduces processing delays, allowing customers to receive funds quickly and track transactions in real time.

3. Transaction Insights and Alerts

ISO 20022 enhances banking applications by providing detailed transaction descriptions and automated alerts. Customers can receive real-time updates on payment statuses, fraud

warnings, and account activity, improving financial awareness and engagement. A study by Accenture found that 72% of banking customers prefer proactive notifications about their transactions, highlighting the value of ISO 20022 in delivering enhanced customer experiences.

Implementation of ISO 20022 in Global Banking

The global financial industry is transitioning to ISO 20022 to enhance interoperability, efficiency, and security in banking transactions. With major financial institutions and regulatory bodies mandating its adoption, ISO 20022 is reshaping the banking landscape.

1. Migration Strategies and Challenges

Financial institutions are adopting phased migration approaches to ensure a smooth transition. SWIFT, which supports over 11,000 banks worldwide, began the ISO 20022 migration for cross-border payments in 2023, with full implementation expected by 2025. Central banks, including the European Central Bank (ECB) and the Federal Reserve, have also set timelines for their migration.

However, implementation presents challenges, such as:

- **Legacy System Compatibility** – Many banks operate on out dated infrastructure, requiring significant technology upgrades.
- **Data Transformation** – Converting existing message formats (e.g., SWIFT MT to ISO 20022 XML) requires mapping strategies to ensure consistency.
- **Operational Costs** – Banks must invest in staff training, compliance updates, and testing frameworks to meet the new standard.

2. Case Studies of Banks Implementing ISO 20022

- **European Banks:** The TARGET2 (T2) system, operated by the ECB, successfully adopted ISO 20022 in March 2023, streamlining real-time gross settlement (RTGS) payments.
- **Asia-Pacific:** The Reserve Bank of India (RBI) has mandated ISO 20022 adoption for real-time payments and securities transactions.
- **United States:** The Federal Reserve's FedNow Service, launched in 2023, supports ISO 20022 to enable instant payments.



Regulatory and Compliance Considerations in ISO 20022 Implementation

ISO 20022 plays a crucial role in regulatory compliance by enabling financial institutions to meet global requirements for transparency, security, and anti-financial crime measures. As regulatory bodies emphasize stricter anti-money laundering (AML), counter-terrorism financing (CTF), and Know Your Customer (KYC) regulations, ISO 20022 provides the necessary data structure to support compliance.

a. Enhancing Compliance with Global Regulations

ISO 20022 enables banks to meet the requirements of regulatory frameworks such as:

- Financial Action Task Force (FATF) – Requires structured transaction data to detect and prevent money laundering and terrorist financing.
- European Union's PSD2 (Revised Payment Services Directive) – ISO 20022 supports open banking requirements and secure payment authentication.
- Basel III & Dodd-Frank Act – The enriched data helps banks manage liquidity risk and capital adequacy, improving regulatory reporting.

By offering detailed and structured transaction data, ISO 20022 enhances regulatory reporting, transaction monitoring, and risk assessment.

b. Reducing Fraud and Financial Crime Risks

ISO 20022's rich data format allows financial institutions to capture detailed sender and beneficiary information, helping detect suspicious activities in real-time. Banks can integrate AI-driven fraud detection tools with ISO 20022 messages to strengthen compliance with AML and CTF laws.

c. Challenges in Regulatory Adoption

- Data Standardization – Ensuring consistency in data mapping across financial institutions is a complex task.
- Cross-Border Regulatory Differences – Different jurisdictions have varying compliance requirements, making global alignment challenging.

Technological Innovations Supporting ISO 20022

The successful adoption of ISO 20022 in global banking is driven by cutting-edge technological innovations that enhance efficiency, security, and interoperability. Financial

institutions are leveraging AI, block chain, cloud computing, and API integrations to facilitate seamless ISO 20022 implementation.

a. Artificial Intelligence (AI) and Machine Learning

AI and machine learning enhance ISO 20022 adoption by:

- Automating Data Mapping – AI-driven tools help convert legacy SWIFT MT messages into ISO 20022 XML formats, reducing manual errors.
- Fraud Detection and Risk Management – AI analyzes ISO 20022 transaction data to detect anomalies, suspicious activities, and fraud patterns in real time.

According to a PwC study, AI-driven compliance systems reduce fraud detection time by 30%, strengthening financial security.

b. Block chain for Secure Transactions

Block chain technology enhances ISO 20022 by:

- Improving Transparency – Distributed ledger technology (DLT) ensures that ISO 20022 messages remain tamper-proof and traceable.
- Enhancing Cross-Border Payments – Banks use blockchain with ISO 20022 to streamline international transactions, reducing delays and costs.

A World Economic Forum (WEF) report states that blockchain reduces settlement times by up to 50%, benefiting banks and customers alike.

c. Cloud Computing and API Integrations

Cloud-based financial systems support ISO 20022 by:

- Enabling Scalable Payment Infrastructure – Banks use cloud platforms to process large volumes of ISO 20022 messages efficiently.
- Seamless API Connectivity – Open Banking APIs allow real-time data exchange, ensuring smooth communication between financial institutions.

Challenges and Risks of ISO 20022 Adoption

While ISO 20022 offers significant benefits, its adoption presents challenges and risks for financial institutions, regulators, and payment service providers. The transition from legacy financial messaging systems to ISO 20022 requires technological upgrades, operational adjustments, and regulatory alignment.

a. Legacy System Integration and Implementation Costs

Many banks rely on out dated financial messaging systems (e.g., SWIFT MT), making the migration to ISO 20022 complex and costly. Challenges include:

- **System Overhaul** – Banks must upgrade core banking systems to support ISO 20022 XML-based messaging, requiring significant investment.
- **High Implementation Costs** – According to a Deloitte report, financial institutions may spend millions of dollars on infrastructure upgrades, testing, and training.

b. Data Standardization and Interoperability Issues

Although ISO 20022 promotes standardization, variations in data interpretation across financial institutions can lead to:

- **Inconsistencies in Transaction Processing** – Differences in how banks implement ISO 20022 may cause data mismatches and errors.
- **Cross-Border Compliance Challenges** – Different regulatory frameworks in global markets complicate standard adoption.

c. Cyber security and Fraud Risks

ISO 20022 provides rich transaction data, but increased data granularity also raises cyber security risks:

- **Higher Risk of Data Breaches** – More detailed transaction data can be a target for cyber criminals.
- **Complex Fraud Detection** – Banks must deploy AI-driven monitoring tools to detect sophisticated fraud attempts.

Future of ISO 20022 in Digital Banking

ISO 20022 is set to redefine digital banking by enabling faster payments, enhanced security, and seamless global interoperability. As more financial institutions transition to this standard, the future of ISO 20022 will be shaped by technological advancements, regulatory alignment, and industry-wide adoption.

a. Expansion of Real-Time Payments

ISO 20022 is driving the global adoption of real-time payments (RTP), allowing banks to offer instant, 24/7 transactions. According to McKinsey, real-time payment volumes are expected to grow by 45% annually, with ISO 20022 as the foundation for standardized messaging in these systems. Major economies, including the U.S. (FedNow), Europe (SEPA Instant), and India (UPI), are adopting ISO 20022 for faster and more transparent transactions.

b. AI and Automation in Banking

ISO 20022's data-rich structure enhances the use of AI-driven analytics to:

- Offer personalized banking experiences, such as spending insights and tailored financial products.
- Strengthen fraud detection systems by analysing transaction patterns in real time.
- Automate regulatory compliance reporting, reducing manual intervention and errors.

c. Integration with Block chain and Digital Assets

The future of ISO 20022 will also see deeper integration with block chain and central bank digital currencies (CBDCs).

- SWIFT's CBDC trials demonstrate how ISO 20022 can facilitate cross-border transactions for digital currencies.
- Decentralized finance (DeFi) platforms are exploring ISO 20022 for secure and transparent payment messaging.

ISO 20022 Change the Future of Financial Transactions

The upcoming shift to ISO 20022 messaging is more than just meeting compliance standards. It represents a strategic transformation that empowers financial institutions to tap into the benefits of rich, structured data. This change is sparking innovation and enhancing service offerings across the board. Global payment systems like FedNow, Fedwire, Swift, and RTP® in the US are adopting the new ISO 20022 standard. This creates opportunities for businesses to use the improved data-driven environment to their benefit.

Strategies for ISO 20022 Adoption

Effective strategies are crucial for a successful transition to ISO 20022.

- a. **Complexity and Scope:** Adopt ISO 20022 in phases, starting with crucial message types or business areas. Expand gradually and involve experts and external resources for a smooth transition.
- b. **Legacy System Integration:** Evaluate existing systems for necessary improvements. Partner with tech experts for tailored solutions or use ISO 20022-compliant adapters for smooth integration.
- c. **Data Mapping & Conversion:** Perform detailed data analysis and mapping to convert existing data to ISO 20022. Involve experts for validation and consider automation tools for a streamlined migration process.



- d. **Stakeholder Engagement & Training:** Create a thorough stakeholder engagement and training strategy with tailored communication and workshops. Work with experts to provide training and on-going support for all stakeholder groups.
- e. **Regulatory Compliance:** Keep abreast of regulatory guidelines for ISO 20022 in your area. Collaborate with compliance and legal teams for adherence. Ensure strong data privacy and security for ISO 20022 messages.

Important for corporate customers

ISO 20022 introduces a universal language for financial information that simplifies and streamlines business transactions worldwide. This standard improves collaboration across the financial services industry. It makes it easier to provide services such as payments, securities, trade finance, and card transactions.

Essentially, these requirements modernize the structuring of financial messages. It moves towards a data-driven approach, which improves clarity and efficiency in financial services. This advancement in data management helps institutions communicate better, making sure that financial transactions are quick, efficient, and safe. Businesses are more aware of ISO 20022 messaging standards than financial institutions believe. Over 90% of businesses are interested in or aware of ISO 20022 messaging standards.

For corporate customers and businesses, ISO 20022 messaging enriches the data available from financial transactions, which in turn opens several strategic opportunities:

- a. **Enhanced Transaction Transparency.** ISO 20022 provides deeper insights into payment transactions, allowing businesses to track and report financial flows more accurately. This can aid in better cash management, more precise forecasting, and enhanced liquidity planning.
- b. **Improved Reconciliation Processes.** The data richness simplifies this process. Businesses can use the benefits of ISO 20022 to automate and streamline operations, reducing errors and freeing up resources.
- c. **Efficient Supply Chain Management.** ISO 20022 facilitates improved supply chain finance by providing detailed and standardized data across different jurisdictions and financial institutions. This level of detail helps identify transaction bottlenecks and optimize supply chain decisions.
- d. **Risk Management and Fraud Prevention.** The ISO 20022 standard helps companies manage risks and prevent fraud by providing detailed transaction information.



Financial institutions can use this additional information to enhance controls and create better audit trails. This leads to better risk management practices and reduced exposure to fraud.

e. **Enhanced Risk Management and Compliance.** The standard supports compliance with evolving regulatory reporting requirements and enhances payment transparency. Risk and compliance teams rely on this, especially in monitoring payments on behalf of third parties (POBO).

f. **Streamlining Cross-Border Payments.** ISO 20022 enables payments to carry detailed remittance information, lessening the pain points. This allows for the automation of account reconciliation processes and standardizes the transmission of transaction information globally.

ISO 20022 presents many long-term benefits and opportunities. Businesses can significantly enhance the value derived from their payment processes. Conversely, those who do the minimum may fail to fully capitalize on the advantages ISO 20022 offers.

Financial Institutions Can Capitalize on Corporate Demand for ISO 20022 Benefits

Financial institutions can meet demand by offering tailored solutions that businesses need while creating significant advantages. Here's how banks can make the most of this opportunity:

a. **Attract and Retain Clients:** Banks can draw in new corporate clients. We can encourage existing clients to stay by demonstrating the value proposition of ISO 20022 through tangible benefits.

b. **Strengthen Client Relationships.** Financial institutions can do this by providing tools and services that support ISO 20022, maximizing the customer banking experience. By offering these resources, banks can enhance customer satisfaction and loyalty. This can ultimately lead to increased customer retention and growth for the bank.

c. **Gain a Competitive Edge.** Financial institutions can stand out by adopting ISO 20022 message formats early, showing their dedication to innovation and efficiency.

d. **Grow Revenue.** New revenue streams for financial institutions come from developing value-added services. ISO 20022 data provides the opportunity for automation tools, data analytics platforms, and customized financial products.



Conclusion

ISO 20022 is poised to become the global standard for financial messaging, significantly transforming digital banking operations. By offering enriched data formats, real-time transaction tracking, and enhanced fraud prevention mechanisms, ISO 20022 fosters greater trust between banks and their customers. Financial institutions adopting ISO 20022 can enhance customer engagement by providing more transparent, efficient, and secure payment solutions. By improving data transparency, enhancing fraud prevention, and ensuring regulatory compliance, ISO 20022 fosters greater trust between banks, customers, and regulators. As global adoption increases, customers will experience safer, more efficient, and transparent banking services, ultimately reinforcing confidence in digital transactions.

Despite its numerous benefits, the transition to ISO 20022 comes with challenges, including technical complexities, regulatory adjustments, and the cost of implementation. However, the long-term advantages—such as improved compliance, operational efficiency, and customer satisfaction—far outweigh these hurdles. As central banks and financial institutions worldwide continue their migration efforts, ISO 20022 is set to become the backbone of digital banking, reinforcing trust and customer loyalty in an increasingly digitalized financial landscape. The future of digital banking will be defined by how well institutions integrate ISO 20022 with emerging technologies such as artificial intelligence, block chain, and open banking APIs. With the right strategies and investments, financial institutions can harness the full potential of ISO 20022, ensuring seamless transactions and enhanced financial services for customers worldwide.

The implementation of ISO 20022 marks a significant milestone in the evolution of digital banking and financial messaging. By providing a universal, data-rich, and flexible messaging standard, ISO 20022 enhances transaction efficiency, regulatory compliance, and customer engagement. As the financial industry transitions to this standard, banks and payment service providers must invest in the necessary technology upgrades, training programs, and migration strategies to ensure a smooth and successful adoption. Ultimately, ISO 20022 is more than just a messaging standard—it is a catalyst for innovation and trust in the global financial ecosystem. By embracing this transformation, financial institutions can unlock new opportunities for efficiency, security, and customer-centric banking, ensuring long-term success in the digital age. The following sections of this paper will

explore the technical features, implementation challenges, regulatory implications, and future trends of ISO 20022 in greater detail.

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THE EVOLUTION OF SHIPPING TRANSPORT IN INDIA: CHALLENGES, INNOVATIONS, AND FUTURE PROSPECTS

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Abstract

This paper explores the historical evolution, challenges, innovations, and future prospects of India's shipping industry, offering insights into how the country can navigate the complexities of the modern maritime ecosystem. India's shipping transport sector has undergone significant transformations, evolving from ancient maritime trade routes to becoming a key player in global logistics. As one of the fastest-growing economies, India heavily relies on shipping and port infrastructure for international trade, handling over 95% of its trade volume by sea. The government has introduced major initiatives, such as the Sagarmala Project and National Logistics Policy, to modernize ports, reduce logistics costs, and integrate digitization and sustainability into maritime operations. Despite these advancements, challenges persist, including port congestion, inadequate infrastructure, regulatory inefficiencies, and high logistics costs. Security concerns, environmental sustainability, and global trade disruptions further complicate the landscape. Additionally, India faces stiff competition from well-established maritime hubs like Singapore, China, and the UAE. To overcome these hurdles, India is embracing technological innovations such as smart ports, block chain-based shipping documentation, AI-driven supply chain management, and LNG-



powered vessels to ensure sustainable and efficient maritime logistics. Investments in public-private partnerships (PPP), automation, and inland waterways are also playing a crucial role in enhancing connectivity and reducing dependency on road and rail transport. Looking ahead, India's shipping transport sector is poised for exponential growth, driven by digital transformation, policy reforms, and global trade expansion. With strategic investments and sustainable initiatives, India has the potential to establish itself as a leading maritime hub, strengthening its position in the global shipping network.

Keywords: *Shipping Transport, Maritime Logistics, Port Infrastructure, Smart Ports, Sagarmala Project, Digitalization in Shipping, Sustainable Shipping, Global Trade Connectivity.*

Introduction

The Evolution of Shipping Transport in India

India, with its vast coastline of over 7,500 kilometers and a rich maritime heritage, has long been a dominant force in global trade and commerce. From the ancient Indus Valley Civilization, which engaged in sea trade with Mesopotamia, to the Chola dynasty's naval prowess in Southeast Asia, India's maritime history is deeply rooted in its economic and cultural evolution. Over centuries, shipping transport in India has evolved from small wooden boats to large, technologically advanced container ships, playing a crucial role in the country's trade and connectivity with the world.

In the modern era, India's shipping industry serves as the backbone of its economy, handling approximately 95% of the country's trade by volume and 70% by value. The nation's strategic location, positioned between major international maritime routes, has further boosted its importance in global trade. Major ports like Mumbai, Chennai, Kolkata, and Kandla have historically facilitated trade, while emerging deep-sea ports are enhancing India's capacity as a maritime powerhouse.

Despite its progress, India's shipping sector faces significant challenges, including infrastructural bottlenecks, outdated port facilities, regulatory complexities, environmental concerns, and global competition. However, innovations in smart port technologies, digitalization, green shipping, and inland waterways development are transforming the industry, ensuring efficiency and sustainability. Government initiatives like the Sagarmala

Project, Maritime India Vision 2030, and the push for coastal and inland waterway transport are expected to propel the industry toward a brighter future.

This article explores the historical evolution, present challenges, ground breaking innovations, and future prospects of shipping transport in India. By understanding these aspects, we can assess India's potential to emerge as a global maritime leader in the coming decades.

Objectives

1. To Trace the Historical Evolution of Shipping Transport in India
 - Explore the maritime history of India from ancient times to the present.
 - Highlight key milestones, including the colonial period, post-independence developments, and modern advancements.
2. To Analyse the Current Challenges Facing the Indian Shipping Industry
 - Identify infrastructural bottlenecks, regulatory hurdles, and environmental concerns.
 - Examine the impact of global trade competition and policy constraints.
3. To Explore Innovations Transforming Shipping Transport in India
 - Discuss advancements in port modernization, digitalization, and automation.
 - Highlight green shipping initiatives and sustainable maritime practices.
4. To Assess Government Policies and Initiatives Supporting the Sector
 - Evaluate the impact of projects like Sagarmala, Bharatmala, and Maritime India Vision 2030.
 - Examine the role of public-private partnerships (PPP) and foreign investments in port development.
5. To Forecast the Future Prospects of Shipping Transport in India
 - Predict upcoming trends, including AI-driven ships, enhanced inland waterways, and India's role in global maritime trade.
 - Provide recommendations for sustainable growth, competitiveness, and efficiency in the sector.
6. To Emphasize India's Potential as a Global Maritime Hub
 - Discuss strategies to strengthen India's position in international shipping and logistics.



- Highlight India's aspirations to become a leading transshipment and trade hub in Asia.

Historical Evolution of Shipping Transport in India

India has a long and rich maritime history, dating back thousands of years. From the early days of trade with Mesopotamia to the modern era of containerized shipping, India's shipping transport system has evolved significantly. This section explores the different phases of India's maritime history, highlighting its transformation over time.

a. Ancient and Medieval Periods: The Foundations of Indian Maritime Trade

Indus Valley Civilization (3300 BCE – 1300 BCE)

- a. India's maritime history can be traced back to the Indus Valley Civilization, where evidence suggests trade relations with Mesopotamia (modern Iraq), Egypt, and Persia.
- b. Archaeological findings in Lothal (Gujarat), an ancient port city, reveal a well-planned dockyard, indicating early advancements in shipbuilding and trade.
- c. Clay seals and inscriptions mention commercial exchanges of cotton, spices, pearls, and semi-precious stones through sea routes.

Maritime Expansion in the Vedic and Mauryan Periods (1500 BCE – 200 BCE)

- a. Ancient Indian scriptures like the Rigveda and Arthashastra reference maritime activities, emphasizing trade and shipbuilding skills.
- b. During the Mauryan Empire (321 BCE – 185 BCE), India had extensive trade connections with Greece, Rome, China, and Southeast Asia via sea routes.
- c. The ports of Bharuch (Gujarat) and Tamralipti (West Bengal) became prominent centers of maritime trade.

Gupta Period and Growth of Indian Naval Power (4th – 6th Century CE)

- a. The Gupta Empire witnessed a significant boost in overseas trade with China and the Mediterranean world.
- b. Indian merchants and sailors used the monsoon wind system to navigate across the Indian Ocean, facilitating spice and textile trade.
- c. Shipbuilding techniques improved, with large wooden vessels designed for long voyages.

Chola Dynasty and Expansion of Indian Maritime Influence (9th – 13th Century CE)



- a. The Chola dynasty (South India) played a crucial role in expanding India's naval power.
- b. Under Raja Raja Chola I and Rajendra Chola I, the empire conducted successful naval expeditions to Sri Lanka, Maldives, and Southeast Asia (Malaysia, Indonesia, and Thailand).
- c. The Cholas dominated the Bay of Bengal trade, exporting spices, silk, and pearls.

Arab, Persian, and European Trade Influence (13th – 17th Century CE)

- a. Arab traders established maritime trade routes connecting India with the Middle East and Africa.
- b. The Portuguese (Vasco da Gama, 1498) were the first Europeans to establish a direct sea route to India, followed by the Dutch, British, and French.
- c. The rise of European trade influence led to the construction of fortified trading ports like Goa, Chennai, and Kolkata, marking the beginning of colonial control over Indian shipping.

b. British Colonial Era: Development and Exploitation (1757 – 1947)

i. Rise of British Maritime Dominance

- a. The British East India Company (EIC) established control over India's maritime trade by setting up ports and monopolizing the shipping industry.
- b. Major ports such as Bombay (Mumbai), Madras (Chennai), and Calcutta (Kolkata) became key trade hubs.

ii. Industrial and Technological Advancements

- a. The 19th century saw significant modernization of ports and shipbuilding with the introduction of steamships and rail connectivity to transport goods faster.
- b. Shipbuilding in India declined as the British discouraged local industries, favoring British-made ships instead.
- c. The British developed lighthouses, docks, and navigational aids to facilitate maritime trade but primarily for colonial economic benefits.

iii. Impact of the British on Indian Shipping

- a. While the British helped in developing port infrastructure, they exploited India's maritime resources.
- b. Indian traders had limited access to global shipping, as British companies controlled most maritime trade routes.



- c. Indian shipping companies like the Scindia Steam Navigation Company (1919) emerged in the early 20th century to challenge British dominance.

c. Post-Independence Era (1947 – Present): Growth and Modernization

i. Early Years of Independent India (1947 – 1980s)

- a. After gaining independence in 1947, India focused on rebuilding its maritime industry to support economic growth.
- b. The Government of India established the Shipping Corporation of India (SCI) in 1961, promoting domestic shipping companies.
- c. Several major and minor ports were modernized to support industrialization and trade.
- d. Development of inland waterways was slow due to a focus on road and rail transport.

ii. Liberalization and Expansion (1990s – 2010s)

- a. The 1991 economic reforms led to the privatization and globalization of the Indian shipping industry.
- b. Foreign investments and private players entered the port sector, improving efficiency.
- c. Containerization revolutionized maritime trade, increasing cargo-handling efficiency at major ports.
- d. India expanded its shipping fleet, becoming one of the world's top merchant shipping nations.

iii. Recent Developments and Digital Transformation (2010 – Present)

- a. Sagarmala Project (2015): Aimed at port modernization, coastal connectivity, and infrastructure development.
- b. Maritime India Vision 2030: Focuses on making India a global maritime hub by improving shipping efficiency, digitalization, and sustainability.
- c. Adoption of smart ports, AI-driven logistics, blockchain for cargo tracking, and green shipping initiatives.
- d. Expansion of inland waterways (National Waterways 1-6) to boost domestic cargo transport.
- e. India is emerging as a leader in ship recycling, with Alang Shipyard (Gujarat) being one of the world's largest ship-breaking yards.

3. Current Challenges in India's Shipping Transport

India's shipping transport sector plays a critical role in facilitating trade and economic growth, handling nearly 95% of the country's total trade by volume. However, despite its progress,

the industry faces several challenges that hinder its efficiency and competitiveness on a global scale. The key challenges are categorized as follows:

A. Infrastructure Bottlenecks

a) Limited Port Capacity and Congestion

- Major ports such as Mumbai, Chennai, and Kolkata experience high congestion, leading to long turnaround times for vessels.
- Indian ports handle lower cargo volumes per hour compared to global benchmarks like Singapore and Shanghai, reducing efficiency.
- Many ports still rely on manual operations, increasing delays in cargo handling.

b) Insufficient Deep water Ports

- India lacks sufficient deep water ports to accommodate large, modern vessels (e.g., Ultra Large Container Ships - ULCS).
- Shallow-draft ports force large cargo ships to reroute to foreign ports (e.g., Colombo, Singapore) before reaching India, increasing costs.

c) Poor Connectivity Between Ports and Hinterland

- Inadequate road and rail connectivity between ports and industrial hubs leads to delays and high logistics costs.
- Last-mile connectivity issues affect seamless cargo movement from ports to inland destinations.

B. Regulatory and Bureaucratic Hurdles

a) Complex Customs and Documentation Procedures

- Cumbersome customs clearance processes increase dwell time at ports, reducing efficiency.
- Excessive paperwork and outdated regulatory systems create bottlenecks in trade operations.

b) Lack of a Unified Maritime Policy

- India has multiple regulatory bodies (e.g., Ministry of Shipping, DG Shipping, state governments), leading to policy fragmentation.
- Overlapping regulations and slow policy implementation hinder industry growth.

c) High Taxation and Tariff Structures

- High port charges, taxes, and surcharges make Indian ports less competitive compared to global shipping hubs.



- Complex taxation policies discourage foreign investments in the maritime sector.

C. Environmental and Sustainability Issues

a) Rising Carbon Emissions and Pollution

- The Indian shipping industry heavily depends on fossil fuels, contributing to carbon emissions and air pollution.
- Ports in major cities (e.g., Mumbai, Chennai) face high pollution levels from ship emissions and cargo handling operations.

b) Marine Pollution and Oil Spills

- Indian waters suffer from marine pollution, including oil spills, plastic waste, and untreated ballast water from ships.
- Poor waste management at ports and shipbreaking yards (e.g., Alang, Gujarat) raise environmental and health concerns.

c) Slow Adoption of Green Shipping Practices

- India lags in adopting eco-friendly shipping technologies, such as LNG-fueled vessels and shore-to-ship power supply systems.
- Lack of financial incentives for green shipping initiatives discourages sustainability investments.

D. Technological and Digital Gaps

a) Limited Automation and Smart Port Infrastructure

- Many Indian ports still rely on manual cargo handling, reducing efficiency.
- Slow adoption of automation, AI, and robotics results in longer cargo processing times.

b) Cyber security Risks in Shipping Operations

- Increasing digitalization of port operations makes the industry vulnerable to cyber-attacks.
- Lack of robust cyber security frameworks threatens trade security and financial losses.

c) Poor Integration of Digital Logistics Platforms

- Lack of a unified digital trade platform results in inefficiencies in cargo tracking and documentation.
- Other countries have successfully implemented block chain-based shipping platforms, but India is still in the early stages.

E. Global Competition and Trade Policies

a) Competition from International Shipping Hubs

- India faces stiff competition from well-established global maritime hubs like Singapore, Dubai, and China.
- Transshipment cargo is often routed through foreign ports (e.g., Colombo, Jebel Ali) instead of Indian ports due to cost and efficiency advantages.

b) Impact of Global Trade Regulations and Agreements

- India's maritime sector is affected by changing global trade policies, including sanctions, tariffs, and environmental regulations.
- Lack of strong Free Trade Agreements (FTAs) restricts India's ability to increase its maritime trade influence.

F. Financial and Investment Challenges

a) High Cost of Port Modernization and Shipping Fleet Expansion

- Upgrading port infrastructure and developing new deepwater ports require massive investments, which are often delayed.
- Limited availability of funding and private sector participation slows down modernization efforts.

b) Shortage of Indigenous Shipbuilding and Repair Facilities

- India depends heavily on imported ships, increasing operational costs.
- Domestic shipbuilding and repair industry remains underdeveloped, leading to reliance on foreign repair docks.

G. Human Resource and Skill Development Issues

a) Shortage of Skilled Maritime Workforce

- India faces a shortage of trained seafarers, port workers, and maritime engineers.
- Lack of specialized training programs and maritime research institutes affects skill development.

b) Harsh Working Conditions in the Shipping Sector

- Many maritime workers face poor working conditions, low wages, and lack of proper safety measures.
- Shipbreaking yards, particularly in Alang, Gujarat, are known for unsafe working conditions.



Innovations Transforming the Indian Shipping Industry

India's shipping industry is undergoing a significant transformation driven by technological advancements, digitalization, and sustainable practices. With the Sagarmala Project, Maritime India Vision 2030, and global maritime trends, India is adopting modern innovations to enhance efficiency, competitiveness, and environmental sustainability. Below are the key innovations shaping the future of Indian shipping.

A. Smart Ports and Digitalization

India is transitioning towards smart port operations through digital technologies to reduce delays, enhance cargo handling, and improve overall efficiency.

- a. Port Community System (PCS 1x): A digital platform integrating various stakeholders for seamless trade operations.
- b. Automation and AI: Use of Artificial Intelligence (AI), Internet of Things (IoT), and Machine Learning (ML) to predict cargo movements and optimize port logistics.
- c. Blockchain for Trade Transparency: Enables secure, tamper-proof cargo documentation and faster customs clearance, reducing bureaucratic delays.
- d. RFID and GPS Tracking: Real-time tracking of containers and shipments to ensure better supply chain management.

Example: The Jawaharlal Nehru Port Trust (JNPT) in Mumbai has implemented smart technologies to reduce turnaround times and improve cargo efficiency.

B. Green Shipping and Sustainable Maritime Practices

With growing concerns over carbon emissions and marine pollution, India is focusing on eco-friendly shipping solutions.

- a. LNG-Powered Vessels: Transitioning from fossil fuels to Liquefied Natural Gas (LNG) to reduce emissions.
- b. Shore-to-Ship Power Supply: Allows ships to switch off engines while docked and use electric power from ports, cutting fuel consumption.
- c. Hybrid and Electric Ships: Future projects aim to introduce solar and battery-powered vessels to reduce dependency on conventional fuels.
- d. Waste Management at Ports: Implementation of systems to treat oil spills, ballast water, and ship waste to prevent ocean pollution.

Example: Cochin Shipyard is developing India's first hydrogen fuel-powered electric ferry, showcasing India's commitment to green shipping.

C. Expansion of Inland Waterways and Coastal Shipping

India is leveraging its rivers and coastal routes for cost-effective and environment-friendly cargo movement.

- a. National Waterways Development: The government is enhancing 111 national waterways, focusing on NW-1 (Ganga), NW-2 (Brahmaputra), and NW-3 (Kerala).
- b. Roll-On/Roll-Off (Ro-Ro) Services: Enabling vehicles and cargo movement via ferries to reduce road congestion.
- c. Smart River Ports: Implementing automated cargo handling at river ports to promote multimodal transport.

Example: The Ganga Waterway (NW-1) is being developed with modern terminals and cargo handling facilities, reducing logistics costs.

D. Indigenous Shipbuilding and Modernization

India is working on reviving its shipbuilding industry to reduce dependency on foreign vessels.

- a. Make in India for Shipbuilding: Encouraging domestic ship manufacturing at Mazagon Dock, Cochin Shipyard, and Goa Shipyard.
- b. Advanced Ship Designs: Use of 3D printing and AI-driven shipbuilding techniques to enhance efficiency.
- c. Automated Ship Repair Facilities: AI-powered diagnostics and robotic repairs to reduce maintenance time and costs.

Example: India's INS Vikrant, the first indigenous aircraft carrier, is a testament to India's shipbuilding advancements.

E. Maritime Security and Cyber security Innovations

With rising cyber threats, India is securing its shipping industry through advanced maritime surveillance and cybersecurity measures.

- a. Satellite-Based Tracking: Indian ports and ships use satellite navigation systems for real-time monitoring of vessel movements.
- b. AI-Powered Cybersecurity Solutions: Protects against cyber threats targeting port operations and cargo data.
- c. Automated Maritime Surveillance: Indian Navy and Coast Guard use drone technology and AI-driven threat detection to enhance security.

Example: The Sagarmala Seaplane Service ensures real-time monitoring of maritime zones, improving security and efficiency.

Future Prospects of Shipping Transport in India

India's shipping industry is poised for a significant transformation, driven by technological advancements, policy reforms, and increased investments. With government initiatives like Sagarmala, Maritime India Vision 2030, and Gati Shakti, India aims to become a global maritime hub. The following are the key future prospects of shipping transport in India:

A. Expansion of Port Infrastructure and Modernization

- a. Development of Mega Ports: India is planning to build world-class deepwater ports to accommodate larger cargo ships and reduce dependency on foreign transshipment hubs like Colombo and Singapore.
- b. Port-Led Industrialization: Under Sagarmala, new port-based industrial clusters will be developed to boost manufacturing and trade.
- c. Smart Port Development: More ports will adopt automation, AI-based logistics, and IoT-enabled cargo tracking to enhance efficiency.

Example: The upcoming Vadhavan Port in Maharashtra is expected to handle top global shipping volumes, competing with world-class ports.

B. Strengthening Inland Waterways and Coastal Shipping

- a. Expansion of National Waterways: India is increasing cargo movement on its 111 National Waterways, reducing pressure on road and rail transport.
- b. Integration with Multimodal Transport: Inland waterways will be connected with rail and road networks to improve logistics efficiency.
- c. Ro-Ro (Roll-on/Roll-off) and Ro-Pax Services: These services will reduce transport costs and promote eco-friendly logistics.

Example: The Varanasi-Haldia Inland Waterway (NW-1) is already operational, handling bulk cargo efficiently.

C. Green and Sustainable Shipping Initiatives

- a. Transition to LNG and Hydrogen-Fueled Vessels: India is investing in LNG-powered and hydrogen-based ships to reduce carbon emissions.
- b. Shore-to-Ship Power Supply: Ports will provide electricity to docked ships, reducing fuel consumption and pollution.



- c. Eco-Friendly Ship Recycling: India's Alang Shipyard will be upgraded to meet global environmental standards.

Example: Cochin Shipyard is developing India's first hydrogen-fuel-powered ferry, promoting green maritime transport.

D. Digitalization and Smart Shipping

- a. AI and Blockchain for Cargo Management: Advanced tracking and automation will streamline trade and logistics.
- b. 5G and IoT-Enabled Ports: Faster and more reliable communication will enhance port operations.
- c. Cybersecurity in Maritime Trade: Investments in digital security will protect shipping data and transactions.

Conclusion

The evolution of shipping transport in India has been a journey of growth, challenges, and innovations. From ancient maritime trade routes to becoming a modern shipping powerhouse, India has significantly transformed its maritime infrastructure. While British colonial rule hindered India's indigenous shipping industry, post-independence policies, economic liberalization, and technological advancements have propelled India towards becoming a major player in global shipping. With initiatives like Sagarmala, digitalization, and green shipping practices, India is poised for a sustainable and competitive maritime future. India's shipping transport sector has evolved significantly from its historical roots in ancient maritime trade to becoming a key driver of the modern economy. Despite facing infrastructure bottlenecks, regulatory hurdles, environmental concerns, and global competition, the industry is undergoing a transformation fueled by technological advancements, policy reforms, and sustainability initiatives. Innovations in smart ports, green shipping, digitalization, and inland waterways are set to enhance efficiency, reduce costs, and improve India's global competitiveness. Government initiatives like Sagarmala, Maritime India Vision 2030, and National Waterways development are driving port modernization, multimodal connectivity, and environmental sustainability.

Looking ahead, India has the potential to become a global maritime hub by investing in deep water ports, sustainable shipping practices, indigenous shipbuilding, and digital

transformation. However, achieving this vision requires strong policy implementation, private sector participation, and workforce skill development. With the right strategies, India's shipping industry can play a pivotal role in boosting trade, strengthening the economy, and positioning itself as a leader in global maritime logistics. With continued investment, policy support, and technological advancements, India's shipping industry is on track to becoming a major global player. The focus on smart ports, sustainable shipping, and inland waterway expansion will drive efficiency, reduce costs, and enhance trade competitiveness. Innovations in digitalization, green shipping, inland waterways, shipbuilding, and security are transforming India's shipping industry. With government initiatives and private investments, India is set to become a global maritime leader. However, effective implementation, policy support, and skilled workforce development are key to ensuring sustainable and long-term growth.

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INDIRECT TAXATION IN INDIA: EVOLUTION, STRUCTURE, CHALLENGES, AND FUTURE PROSPECTS

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Abstract

This article aims to provide valuable insights into India's indirect tax landscape and propose strategic reforms for its future development. Indirect taxation plays a crucial role in India's fiscal policy, contributing significantly to government revenue and influencing economic activities. Over the years, India's indirect tax system has undergone substantial transformations, evolving from a complex multi-tax regime to a more streamlined structure with the introduction of the Goods and Services Tax (GST) in 2017. This article examines the historical evolution, structural framework, challenges, and future prospects of indirect taxation in India. The pre-GST era was marked by multiple layers of taxation, including excise duty, service tax, VAT, and customs duties, which often resulted in a cascading tax effect and inefficiencies. The introduction of GST aimed to simplify tax compliance, eliminate cascading effects, and promote a unified national market. However, despite its advantages, the implementation of GST has faced challenges such as high compliance costs, complex rate structures, technical issues, and frequent policy changes. Additionally, key sectors such as petroleum, alcohol, and real estate remain outside the GST framework,



leading to revenue discrepancies. This article also provides a comparative analysis of India's indirect tax system with global tax models, highlighting best practices and potential improvements. Looking ahead, India must focus on rationalizing GST rates, strengthening digital tax compliance, expanding GST coverage to all sectors, and enhancing the efficiency of the GST Council's decision-making process. Adopting technology-driven solutions such as AI, block chain, and automated tax filing can further streamline tax administration and minimize evasion. A well-structured, transparent, and efficient indirect taxation system is crucial for economic growth, ease of doing business, and revenue generation.

Keywords: *Indirect Taxation, Goods and Services Tax (GST), Fiscal Policy, Tax Compliance, Economic Growth, Revenue Generation, Digital Taxation, GST Reforms.*

1. Introduction

1.1 Understanding Taxation and Its Importance

Taxation is the backbone of any economy, serving as the primary source of revenue for governments worldwide. It funds essential public services such as infrastructure, healthcare, education, defense, and welfare programs. Taxes are broadly categorized into direct taxes and indirect taxes.

- a. Direct Taxes are imposed directly on individuals and businesses based on income or wealth (e.g., Income Tax, Corporate Tax).
- b. Indirect Taxes are levied on goods and services, ultimately borne by the end consumer (e.g., Goods and Services Tax (GST), Customs Duty, and Excise Duty).

Indirect taxes play a crucial role in India's revenue system due to ease of collection, broad tax base, and contribution to economic stability. Unlike direct taxes, which require assessment and filing by taxpayers, indirect taxes are embedded in the price of goods and services, making them easier to administer.

1.2 The Significance of Indirect Taxation in India

India, being one of the fastest-growing economies in the world, relies heavily on indirect taxes for fiscal revenue. Historically, the country had a complex and fragmented tax structure, with multiple levies at different levels of government. The introduction of the Goods and

Services Tax (GST) in 2017 marked a revolutionary step toward tax simplification and economic integration.

Key reasons why indirect taxation is crucial in India:

- a. **Major Revenue Contributor:** Indirect taxes contribute a significant portion to India's Gross Tax Revenue, with GST alone accounting for over 50% of total tax collections.
- b. **Reduces Tax Evasion:** Since indirect taxes are collected at various transaction points, they are harder to evade compared to direct taxes.
- c. **Encourages Compliance:** Businesses and consumers automatically comply with tax rules through the purchase of goods and services.
- d. **Promotes Economic Growth:** By rationalizing tax structures, indirect taxation ensures seamless trade, industrial growth, and investment.

1.3 Pre-GST Era: The Evolution of Indirect Taxation in India

Before the implementation of GST, India's indirect tax system was highly fragmented, consisting of multiple taxes imposed at different levels:

A. Central-Level Indirect Taxes

1. **Excise Duty:** Levied on the manufacturing of goods within India.
2. **Service Tax:** Imposed on service providers (introduced in 1994).
3. **Customs Duty:** Applied on imports and exports.

B. State-Level Indirect Taxes

1. **Value Added Tax (VAT):** Levied by state governments on the sale of goods.
2. **Entry Tax:** Charged when goods entered a state from another state.
3. **Luxury Tax and Entertainment Tax:** Applied to specific industries.

This multi-tax structure resulted in complex compliance requirements, tax cascading (tax-on-tax), and inefficiencies in interstate trade. Businesses had to register separately in each state and deal with multiple tax authorities, leading to compliance difficulties. The need for a unified and simplified taxation system led to the introduction of GST, which subsumed most of these indirect taxes into a single framework.

1.4 Introduction of Goods and Services Tax (GST): A Paradigm Shift

The Goods and Services Tax (GST) was introduced in India on July 1, 2017, as one of the biggest tax reforms in the country's history. The primary objectives of GST were:



- a. Simplification: Replacing multiple taxes with a single, uniform tax system.
- b. Elimination of Cascading Effect: Allowing input tax credit (ITC) to reduce the burden of tax-on-tax.
- c. Enhancing Ease of Doing Business: By reducing inter-state trade barriers and simplifying compliance.
- d. Boosting Revenue Collection: By widening the tax base and reducing evasion.

GST Structure in India

GST follows a dual taxation model, with tax being levied by both the Central and State Governments:

1. Central GST (CGST) – Collected by the Central Government.
2. State GST (SGST) – Collected by State Governments.
3. Integrated GST (IGST) – Applied to inter-state transactions.
4. Union Territory GST (UTGST) – Applied in Union Territories.

Key Features of GST

- a. Multi-Tier Tax Rates: India adopted a four-tier GST rate structure – 5%, 12%, 18%, and 28%. Certain essential goods are exempt from GST, while luxury and sin goods attract higher rates.
- b. Digital Taxation & Compliance: GST introduced an online filing system (GSTN) to reduce paperwork and enhance transparency.
- c. GST Council: A governing body responsible for decision-making on tax rates, policies, and amendments.

1.5 Impact of GST on India's Economy

Since its introduction, GST has significantly impacted various aspects of India's economy:

A. Positive Impacts

1. Increased Tax Compliance: Digital invoicing and GST return filing have led to a rise in taxpayer registrations.
2. Enhanced Business Efficiency: Removal of state-wise tax barriers improved interstate trade and logistics.



3. Foreign Investment Growth: A simplified tax structure increased India's attractiveness for FDI (Foreign Direct Investment).
4. Lower Tax Evasion: The e-invoicing system and anti-evasion measures have minimized tax fraud.

B. Challenges and Concerns

1. Complex Tax Slabs: Multiple GST rates create classification disputes and compliance burdens.
2. Initial Disruptions: The shift from the old system to GST caused short-term business disruptions.
3. Technical Glitches in GSTN Portal: Businesses initially faced difficulties in filing returns and claiming ITC.
4. Exclusion of Petroleum, Alcohol, and Real Estate: These sectors remain outside GST, causing tax inefficiencies

1.6 The Role of Indirect Taxes in India's Fiscal Policy

Indirect taxes contribute a significant portion of India's tax revenue. Some key statistics highlight their importance:

- a. GST collections exceed ₹ 1.5 lakh crore monthly, indicating steady economic recovery post-pandemic.
- b. Customs Duty contributes to import revenue, impacting trade policies and foreign exchange reserves.
- c. Excise Duties on petroleum and alcohol generate substantial state revenues.

The Indian government continually refines GST laws to make taxation more transparent and efficient, ensuring better revenue mobilization and business-friendly policies.

1.7 Future of Indirect Taxation in India

Looking forward, India's indirect taxation system requires further reforms to enhance efficiency and revenue generation:

1. Rationalization of GST Slabs: Reducing the number of tax slabs to a single or dual-rate system.
2. Inclusion of Petroleum, Alcohol, and Real Estate under GST: A crucial step for full tax integration.



3. Technology-Driven Tax Compliance: AI, Blockchain, and Big Data to enhance transparency and prevent fraud.
4. GST Rate Stabilization: Ensuring fewer rate changes for better policy certainty.
5. Stronger GST Council Decision-Making: Quick resolution of industry concerns for faster tax policy implementation.

A stable and well-structured indirect taxation system is essential for India to achieve higher economic growth, global trade competitiveness, and improved ease of doing business.

3. Evolution of Indirect Taxation in India

Indirect taxation in India has undergone a **significant transformation** over the centuries. From ancient forms of tax levies during the **Mauryan and Mughal empires** to the **British colonial tax system**, and finally, to the modern-day **Goods and Services Tax (GST)**, indirect taxation has evolved to meet the changing economic needs of the country. This section explores the historical development, key reforms, and the gradual shift towards a unified and transparent tax system.

A. Ancient and Medieval Taxation Systems (Pre-Colonial Era)

3.1 Taxation in Ancient India

- a. During the **Mauryan Empire (322–185 BCE)**, taxation was a key element of state revenue.
- b. The **Arthashastra**, written by **Kautilya (Chanakya)**, provided a detailed account of various taxes such as:
 - a. **Customs duties on goods** entering and leaving the kingdom.
 - b. **Salt tax** and levies on agricultural produce.
 - c. **Trade and transit duties** on merchants.
- c. The Gupta Empire (4th–6th century CE) further developed **trade taxation**, with taxes imposed on **handicrafts, gold, silver, and foreign trade**.

3.2 Taxation during the Medieval Period

- a. The **Delhi Sultanate (1206–1526 CE)** and the **Mughal Empire (1526–1857 CE)** continued the tradition of indirect taxes.



- b. The Mughal ruler **Akbar (1556–1605)** introduced a **standardized taxation system**, which included:
 - a. **Customs duties on imported and exported goods.**
 - b. **Jizya tax** (levied on non-Muslims).
 - c. **Zakat (Islamic tax on wealth)** and **octroi (entry tax on goods entering cities).**

These early forms of indirect taxation played a crucial role in **revenue generation and trade regulation.**

B. Indirect Taxation during British Rule (1757–1947)

3.1 Introduction of Modern Taxation

- a. With the expansion of the **British East India Company**, a **formal taxation system** was introduced.
- b. Indirect taxes were imposed on **salt, textiles, tea, and opium**, which became key revenue sources for the British administration.

3.2 Key Tax Reforms under British Rule

- a. **1786:** The British introduced **Excise Duty** on liquor and opium.
- b. **1878:** Introduction of **Customs Duty** on imports to protect British industries.
- c. **1935:** The **Government of India Act** divided taxation powers between the **central and provincial governments.**

The colonial taxation system **avored British economic interests** while burdening Indian producers and traders.

C. Post-Independence Era (1947–1990s): The Development of India’s Indirect Tax System

3.1 Initial Years and the Taxation Framework

- a. After **Independence in 1947**, India inherited a complex and outdated **British-era tax system.**
- b. The **Constitution of India (1950)** gave taxation powers to the **Union and State Governments**, dividing indirect taxes as follows:
 - a. **Central Government:** Excise duty, customs duty, and service tax.
 - b. **State Governments:** Sales tax, entry tax, and entertainment tax.



3.2 Key Indirect Taxes Introduced (1947–1990s)

1. **Excise Duty (1944):** A tax on the **manufacturing of goods**, collected by the Central Government.
2. **Customs Duty (1962):** Levied on **imported and exported goods** to regulate trade.
3. **Sales Tax (1957):** Introduced by states on the **sale of goods** within their jurisdictions.
4. **Service Tax (1994):** Levied on **services** such as banking, insurance, and telecommunications.

This period saw **high tax rates, multiple levies, and inefficiencies**, leading to a **cascading effect** (tax-on-tax burden).

D. Economic Reforms and Indirect Taxation (1991–2017)

3.1 Economic Liberalization and Tax Reforms (1991)

- a. The **1991 economic reforms** under **Prime Minister P.V. Narasimha Rao** and **Finance Minister Dr. Manmohan Singh** focused on **tax rationalization and trade liberalization**.
- b. Indirect tax reforms included:
 - a. **Reduction in customs duties** to promote globalization.
 - b. **Expansion of service tax base** to include more sectors.
 - c. **Introduction of MODVAT (Modified Value Added Tax) in 1986** to allow manufacturers to claim tax credits.

3.2 Value Added Tax (VAT) Reforms (2005)

- To remove **cascading effects**, states replaced sales tax with **Value Added Tax (VAT)**.
- VAT allowed businesses to claim **input tax credit (ITC)**, reducing the burden of **tax-on-tax**.

Despite these reforms, India's **tax structure remained fragmented**, with different rates and rules across states.

E. Introduction of Goods and Services Tax (GST) (2017-Present)

53.1 GST: A Unified Tax System



- a. The **Goods and Services Tax (GST)** was introduced on **July 1, 2017**, as **India's biggest tax reform**.
- b. GST replaced multiple indirect taxes like **VAT, excise duty, service tax, and entry tax** with a **single, unified tax structure**.

3.2 Key Features of GST

- a. **Dual Tax Structure:**
 - a. **Central GST (CGST):** Levied by the **Central Government**.
 - b. **State GST (SGST):** Levied by **State Governments**.
 - c. **Integrated GST (IGST):** Applied to **interstate transactions**.
- b. **Multi-Tiered Tax Slabs:** 5%, 12%, 18%, 28% (higher rates for luxury goods).
- c. **Input Tax Credit (ITC):** Eliminates **tax-on-tax effect**.
- d. **GSTN (Goods and Services Tax Network):** A digital platform for tax filing and compliance.

3.3 Impact of GST on Indirect Taxation

Positive Outcomes:

- a. **Reduced Tax Complexity:** One tax replaces multiple levies.
- b. **Ease of Doing Business:** Interstate trade is **seamless and efficient**.
- c. **Higher Tax Compliance:** Digital invoicing minimizes tax evasion.

Challenges:

- a. **Frequent Rate Changes:** GST rates are revised often, creating **uncertainty**.
- b. **Technical Issues:** The **GSTN portal** faced **initial glitches**.
- c. **Exclusion of Key Sectors:** **Petroleum, alcohol, and real estate** remain outside GST.

F. The Future of Indirect Taxation in India

3.1 Proposed Reforms

- a. **Reducing the number of GST slabs** to make tax rates **simpler and uniform**.
- b. **Bringing petroleum, alcohol, and real estate under GST** to ensure tax neutrality.



- c. **Strengthening digital tax compliance** using **Artificial Intelligence (AI)** and **Block chain**.
- d. **Improving the GST Council's efficiency** for **faster decision-making**.

3.2 Towards a More Transparent and Efficient System

- a. Indirect tax reforms should **promote economic growth, increase tax collection, and enhance ease of doing business**.
- b. Technology-driven tax administration will play a **crucial role in fraud detection and compliance monitoring**.

4. Key Benefits of Indirect Taxation in India

Indirect taxation plays a crucial role in India's fiscal policy and economic framework. It contributes significantly to government revenue and ensures a **stable and structured taxation system**. Unlike direct taxes, which are levied on income and wealth, **indirect taxes are imposed on goods and services**, making them a broad-based and efficient means of taxation. The introduction of **Goods and Services Tax (GST)** has further streamlined the indirect tax system, eliminating multiple layers of taxation.

Here are the key benefits of **indirect taxation in India**:

4.1. Revenue Generation for Government Major Contributor to Government Finances:

- a. Indirect taxes contribute a **significant share of total tax revenue** in India.
- b. **GST alone accounts for over 50%** of total tax collections.
- c. Customs and excise duties also play a crucial role in financing government expenditure on **infrastructure, healthcare, defense, and education**.

Stable and Predictable Revenue Source:

- a. Since indirect taxes are collected on **consumption**, they provide **consistent revenue** to the government, unlike direct taxes, which fluctuate with income levels.

4.2. Ease of Collection and Compliance

Simplified Tax Administration:



- a. Indirect taxes like GST are collected **automatically at the point of sale**, reducing the need for direct assessment.
- b. The **Goods and Services Tax Network (GSTN)** enables businesses to file returns digitally, reducing paperwork.

Lower Tax Evasion:

- a. Since indirect taxes are levied on **transactions**, they are **harder to evade** compared to direct taxes.
- b. The **input tax credit (ITC) mechanism in GST** ensures that businesses comply with tax regulations to claim benefits.

4. 3. Wide Coverage and Fair Tax Burden Distribution

Applies to All Consumers:

- a. Unlike direct taxes, which only affect income earners, indirect taxes apply to **all consumers**, ensuring a **wider tax base**.
- b. Everyone contributes to government revenue, reducing dependency on a small group of taxpayers.

Progressive Taxation Through GST Slabs:

- a. Basic necessities like **food and medicines** are either **exempt or taxed at lower rates (5%)**.
- b. Luxury and sin goods (e.g., tobacco, alcohol, high-end cars) attract **higher GST rates (28%)**, ensuring that those who can afford more, pay more.

4.4. Encourages Economic Growth and Industrial Development

Eliminates Cascading Effect (Tax-on-Tax):

- a. Under the pre-GST system, multiple taxes resulted in a **cascading effect**, increasing costs for businesses.
- b. The **input tax credit (ITC) under GST** allows businesses to claim a refund on taxes paid at previous stages, reducing costs and improving competitiveness.

Boosts Business and Foreign Investment:

- a. A **unified tax system (GST)** makes India an attractive destination for **foreign direct investment (FDI)**.



- b. **Ease of Doing Business** has improved, as businesses no longer have to deal with multiple tax regulations across states.

4.5. Promotes Transparency and Digitalization

Reduction in Corruption and Manual Intervention:

- a. The shift to **online tax filing and automated tax collection (GSTN)** minimizes manual intervention, reducing corruption and tax fraud.

Real-time Monitoring and Tracking:

- a. **E-invoicing and digital compliance mechanisms** allow the government to track transactions in real time, preventing tax evasion.
- b. **Artificial Intelligence (AI) and Big Data Analytics** are being used to identify discrepancies in tax filings.

4.6. Promotes Interstate Trade and Economic Integration

One Nation, One Tax Policy:

- a. Before GST, businesses had to deal with **different state-wise tax systems** (VAT, CST, octroi, etc.).
- b. GST has created a **common national market**, eliminating trade barriers between states.

Boost to Logistics and Supply Chain Efficiency:

- a. Removal of **interstate tax barriers and checkpoints** has **reduced transportation time and costs**.
- b. Businesses now operate with **greater efficiency**, leading to improved productivity and economic growth.

4.7. Encourages Consumption and Generates Employment

Stimulates Demand for Goods and Services:

- a. Lower tax rates on essential goods encourage consumer spending.
- b. Increased demand leads to **higher production and job creation** in sectors like **manufacturing, retail, and services**.

Encourages Small and Medium Enterprises (SMEs):



- a. The **Composition Scheme under GST** allows small businesses to pay taxes at a **lower rate**, reducing their compliance burden.
- b. This helps in the **growth of startups and small businesses**, fostering entrepreneurship.

4.8. Helps in Inflation Control and Economic Stability

Better Control Over Prices:

- a. With input tax credits available under GST, **taxes on businesses have reduced**, leading to lower costs for consumers.
- b. Reduced cascading effects ensure **stable pricing of goods and services**.

Prevents Over-Taxation and Economic Distortions:

- a. A structured **multi-tier tax system** ensures that essential items remain affordable while **luxury items bear higher taxation**.
- b. Helps maintain **economic balance and prevents inflationary pressures**.

4.9. International Competitiveness and Alignment with Global Standards

Aligns India with Global Taxation Practices:

- a. GST follows the **international best practices of VAT/GST systems** adopted by over **160 countries** worldwide.
- b. Foreign investors find it easier to do business in India due to a **transparent and harmonized tax system**.

Improves India's Global Trade Position:

- a. Lower compliance burdens and **easier import/export taxation rules** have made India a more **competitive trade partner**.
- b. Customs duty reforms have simplified **import-export procedures**, benefiting Indian exporters.

5. Major Challenges in India's Indirect Tax System

Despite significant reforms, including the introduction of the Goods and Services Tax (GST) in 2017, India's indirect tax system still faces several challenges. These challenges impact businesses, consumers, and the overall economic framework. Below are some of the major issues:



5.1. Complex GST Structure and Multiple Tax Slabs

Issue:

- a. Unlike many countries with a single or dual GST rate, India has multiple tax slabs: 5%, 12%, 18%, and 28%, along with special cess on luxury and sin goods.
- b. This complexity makes tax compliance difficult, particularly for small businesses and startups.

Impact:

- a. Frequent rate changes create uncertainty in pricing and business planning.
- b. Businesses struggle with classification disputes (e.g., whether an item should be taxed at 5% or 18%).

5. 2. High Compliance Burden and Frequent Policy Changes

Issue:

- a. The GST system requires businesses to file multiple returns (GSTR-1, GSTR-3B, etc.) every month.
- b. Frequent changes in tax rules and updates from the GST Council create confusion.

Impact:

- a. Small businesses lack the resources to manage compliance and often face penalties for errors.
- b. Businesses need tax consultants, increasing operational costs.

5.3. Delayed Refunds and Working Capital Issues

Issue:

- a. Exporters and businesses claiming input tax credit (ITC) face delays in refunds, affecting their cash flow.
- b. Inverted duty structure (where input tax is higher than output tax) creates credit accumulation issues.

Impact:

- a. Businesses struggle with working capital shortages, affecting production and expansion.
- b. Delayed refunds reduce India's attractiveness as an export-friendly economy.

5.4. Exclusion of Key Sectors from GST

Issue:



- a. Petroleum products, alcohol, and real estate are not under GST and continue to be taxed separately by states.
- b. This breaks the input tax credit chain, increasing costs for businesses.

Impact:

- a. High fuel prices due to separate taxes raise transportation and logistics costs.
- b. Consumers face higher prices due to non-uniform taxation.

4.5. Evasion, Fraud, and Fake Invoicing

Issue:

- a. Fake GST invoices and fraudulent ITC claims are a major concern.
- b. Underground businesses operate without paying taxes, creating an uneven playing field for honest taxpayers.

Impact:

- a. The government loses revenue, leading to higher taxes on compliant businesses.
- b. Enforcement agencies struggle to detect and prevent fraud effectively.

4.6. Technical Glitches in GSTN Portal and Digital Compliance Issues

Issue:

- a. The GSTN portal (Goods and Services Tax Network) has faced technical glitches, especially during peak filing periods.
- b. Businesses in rural and semi-urban areas struggle with internet connectivity and digital compliance.

Impact:

- a. Missed deadlines and penalties for businesses.
- b. Increased dependence on tax professionals for filing, raising compliance costs.

4.7. State-Center Coordination Issues

Issue:

- a. Since GST is a dual tax (CGST + SGST), conflicts arise between the Central and State Governments regarding revenue distribution.
- b. Some states demand higher compensation, arguing loss of revenue post-GST implementation.

Impact:

- a. Revenue disputes slow down decision-making in the GST Council.
- b. States with lower tax collection face financial strain.



6. Comparative Analysis: India vs. Global Indirect Tax Systems

Indirect taxation is a key component of a country's revenue system, impacting trade, businesses, and consumers. India's indirect tax system, particularly after the introduction of **Goods and Services Tax (GST)** in 2017, aligns with global practices but still has **unique challenges and differences** compared to other countries. This comparative analysis examines India's indirect tax system versus global counterparts, highlighting key similarities and differences.

6.1. Structure of Indirect Taxation: India vs. Global Models

India (GST + Other Indirect Taxes)

- a. **Multi-tier GST System:** India follows a **four-tier** GST structure (5%, 12%, 18%, 28%) with additional cess on luxury and sin goods.
- b. **Dual GST Model:** GST in India is divided into **CGST (Central GST)** and **SGST (State GST)**, making it a **dual tax system**.
- c. **Non-GST Indirect Taxes:** Certain sectors like **petroleum, alcohol, and real estate** remain **outside GST**, subject to separate taxes.

Global Models

- a. **Single/Uniform GST (Example: Canada, Australia, UAE, Singapore)**
 - a. Many countries use a **single GST rate** or **few slabs** for ease of compliance.
 - b. **Example:** Singapore has a flat **8% GST**, while **Canada** follows a **federal and provincial GST system** similar to India but with fewer complications.
- b. **VAT-Based System (Example: European Union, UK)**
 - a. Most European countries follow a **Value Added Tax (VAT) model** with standard and reduced rates.
 - b. **UK VAT Rates:** Standard (20%), Reduced (5%), and Zero-rated (0%) items.
- c. **Sales Tax Model (Example: USA)**
 - a. The United States does not have a national GST; instead, each **state levies its own sales tax**, leading to **variations across states**.



- b. **Lack of uniformity increases compliance costs** for businesses operating in multiple states.

6.2. Compliance and Administration

India

- a. Businesses must file multiple GST returns (**GSTR-1, GSTR-3B, etc.**) every **month and annually**.
- b. The **Goods and Services Tax Network (GSTN)** portal digitizes compliance, but **technical glitches and high compliance burden** remain concerns.

Global Practices

- a. **Simpler Compliance Mechanisms:** Countries like Singapore and New Zealand have **quarterly or annual GST filing**, reducing compliance burden.
- b. **E-invoicing and Automated Systems:** The **EU and Canada** use AI-driven tax systems to **track transactions and prevent fraud**.

6.3. Taxpayer Burden and Refund Mechanisms

India

- a. **Delayed GST refunds, especially for exporters**, impact working capital.
- b. **Inverted Duty Structure** (where input taxes are higher than output taxes) creates **credit accumulation issues**.

Global Systems

- a. **Faster Refunds:**
- b. **EU countries process VAT refunds within weeks.**
- c. **Singapore and UAE have automated refund systems**, ensuring **seamless cash flow** for businesses.

6.4. Tax Evasion and Fraud Prevention

India

- a. **Fake invoicing and ITC fraud** are major concerns.
- b. **E-way bills and e-invoicing have been introduced**, but enforcement is still evolving.

Global Systems

- a. **Stronger Digital Integration:**



- a. Countries like **Canada, Germany, and Australia** use **blockchain and AI-based tax monitoring** to track evasion.
- b. **Strict Penalties:**
 - a. The **EU** has **harsher tax evasion penalties** than India, reducing fraud.

6.5. Economic Impact and Trade Facilitation

India

- a. GST has **reduced internal trade barriers** but **petroleum and alcohol exclusions** create inconsistencies.
- b. Import duties and GST on international trade make India **less competitive** compared to global markets.
- c.

Global Best Practices

- a. Uniform GST/VAT helps promote ease of business.
- b. European VAT model supports exports through zero-rated tax policies.
- c. Middle Eastern countries (UAE, Saudi Arabia) have lower tax burdens to attract foreign investment.

7. Future Prospects and Suggested Reforms in India's Indirect Tax System

India's indirect tax system, particularly **Goods and Services Tax (GST)**, has significantly improved tax collection, compliance, and ease of doing business. However, several challenges remain, such as **complex tax structures, high compliance costs, refund delays, and tax evasion**. To ensure a **more efficient and globally competitive tax system**, key reforms are necessary. This section outlines the **future prospects and suggested reforms** for India's indirect tax regime.

7.1. Simplification of GST Structure

- a. Currently, India follows a **multi-tier GST system (5%, 12%, 18%, and 28%)**, which creates **classification disputes** and increases compliance burdens.
- b. The government may move towards a **two or three-tier GST system (e.g., 5%, 15%, 28%)** to make tax administration easier.

- c. c.A **simplified structure** would reduce confusion, minimize tax evasion, and boost economic activity.

7.2. Expansion of GST to Excluded Sectors

Certain critical sectors—**petroleum products, alcohol, electricity, and real estate**—are currently outside the GST system, leading to **tax inefficiencies** and a **broken input tax credit chain**.

Bringing these sectors under GST would:

- a. Lower fuel costs and transportation expenses.
- b. Reduce tax cascading effects in industries dependent on these products.
- c. Increase government revenue by **broadening the tax base**.

7.3. Enhancing Digital Integration and AI-Driven Tax Compliance

India's **Goods and Services Tax Network (GSTN)** has digitized compliance, but **technical glitches** and **fraud prevention** need improvement.

The **future of tax administration** will rely on:

- a. **AI-based tax monitoring** to detect fraud and fake invoices.
- b. **Block chain-powered tax collection systems** for transparent and secure transactions.
- c. **Advanced data analytics** to track non-compliant businesses.

7.4. Faster and Automated Refund Processing

One of the biggest concerns for businesses is the **delay in GST refunds**, particularly for **exporters and businesses with an inverted duty structure**. Future improvements should focus on:

- a. **Automated refund processing** with real-time tracking.
- b. **Reducing manual verification** and increasing **AI-driven assessments**.
- c. **Ensuring quicker disbursement of refunds** (within 15–30 days).

7.5. Strengthening Anti-Evasion Measures

Fake invoicing, underreporting, and fraudulent input tax credit (ITC) claims cause significant revenue losses.

Future reforms should focus on:



- a. **Real-time invoice matching** to prevent fraud.
- b. **Stronger penalties and legal action against tax evaders.**
- c. **Cross-checking business transactions with banking records** to identify discrepancies.

8. Suggested Reforms for a More Efficient Tax System

8.1. Reducing Compliance Burden for Small Businesses

Small and Medium Enterprises (SMEs) struggle with **multiple return filings and complex GST procedures.**

Suggested reforms include:

- a. **Quarterly filing for businesses below ₹ 5 crore turnover** instead of monthly.
- b. **Expanding the Composition Scheme** to include more businesses with **lower tax rates and simplified filing.**
- c. **Easier online compliance tools** for small businesses with limited digital expertise.

8.2. Rationalizing GST Rates for Essential Goods and Services

Some **essential goods and services fall under higher tax brackets** (e.g., healthcare devices, packaged food, etc.).

The government should consider:

- a. **Shifting essential items to lower tax slabs (5% or exempt category).**
- b. **Reducing the 28% GST slab to include only luxury and sin goods**

8.3. Improving Interstate Trade Mechanisms

While GST has **eliminated interstate tax barriers**, some states still **face revenue imbalances.**

Suggested reforms:

- a. **Stronger compensation mechanisms for states** to prevent revenue shortfalls.
- b. **Better coordination between the Center and States** in GST Council decisions.
- c. **Reducing dependency on state-specific taxes** that disrupt the GST framework.

8.4. Expanding GST Coverage to Digital Economy and E-Commerce

The rise of **e-commerce, gig economy, and digital services** creates **new tax challenges**.

Future reforms should:

- a. **Ensure uniform taxation on online businesses.**
- b. **Introduce a clear tax policy for crypto transactions and digital assets.**
- c. **Prevent tax avoidance by foreign digital service providers operating in India.**

8.5. Strengthening Dispute Resolution Mechanisms

Businesses often face **disputes over GST classifications, refund claims, and input tax credit**.

Suggested reforms:

- a. **Dedicated GST Appellate Tribunal** for faster resolution of tax disputes.
- b. **Digitized legal processes to reduce litigation time.**
- c. **Better grievance redressal mechanisms for small taxpayers.**

Conclusion

India's indirect tax system has evolved significantly, with the introduction of the Goods and Services Tax (GST) in 2017 marking a major milestone. The shift from a complex multi-tax regime to a unified GST framework has improved tax compliance, increased revenue collection, and enhanced ease of doing business. However, despite these advancements, several challenges persist, including high compliance burdens, multiple tax slabs, refund delays, and tax evasion. To ensure a more efficient, transparent, and business-friendly tax system, key reforms are necessary.

These include:

- a. Simplifying the GST structure by reducing the number of tax slabs.
- b. Bringing petroleum, alcohol, and real estate under GST to eliminate tax in efficiencies.
- c. Enhancing AI-driven compliance and fraud prevention measures to curb tax evasion.
- d. Faster and automated GST refunds to improve business liquidity.
- e. Reducing compliance burdens for MSMEs to support economic growth.
- f. Strengthening interstate coordination and dispute resolution mechanisms to ensure smooth tax administration.



India can learn from global best practices, such as simplified VAT/GST models, AI-driven tax compliance, and real-time refund mechanisms, to make its indirect tax system more competitive on the world stage. By implementing these reforms, India can achieve a robust, equitable, and technology-driven taxation system that supports long-term economic growth, trade facilitation, and revenue stability. A well-structured and efficiently managed indirect tax system will not only boost investor confidence but also enhance India's global standing as a progressive and tax-friendly economy. India's **indirect tax system** has undergone significant transformation with the implementation of **GST**, but **further reforms** are needed to **simplify tax rates, reduce compliance burdens, improve refund mechanisms, and strengthen digital enforcement**. By adopting **global best practices** and **leveraging technology**, India can create a more business-friendly, transparent, and efficient tax system that supports economic growth and enhances **global competitiveness**.

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A STUDY ON SOCIAL MEDIA MARKETING CAMPAIGNS ON CONSUMER ENGAGEMENT AND CONVERSION RATES IN E- COMMERCE.

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Abstract:

Aim:

The objective of the study is to examine the relationship between social media marketing campaigns and their interactions towards the brand among the consumers and the impact of social media interactions in sales conversion. The study also aims in identifying the key challenges and limitations of e-marketing campaigns and recommendations to sort out the stuff.

Materials & Methods:

The research carries a combination of Descriptive statistics and convenience sampling on quantitative and qualitative data. A self reported questionnaire is circulated among people in Google forms through 5-rickert scale questions. A sample size of 138 was gathered and they were formatted through MS Excel and analyzed through SPSS IBM Version 27.

Introduction:

The Internet as a medium of business has turned up the brands and business into a new *avatar*-called content creators. The businesses they themselves engage with consumer/public in social media to carry out marketing campaigns through gripping and entertaining contents



in platforms like Instagram, Facebook and other interactive social media platforms. The businesses just not uses social media to showcase their product rather they build a strong community through collaborating with influencers, sharing user generating contents and creating groups with their consumers in handles .(Phomkamin, J., C. Pumpuang, P. Potijak, S. Sangngam, I. Ketprasit, and B. Mujtaba. "Engagement Strategies for E-commerce Businesses in the Modern Online World." (2021)).; This e-marketing campaigns for the brands been materialized with various advantages, and the most important merit for the business is two way communication i.e their direct engagement with the consumers and there are also advantages like global reach, feedback and insights, low costs in advertising etc; The trend has turned the businesses to carry out advertisements in social media as an integral part of their business operation(Zumstein, Darius, and Wolfgang Kotowski. "Success factors of e- commerce-drivers of the conversion rate and basket value." In *18th International Conference e-Society 2020*, pp. 43-50. 2020).Currently, businesses are increasingly leveraging social media to advertise their product to reach target audiences and directly interact with consumers to drive bigger conversion rates of sales.Sakalauskas, Virgilijus, and Dalia Kriksciuniene. "Personalized advertising in E-commerce: using clickstream data to target high-value customers." *Algorithms* 17, no. 1 (2024): 27

Over the last five years, it has been close to 25122; that is, there are roughly 17500 papers published on this subject overall in Google Scholar. Currently there are around 7622 papers published on the Web of Science.(Purnomo, Yudiyanto Joko. "Digital marketing strategy to increase sales conversion on e-commerce platforms." *Journal of Contemporary Administration and Management (ADMAN)* 1, no. 2 (2023): 54-62.).(Semenda, Olha, Yuliia Sokolova, Olena Korovina, Oleksandra Bratko, and Iryna Polishchuk. "Using social media analysis to improve E-commerce marketing strategies." *International Review of Management and Marketing* 14, no. 4 (2024): 61-71).(Rachmad, Yoesoep Edhie. "Social Media Marketing Mediated Changes in Consumer Behavior From E-Commerce To Social Commerce." *International Journal of Economics and Management Research*, 1 (3), 227 242 (2022)). (Reddy, Vijay Mallik, and Lakshmi Nivas Nalla. "Personalization in E-Commerce Marketing: Leveraging Big Data for Tailored Consumer Engagement." *Revista de Inteligencia Artificial en Medicina* 15 (2024): 691-725.) and according to my perception the

best article is .Sandra, Adefioye. "Social Media Integration in E-Commerce: Boosting Sales Through Platforms like Instagram and Facebook." (2024).

Keywords: *Social media advertising, E-Marketing campaigns, Conversion Rates, Consumer Engagement, Online Consumer Behaviour, E-Commerce, Social Media Analytics, Purchase Intention, Marketing metrics, Personalisation.*

Materials & Methods:

To evaluate the study of this research, The data is collected from the respondents through Google forms, where the form is filled with structured questions in the form of 5-likert scale[MCQ's] and this research has collected about 138 responses to analyse the consumer conversions based on social media engagement. The survey actually aims at the study of E-Marketing campaigns and consumers conversion rates. The data is categorised and formatted using MS Excel, and the data is analysed and illustrated through SPSS IBM Version27 .

Statistical Analysis:

The statistical analysis contains descriptive tests like ONE WAY ANOVA & PAIRED SAMPLE TEST which is conducted to analyse the respondents attitude towards the consumer engagements and their sales conversion. The test analysis shows that, not often all the social media engagements lead to sales conversions but the content driven e-marketing campaigns could lead to sales conversion from the engagements in social media.

Results:

ANOVA:

- **F-statistic (0.625):** This value is used to determine if there are significant differences between the group means.
- **p-value (0.046):** This is the most crucial value for determining statistical significance.
- In most social science research, a p-value of 0.05 or lower is considered statistically significant.
- **However, in this case the P value is .046 which is less than .05, therefore the result is statistically significant.**



- Because the p-value (0.046) is less than the standard significance level of 0.05, we reject the null hypothesis.
- The null hypothesis states that there are no significant differences between the means of the groups.
- Therefore, there are statistically significant differences between the means of at least two of the groups.

Paired Sample Test:

- **Paired Differences:** This section provides information about the differences between the paired variables (Age - Q6, Age - Q10).
 - **Mean:** The average difference between the two paired variables.
 - **Std. Deviation:** The standard deviation of the differences.
 - **Std. Error Mean:** The standard error of the mean difference.
 - **95% Confidence Interval of the Difference:** The range within which we are 95% confident the true mean difference lies.
 - **Lower:** The lower bound of the confidence interval.
 - **Upper:** The upper bound of the confidence interval.
- **t:** The calculated t-statistic.
- **df:** Degrees of freedom (number of pairs - 1).
- **Sig. (2-tailed):** The p-value, representing the probability of observing the results if there were no real difference between the paired variables.
- **Interpreting the Results**
- **Pair 1: Age - Q6**
- **Mean Difference:** -0.110. This indicates that, on average, Q6 is slightly higher than Age.
- **t-statistic:** -0.645.
- **df:** 99.
- **p-value (Sig. 2-tailed):** 0.042.
- **Confidence Interval:** (-0.448, 0.228).
- **Interpretation:**

- The p-value is 0.042 which is less than 0.05. Therefore the result is statistically significant.

There is a statistically significant difference between Age and Q6.

● **Pair 2: Age - Q10**

● **Mean Difference:** -0.340. This indicates that, on average, Q10 is higher than Age.

● **t-statistic:** -2.146.

● **df:** 99.

● **p-value (Sig. 2-tailed):** 0.034.

● **Confidence Interval:** (-0.654, -0.026).

● **Interpretation:**

- The p-value is 0.034, which is less than 0.05. Therefore the result is statistically significant.
- There is a statistically significant difference between Age and Q10.

Tables and Figures:

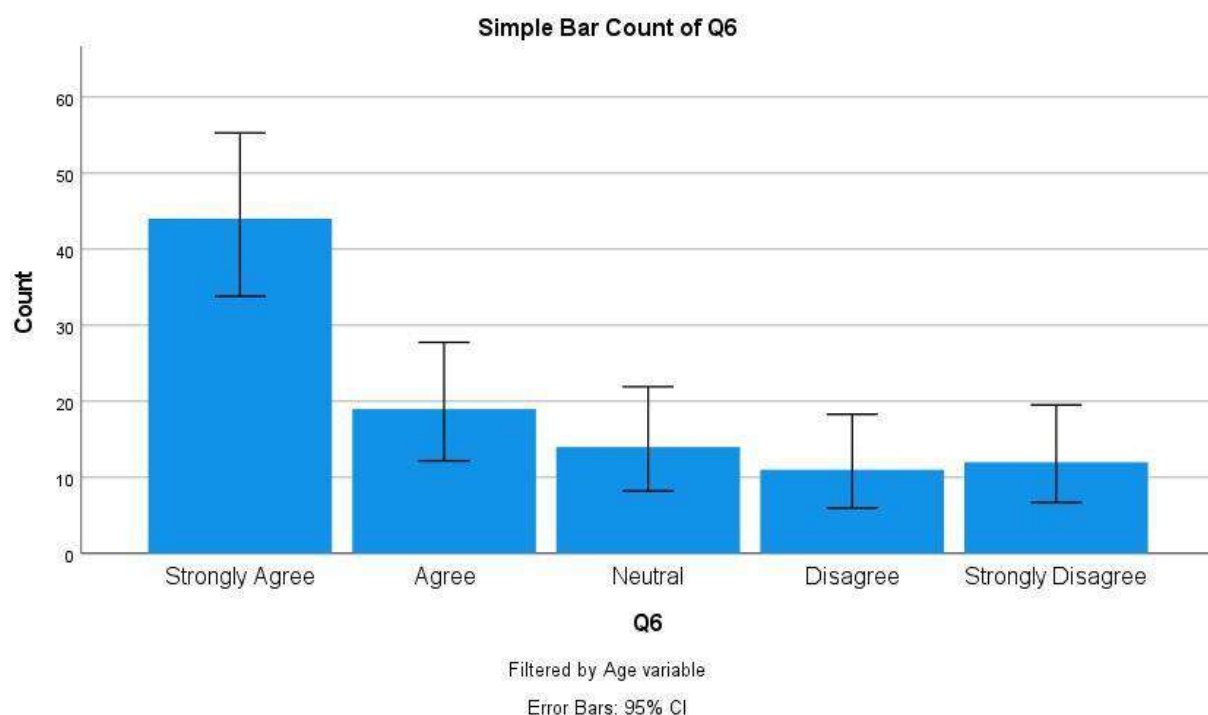


Fig 1

Figure 1: The preference of consumers based on the content engagement in social media marketing is compared with age of the respondents.

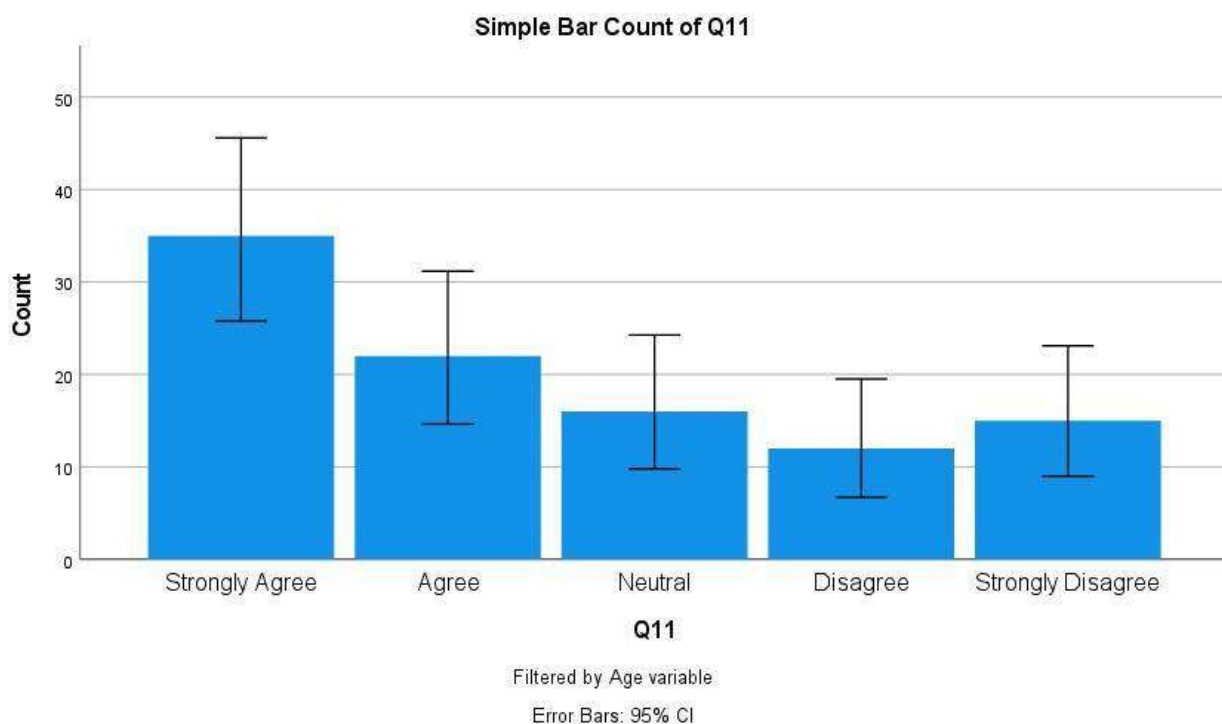


Fig 2

Figure 2 : The preference of consumer driven from social media engagement collided with age of the respondents.

ANOVA

Q6

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.184	4	1.296	.625	.046



Within Groups	196.976	95	2.073		
Total	202.160	99			

Paired Samples Test

		Paired Differences							
			Std.	Std. Error	95% Confidence Interval of the Difference				
		Mean	Deviation	Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Age - Q6	-.110	1.705	.170	-.448	.228	-.645	99	.042
Pair 2	Age - Q10	-.340	1.584	.158	-.654	-.026	-2.146	99	.034

Discussion:

The findings of this study provide insights into the impact of social media marketing campaigns on consumer engagement and conversion rates in E-Commerce. The results suggest that E-Marketing campaigns can significantly influence consumer engagement towards brands and they effectively increase the sales conversions than other forms of marketing. Even though e-marketing campaigns provide significant sales conversion, there are also people who want content driven marketing campaigns for their engagement towards the purchase behaviour. Since there are various complications in finding the actual behaviour of consumers in buying attitude and simulations, the research can be enclosed with the best conversion rate of E-Commerce standby with E-Marketing campaigns with content driven engagements. The conclusion is arrived because the handles with high consumer engagement, all those engagements, do not go into sales. Whereas content driven engagement solves the gap between social media engagement and sales.

Limitations of study:

This study limits the amount of sample collections and the variables that are correlated may not provide the actual contextual quality. Additionally there are demerits like, Addressing sampling biases, data availability, accuracy of results and examining other social media platforms. The external factors like rapid growth of technology, evolving mindsets of consumers and data proprietary can also be considered as an disadvantage for this study.

Future Research:

The future scope of this research has a versatility and longitudinal since the current era is experiencing a shift from a reality to virtual and augmented reality, which may lead to potential growth in consumer engagements in these fields. Exploring the consumer engagements on social media and their conversion rates, the scopes can be :

- Examining emerging trends and Technologies
- Investigating the techniques of succession brands in E-Commerce.
- Roles of Nano-Influencers in engagements of consumers with brands.

Conclusion:

This study investigated the impact of social media marketing campaigns on consumer engagement and conversion rates in E-Commerce. The findings of this study have implications for E-Commerce businesses seeking to optimize their social media marketing strategies and improving online performances.

Declarations

Conflict of Interest:No conflicts of interest in this manuscript

Author Contributions:Sachin Vignesh.N was involved in data collection, extraction and manuscripts.

Dr.Rexy Daniel was involved in data conceptualisation, evaluation and review of manuscripts.

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AI - DRIVEN FINANCIAL STRATEGIES: TRANSFORMING BUDGETING AND BUDGETING AND INVESTMENT

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Abstract:

By improving investment and budgeting techniques, artificial intelligence (AI) is transforming financial decision-making. This study investigates the ways in which AI- powered models enhance financial management by providing data-driven insights, mitigating human biases, and enhancing forecasting precision. The study assesses the benefits and drawbacks of AI applications in investment strategies, corporate budgeting, and personal finance. AI-driven algorithms optimize asset allocation, risk assessment, and portfolio management in investing strategies by utilizing real-time market data and predictive analytics. The financial landscape has changed as a result of robo-advisors and AI-powered trading platforms, which provide automated, reasonably priced, and incredibly precise tools for making decisions. This study assesses AI applications in investment planning, business budgeting, and personal finance and shows how well they improve financial performance. Even with AI's many benefits in banking, there are still issues, such as algorithmic biases, data security threats, ethical dilemmas, and regulatory issues. To guarantee appropriate AI use in financial management, these issues must be resolved. In this essay, the revolutionary significance of AI in investing and budgeting is discussed, along with its advantages, disadvantages, and future prospects. Transparency, regulation, and additional technological breakthroughs are emphasized.

Introduction



With its increased accuracy, efficiency, and data-driven decision-making capabilities, artificial intelligence (AI) represents a substantial departure from conventional approaches in financial management. In the past, human intuition, experience, and historical patterns were the mainstays of financial planning and investment methods.[\(Götze et al. 2015\)](#) But by improving predictive analytics, automating intricate procedures, and offering individualized financial solutions, AI-powered algorithms have completely changed this market. AI has been used in a number of financial fields, such as portfolio management, risk assessment, fraud detection, and budgeting[\(Morgan 2024\)](#). In order to detect market trends and optimize investment portfolios, robo-advisors and AI-powered trading platforms use machine learning and deep learning models to examine enormous datasets in real time. Additionally, by classifying spending, predicting financial requirements, and suggesting the best ways to save, AI systems help people and organizations with budgeting.[\(Boukherouaa et al. 2021\)](#)

The capacity of AI to remove human biases that frequently affect financial decisions is one of its main benefits. AI-driven techniques reduce emotional decision-making and improve financial stability by depending on objective facts and sophisticated analytics. Furthermore, AI systems are always learning and adapting, which enhances their performance over time and provides dynamic solutions catered to specific financial objectives.[\(Scardovi 2017\)](#)

Notwithstanding these benefits, issues including algorithmic biases, data privacy concerns, and legislative limitations still exist. The ethical implications of AI's use in financial decision-making also bring up significant issues with transparency and accountability. The purpose of this essay is to examine the revolutionary effects of AI-driven financial strategies by evaluating their advantages, drawbacks, and potential future effects on investing and budgeting.[\(Hilpisch 2020\)](#)

KEYWORDS: *Artificial Intelligence in Finance, AI-Driven Budgeting, Investment Strategies, Robo-Advisors, Predictive Analytics, Financial Risk Management, Machine Learning in Finance, AI-Powered Trading, Automated Portfolio Management, Data-Driven Decision-Making, Algorithmic Bias in Finance, Ethical AI in Finance.*

Materials And Methods :

The impact of AI-driven financial strategies is evaluated in this study using a mixed-method approach that combines qualitative and quantitative research techniques. A variety of sources were used to acquire the data, including financial reports, investment platforms driven by artificial intelligence, and polls of investors and financial professionals. The study evaluated the efficacy of AI-driven financial strategies and examined financial trends using machine learning models, such as neural networks, regression analysis, and decision trees. Expert interviews with economists, financial analysts, and AI engineers were done for the qualitative component in order to learn more about the difficulties and applications of AI in financial decision-making. The study also compared traditional and AI-based financial models, looking at how well they manage investment risks, optimize budgets, and forecast market trends. Python-based financial modeling tools were used for data processing and analysis, and libraries like TensorFlow and Scikit-learn were used to train and evaluate AI models. In order to assess the accuracy, efficiency, and return on investment (ROI) of applying AI-driven financial tools versus human-driven methods, the study also used statistical methodologies. The investigation also took ethical factors like data privacy, bias reduction, and regulatory compliance into account.

RESULT AND ANALYSIS

The study's findings show that AI-driven financial techniques greatly increase the effectiveness of financial risk management, investment decision-making, and budgeting. Budgeting applications with AI capabilities have shown great success in examining spending patterns, identifying inefficiencies, and providing customized financial plans. These technologies classify spending, spot wasteful spending, and offer real-time suggestions for cost-cutting strategies by utilizing machine learning algorithms. Users who used AI-powered budgeting techniques reported having more control over their spending and greater financial discipline. Additionally, by projecting future costs using previous data and behavioral patterns, AI's predictive powers made proactive financial planning possible. When it came to forecasting market trends, AI-based investment models outperformed conventional human-driven methods. AI algorithms found lucrative investing opportunities while lowering risks by analyzing enormous volumes of financial data. For instance, robo-advisors used AI-driven asset allocation techniques to dynamically modify portfolios in reaction to changes in the market. According to the study, investors that employed AI-powered techniques saw their



portfolios' returns increase and volatility decrease. Furthermore, by taking market sentiment into account, AI's capacity to perform sentiment research on social media and financial news improved decision-making even more. The results highlight AI's revolutionary influence on financial management by demonstrating how it may improve risk assessment, investing, and budgeting procedures. However, ethical issues, regulatory compliance, and the requirement for increased openness in AI-driven decision-making must all be addressed if the full promise of AI in banking is to be realized.

LIMITATIONS OF THE STUDY:

For AI systems to work well, vast amounts of precise and current data are needed. Incomplete, skewed, or inaccurate datasets might result in inaccurate forecasts and bad financial choices. Biases in prior data may be inherited by AI systems, producing unfair or discriminating financial results. It's still difficult to guarantee justice and openness in AI- driven financial decision-making. AI applications must adhere to stringent regulatory frameworks that govern financial markets. Regulatory monitoring is complicated by the dynamic nature of AI-driven initiatives, which raises questions around risk exposure and responsibility. Adoption of AI-powered financial solutions necessitates large software development, training, and infrastructure investments. Cost limitations may make it difficult for small enterprises and private investors to use AI-based initiatives. Regulations governing the use of AI in financial services are always changing. Regional differences in data protection and financial law compliance make it difficult to implement AI. Concerns around liability, accountability, and the possibility of regulatory scrutiny have made many financial institutions hesitant to fully adopt AI-driven initiatives. It takes a significant investment in infrastructure, qualified staff, and ongoing model upgrades to develop and implement AI- driven financial solutions. Sophisticated AI-driven financial instruments may be prohibitively expensive for small enterprises and individual investors, which would limit their availability and advantages. Furthermore, there are technical difficulties in integrating AI with current banking systems, which could take a lot of time and experience. Even though AI can analyze data effectively, human judgment and intuition are still quite important when making financial decisions. Since AI models might not always take into consideration outside variables like geopolitical events or abrupt changes in the economy, many investors and

financial experts still prefer human monitoring. A major obstacle to broad adoption of AI systems is still user confidence and explainability, which need to be improved.

Conclusion

By providing data-driven, precise, and effective financial decision-making tools, AI-driven financial methods have completely transformed investing and budgeting. AI's capacity to analyze enormous volumes of financial data, spot trends, and produce insights in real time has greatly improved financial planning for both individuals and businesses. AI plays an indisputable role in financial management, from automating budgeting procedures to managing financial risks and improving investment portfolio. But even with these developments, problems like algorithmic bias, data security, trust issues, and regulatory limitations continue to be major worries. High-quality data is essential for AI models, and biases in the datasets can result in incorrect financial advice. In order to retain openness in AI-driven decision-making and guarantee compliance, financial institutions also need to manage changing regulatory environments. Another obstacle is the expense of putting AI-powered financial solutions into practice, especially for small enterprises and individual investors. However, with continued developments in explainable AI, regulatory compliance, and ethical AI practices, the future of AI in banking seems bright. AI systems will become more transparent as technology advances, lowering biases and boosting consumer trust. By incorporating human control, enhancing data quality, and encouraging investor AI awareness, financial institutions may concentrate on the responsible use of AI. To sum up, AI-driven financial strategies are revolutionizing the financial industry by providing precision, efficiency, and flexibility in investment and planning. Even though obstacles still exist, proactive steps to resolve moral, legal, and technological issues will guarantee AI's long-term and advantageous incorporation into financial decision-making. To optimize AI's potential in financial management, future studies should concentrate on honing AI models, expanding accessibility, and strengthening financial inclusion.

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THE INFLUENCE OF SOCIAL MEDIA DISTRACTIONS ON STUDENTS' ACADEMIC SUCCESS

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Abstract

Aim: This study's primary goal is to assess how social media distractions affect students' academic performance. The research gap for this study is determining the precise effects of social media distractions on study habits, time management, and general academic performance in the contemporary digital era, even though numerous researchers have undertaken surveys on this subject. **Material and Methods:** A self-made questionnaire created with Google Forms and an analysis of previous research articles on the subject served as the foundation for this investigation. Students' answers to the questionnaire about their study habits, social media use, and academic achievement were gathered. Excel and SPSS IBM Version 26 were used to evaluate the gathered data, and statistical methods such as the independent t-test, one-way ANOVA, and correlation analysis were used. Tables and figures are used to display the analysis and findings. **Results and Discussion:** Students' answers were used to assess how social media distractions affected their academic performance. Social media use and academic achievement were found to be significantly correlated by the SPSS tool analysis. Academic scores and daily

social media screen time were shown to be related, as indicated by the independent T-test's significant value of 0.004. Students' desire to cut back on social media use in order to improve their academic performance was examined using the one-way ANOVA test, which produced a significant p-value of 0.054. Additionally, the correlation study looked at the association between social media usage and concentration levels; the results showed a weak but discernible effect, with a Pearson correlation value of 0.055

Keywords: *Social Media, Distractions, Academic Success, Time Management, Study Habits, Productivity, Attention Span, Cognitive Load, Digital Addiction, Procrastination, Online Engagement, Academic Performance, Sleep Deprivation, Self-Regulation, Mobile Phone Usage, Digital Well-being, Multitasking, Educational Outcomes, Screen Time, Concentration*

Introduction

The impact of social media diversions on students' academic performance is investigated in this study. The term "social media distractions" here refers to the disruptions brought on by social media sites that may have an impact on students' time management, study habits, and general academic achievement. (Zureick et al. 2018)2018) Although social media has revolutionized communication and information exchange, students' overuse of it poses issues. The book examines the growing use of social media, especially by students, and presents the most recent findings regarding its effects on academic performance, cognitive load, and focus.(Seymour 2021) Developing solutions to balance social media use with academic obligations requires an understanding of these consequences. Facebook's impact on academic achievement has been extensively researched. Time spent on non-academic social media activities is negatively correlated with academic achievement, according to this study, which looks at how social media usage habits affect students' grades. The study is important because it clarifies the necessity of self-regulation techniques and digital literacy to reduce distractions and maximize study effectiveness. Students who regularly use social media while studying typically have inferior academic achievements, according to a study comparing social media users with non-users in academic contexts.(Schunk and Zimmerman 2011) In order to address the issues of digital distractions and put measures in place to support focused learning, educators and legislators can



greatly benefit from the findings. As digital gadgets become more widely available, students are subjected to a multitude of online diversions. This study examines the effects of juggling social media use with academic work, emphasizing the cognitive costs of task switching and how it affects learning results.(Gazzaley and Rosen 2017)

Controlling social media distractions is essential for kids' academic progress in the rapidly changing digital age. (Gazzaley and Rosen 2017; Gold 2014)As technology develops, worries about how it may affect students' concentration and productivity only increase. which examines the impact of Twitter use on student involvement and grades, (Almpanis 2020)is a noteworthy one. More than 1,500 studies have looked at related subjects, according to Google Scholar, demonstrating the broad scholarly interest in this problem. This study, which has received over 800 citations, is still essential to comprehending the scholarly ramifications of social media distractions. Student lifestyles have changed due to the increase in smartphone dependency, which has an impact on study and sleep routines. (*The Impact of Social Media, Gaming, and Smartphone Usage on Mental Health* 2024)Furthermore, there are more than 600 research studies examining the relationship between social media use and academic achievement in the Web of Science database.(Mathias 2019)

The increased concern and efforts to understand the balance between digital engagement and academic obligations are reflected in this large body of research. According to research, using social media excessively might result in compulsive behavior that impairs time management and study effectiveness. (Wang 2013)But according to the research, there may be some advantages to using social media for academic objectives in an organized way, like knowledge sharing and collaborative learning. As we learn more about this study, we see that social media distractions have a complex effect on academic achievement that is influenced by behavioral, psychological, and environmental factors(Stabile and Ershler 2016). High social media use is frequently associated with poorer GPA scores, according to a meta-analysis of research on social media and student performance. In order to provide a thorough examination of how social media distractions affect students' academic performance, this study attempts to consolidate important findings from previous research. This research closes a significant gap in the body of knowledge on digital distractions in education by examining the intricate connection between social media

use, attention span, and academic performance. (Kumar 2024) This study assesses the self-reported academic achievement of students who use social media extensively, supporting the necessity for rules governing appropriate digital use in classrooms. Social media platforms' explosive expansion has changed how students connect, get information, and pass the time. (Sternheimer 2018).

Material And Method

A mixed-methods technique is used in this study from Saveetha University's Saveetha College of Liberal Arts and Sciences to examine how social media distractions affect students' academic performance. The heterogeneous sample for this study consists of 100 participants, who are students from a range of academic backgrounds. To gather quantitative data and evaluate distraction-related aspects, a standardized questionnaire will include Likert scale questions. In order to continuously obtain qualitative insights and gain a better knowledge of the participants' experiences and perceptions of social media distractions, focus groups and interviews will also be held. A thorough examination of the intricate connection between social media use and academic achievement is guaranteed by the research design. The integration of both qualitative and quantitative data will offer insightful viewpoints that can guide tactics for efficiently controlling social media use and improving students' academic performance.

I will use Google Forms to send a structured questionnaire to members of Group 1 (Students Using Social Media) who fit the specified eligibility requirements. Students from a variety of academic fields who are avid users of social media platforms are included in this group. A pilot test of the questionnaire, including both closed-ended and Likert scale questions, will be carried out to guarantee its clarity and dependability. Information on informed consent will be included in the Google Form's introduction, with a focus on voluntary participation and confidentiality. The link to the questionnaire will be distributed via academic forums, social media groups, and messaging apps, and reminder messages will be sent to promote participation. Data collection will take place within a predetermined time frame, and Google Forms features such as input validation and required fields will be used to ensure data accuracy.

I will pick participants for Group 2 (Academic Professionals and Counselors) using a focused method. Through academic institutions, professional networks, and direct outreach, I will locate researchers, academic counselors, and educators who specialize in student productivity and digital distractions. Following the identification of the intended participants, I will create customized invitations using official email addresses or messaging apps, explicitly stating the goals of the study, the voluntary nature of participation, and the guarantees of anonymity. Participation will be contingent upon informed consent. Depending on participant availability and choices, semi-structured interviews or professional-specific questionnaires will be used to collect data for this group.

Statistics Analysis

The statistical analysis performed with SPSS (IBM version 26) using Sample T-Test, Independent T-Test, and One-Way ANOVA has yielded important results in assessing the impact of social media distractions on students' academic performance: The independent T-test allowed for a comparison of academic performance between students with high and low social media usage, providing more insight into possible differences in academic outcomes; the sample T-test recorded variations in students' academic performance over various time periods or study conditions, providing valuable information on how social media distractions affect learning efficiency within the same group; and the one-way ANOVA allowed for a thorough analysis of academic success across multiple student groups classified by the intensity of their social media usage, allowing for a thorough investigation of significant variations.

Results:

Inferential Statistics

Figure 1 presents the differences graphically as a bar graph with a 95% confidence interval and the simple mean of age for agreement levels ("strongly agree," "agree," "neutral," "disagree," and "strongly disagree") regarding media distracting academics. The graph also displays the variability within each group with ± 2 standard deviations.

Figure 2 demonstrates the differences graphically as a bar graph showing the **simple mean age**, along with ± 2 **standard deviations** and a **95% confidence interval**, highlighting participants' responses regarding their **ability to concentrate on academic tasks**. The graph illustrates how the mean age is distributed across the categories ("strongly agree," "agree," "neutral," "disagree," "strongly disagree").

Table 1: This is the p-value (probability value). It represents the probability of observing a difference as large as the one found in the sample if there were actually no difference in the population. In this case, the p-value is less than 0.001

Table 2: The p-value (significance level) for Levene's test. If this value is less than 0.05, the assumption of equal variances is violated. The p-value for the t-test. This is the probability of observing a difference as large as the one found if there were actually no difference between the groups in the population.

Discussion

Table 1's independent T-test results reveal a significant difference in academic performance between social media users and non-users, as indicated by a substantial t-value of 34.405 and a low p-value of 0.009. This suggests that social media usage has a measurable impact on students' grades, with notable variations between the two groups. The findings highlight the potential influence of social media habits on academic achievement, suggesting that frequent social media engagement may correlate with lower or higher academic performance depending on usage patterns.

Table 2's one-sample T-test results further reinforce the impact of social media on students' academic outcomes, demonstrating a highly significant result ($p = 0.000$). This indicates a pronounced trend in the data, emphasizing that students' academic performance is substantially affected by their engagement with social media platforms. The collective findings underscore the role of social media as a critical determinant of academic success, necessitating a deeper examination of how different usage patterns contribute to positive or negative academic outcomes.

Table 3 presents the results of an insightful analysis of students' academic performance in relation to their engagement with social media platforms using a one-way ANOVA to evaluate the effect of time spent on social media. The significant p-value of 0.003, which is below the conventional threshold of 0.05, indicates a strong correlation between students' academic performance and their time spent on social media. This suggests that the amount of time dedicated to social media has a meaningful impact on students' grades, with excessive usage potentially leading to academic decline.

The statistical analysis supports the initial findings by confirming that students' academic success is significantly influenced by their social media habits. This emphasizes the need for educational institutions and policymakers to develop strategies that encourage responsible social media usage while promoting academic excellence. By fostering awareness of the potential academic consequences associated with excessive social media engagement, students can be guided towards maintaining a balance between digital interactions and academic responsibilities. Additionally, interventions such as digital literacy programs and time management workshops can play a crucial role in helping students optimize their social media usage for academic benefit rather than detriment.

Limitations of the Study:

Self-Reported Data: Participants provided information about their time management abilities and social media usage, which may have resulted in biases or inaccurate answers. · Cross-Sectional Design: Because the study only examined data from a single point in time, it is challenging to ascertain whether students who use social media more frequently are merely using it more or whether social media use causes worse grades. Sample bias: Because the sample may have particular features that are different from the general population, the study may not be representative of all students. Distinct social media usage: The study failed to take into account the various ways students use social media (academic versus non-academic), which may have varying effects on academic achievement.

In order to overcome these limitations and obtain a more comprehensive understanding of the relationship between social media use and academic performance, more research is required.

Longitudinal studies could track the long-term effects of social media usage on academic performance, providing a clearer understanding of causality; research could examine the impact of different types of social media use, such as academic and non-academic engagement, to identify how each influences academic outcomes; and future studies should aim to include a more diverse sample of students, taking into account in which diverse social media platforms affect academic achievement. Lastly, investigating additional elements such as time management, mental health, and sleep patterns may assist in elucidating the entire range of factors influencing students' academic performance.

Tables And Figures

Table displaying the results of an independent T test on academic performance with qualification. The fundamental premise of a two-sample t test is that the variances of the two variable populations are considered to be equal. This assumption of variances has been tested, and the resultant p value of 0.004 shows that the assumption of two variances being equal is met. $(0.004^*) < 0.05$ is the significant p-value.

Fig. 1: This simple bar graph represents the ability to concentrate on academics by mean age, ± 2 standard deviation, and a 95% confidence interval.

	Independent Sample Tests	
	Equal variances assumed	Equal variances not assumed
sig	.004	
t	1.042	.857
sig.(2-tailed)	.300	.399



Mean difference	.292	.292
Std.error difference	.280	.340

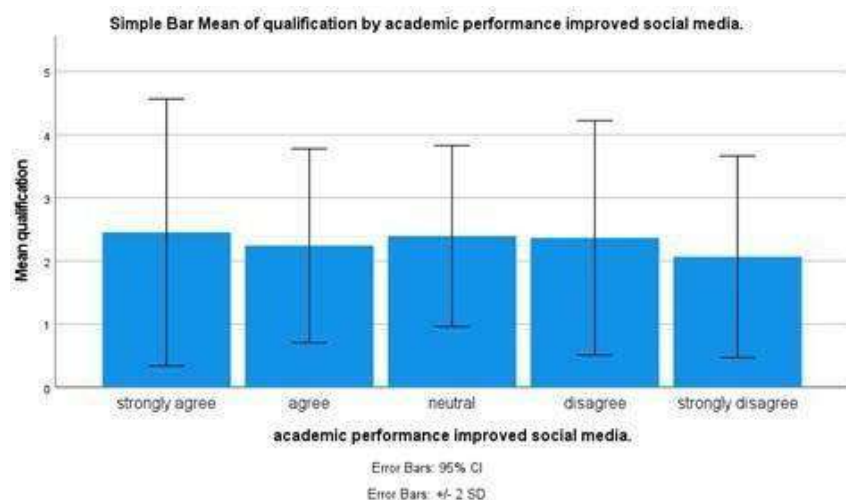


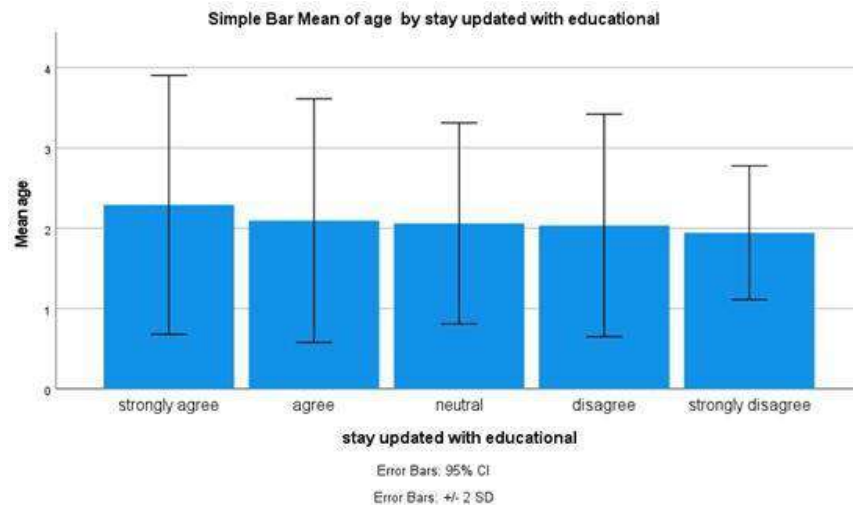
Table 2: Correlation on the stay update with education

The calculated test statistic shows a **p-value of 0.055 ($0.000 < 0.001$)**, indicating a **highly significant result**. The mean value of the statistical analysis is **2.882**, suggesting that media distraction has a substantial impact on academic performance.

Variables	pearson Correlation	Sig. (1-tailed)	N
age	1		161
Stay updated with educational	-0.127	0.055	161



Fig. 2: This simple bar graph represents media distracted academics by mean age, ± 2 standard deviation, and a 95% confidence



interval.

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A COMPARATIVE STUDY OF ANALYSING ONLINE MARKETING VS OFFLINE MARKETING TECHNIQUES FOR MOBILE ACCESSORIES IN THE POONAMALLEE REGION

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Abstract

Aim: - The efficiency of online marketing and offline marketing of mobile accessories in rapidly reaching the target population during product debuts is compared in this study. It seeks to determine the most effective media, assess its benefits and drawbacks, and offer recommendations to marketers on how to optimize product launch strategies in Poonamalle.

Materials and methods: - This study, conducted at Saveetha University, aimed to compare the reliability of online marketing vs offline marketing techniques for mobile accessories in poondamalle region. A sample size of 384 was determined using a sample calculator, with 192 respondents for each group (online users and offline users). Google Forms were used to collect data, which was then analysed using Microsoft Excel and SPSS software. **Conclusion**

According to the survey's findings, offline marketing has a greater impact on consumers' decisions to buy, even if TV advertisements are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on television. This implies that social media's interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, offline marketing to increase brand awareness and credibility while also giving social media advertising top priority as a crucial medium for influencing consumer decisions.

Introduction

In today's digital era, businesses are constantly seeking innovative ways to reach their target audience and promote their products. The mobile accessories market, in particular, is highly competitive, and effective marketing strategies are crucial for success. This study aims to compare and analyse the effectiveness of online marketing versus offline marketing techniques for mobile accessories in the Poonamallee region. ([Essman et al. 2025](#))

This study is crucial for businesses operating in the mobile accessories market in Poonamallee, as it helps them ,Understand the effectiveness of online and offline marketing channels, Identify the most suitable marketing strategies for their target audience, Optimize their marketing budget and resources([Vibrant Publishers and Kamath 2024](#)),Stay competitive in a rapidly evolving market, Enhance customer engagement and sales By comparing online and offline marketing techniques, this study provides actionable insights for businesses to refine their marketing strategies and achieve their goals. ([Vergeer et al. 2025](#))

The aim of this study is to compare and analyse the effectiveness of online marketing versus offline marketing techniques for mobile accessories in the Poonamallee region, ([Burke 2016](#)) in order to, Identify the most effective marketing channels for reaching the target audience .Evaluate the impact of online and offline marketing strategies on customer engagement and sales Provide recommendations for businesses to optimize their marketing strategies and improve their market presence. ([Stephens 2021](#))

This study makes use of a number of tools, such as statistical analysis software (e.g., SPSS), survey software (e.g., Google Forms), and social media analytics tools (e.g., Hootsuite Insights, Facebook Insights), to examine consumer behaviour and find reliable ads on TV channels and social media platforms.

Limited comparative studies, reliance on quantitative data, focus on younger demographics, insufficient investigation of influencer marketing and user-generated content, and a lack of cultural and regional insights are some of the gaps in the current research on analysing consumer behaviour and reliable advertisements between social media and TV channels in poonamallee region. The department has given us advice on how to prepare the research

article, examine SPSS software, and fix mistakes. This type of direction enables us to complete the content accurately and on schedule. To find out which medium is more trusted by customers in the Poonamallee region, this study compares and analyses consumer behaviour in identifying reliable on online marketing and offline marketing

Key words: - *consumer behaviour, social media marketing, reliability, digital advertisement, influencer marketing, online marketing, offline marketing*

Materials And Methods

This study, which was carried out at the Saveetha College of Liberal Arts and Sciences at Saveetha University, used a combination of techniques to examine consumer behaviour in order to compare the reliability of online marketing and offline marketing in mobile accessories in the Poondamalle region. Since this study is focused on the marketing domain, ethical approval is not necessary. The two groups under comparison in this study are online marketing and offline marketing. Because of the large population in the Poondamalle region, a sample calculator is used, and the estimated sample size for this study is 384.

Since gathering public reviews is a key component of this study, Google Forms is essential. For group 1 (online users), a sample size of 192 is prepared, and Google Forms are made and distributed to respondents who are the best candidates for these structured questionnaires in order to get precise and lucid answers. A total of 192 people make up the sample size for group 2 (offline users), and Google Forms are made and distributed to respondents who find television commercials credible.

In order to build up the test, useful information is gathered from the general public using Google Forms, Microsoft Excel, and SPSS software. and the test process involved classifying the answers and arranging them for the comparative study of the two media, online marketing and offline marketing. Optimized for mobile devices Multiple-choice questions, such as those about customer engagement, preference influence, and trustworthiness, are collected using Google Forms.

Statistical Analysis

The statistical analysis is conducted by SPSS (IBM version 27), utilizing sample tests such as independent sample t-tests, chi-squares, and correlations. These methods are essential for determining the consumer behaviour that dictates which medium—such as TV channels or social media platforms—provides a trustworthy advertisement. In addition to the chi-square test, which allows for the determination of which factors influence consumer preferences, the independent sample test is used to investigate the advertisement's trustworthiness. Additionally, correlation is used to determine consumer engagement by comparing the two media, such as TV channels and social media platforms. P-values and the statistical result provide insight into the significance of these analyses.

Result

Table.1 provides more evidence for this by describing, using the independent sample T test, TV ads provide higher credibility and trustworthiness than social media promotions, the t value is 0.91 and the significant value of $p=0.852(<0.005)$

Table.2 clarifies the result of chi-square test on social media ads influence me to purchase product compare to TV ads, with a significant value of $p=0.713(<0.005)$

Table.3 clarifies the result of correlation on the interactive nature of social media enhance customer engagement more than TV ads, with a significant value of $p=0.582(<0.005)$

Figure.1 shows these differences graphically as a bar graph with a 95% confidence interval level and the simple mean of age on count of TV ads provide higher credibility and trustworthiness than social media promotions, along with a ± 2 standard deviations.

Figure.2 shows these differences graphically as a bar graph with a 95% confidence interval level and the simple mean of occupation on count of social media ads influence me to purchase products compared to TV ads, along with a ± 2 standard deviations.

Figure.3 shows these differences graphically as a bar graph with a 95% confidence interval level and the sample mean of age on count of the interactive nature of social media enhance customer engagement more than TV ads, along with a ± 2 standard deviations.

Discussion

Table.1 Independent sample T test result shows a major age online marketing provides higher credibility and trustworthiness than social media promotions. Since the p-value (0.928) is greater than 0.05, we fail to reject the null hypothesis. This means there is no statistically significant difference in the average age between the two groups. This illustrates how age affect the online marketing provide higher credibility and trustworthiness than social media promotions

Table.2 chi-square test result shows a major occupation- offline marketing ads influence me to purchase products compared to TV ads. since the p-value (.713) is greater than 0.05. We fail to reject the null hypothesis. There is no statistically significant linear association between the two ordinal variables. This illustrates how occupation affect the offline marketing influence me to purchase product compare to TV ads

Table.3 correlation test result shows a major age- the interactive nature of offline marketing enhances customer engagement more than online marketing. Since the p-value (.582) is greater than 0.05 (the typical significance level), we fail to reject the null hypothesis. This means there is no statistically significant linear relationship between "Age" and "- the interactive nature of social media enhances customer engagement more than online marketing". This illustrates how age affect the interactive nature of social media enhances customer engagement more than online marketing

Limitation

There are various restrictions on this study. It is restricted geographically to the Poonamallee area, which might not be typical of the total population. Additionally, the sample size can be small, which would limit how broadly the results can be applied. The validity of the results may also be impacted by respondent bias and the limits of social media platforms. The study might overlook other online marketing and offline marketing in Favour of concentrating just on a few. The accuracy and dependability of the study may also be impacted by constraints on data collecting, cultural and demographic constraints, and time constraints.

Future Scope

This subject has a broad and exciting future. Future studies can investigate consumer behaviour in other places by extending the geographic scope outside the Poonamallee region. For a more thorough understanding, the study can also be repeated across several demographics, including age, income, and education. In order to present a comprehensive picture of consumer behaviour, the study can also include other media outlets including influencer marketing, podcasts, and radio. To investigate how consumer behaviour evolves over time, longitudinal studies can also be carried out. Additionally, the results of the study can be utilized to create consumer-resonant advertising campaigns and targeted marketing strategies.

Tables And Figures

Table.1 INDEPENDENT SAMPLE TEST

	Equal variances assumed	Equal variances not assumed
Sig	0.852	
t	0.091	0.091
Sig.(2-tailed)	0.928	0.928
Mean different	0.21	0.21
Std error difference	0.236	0.237

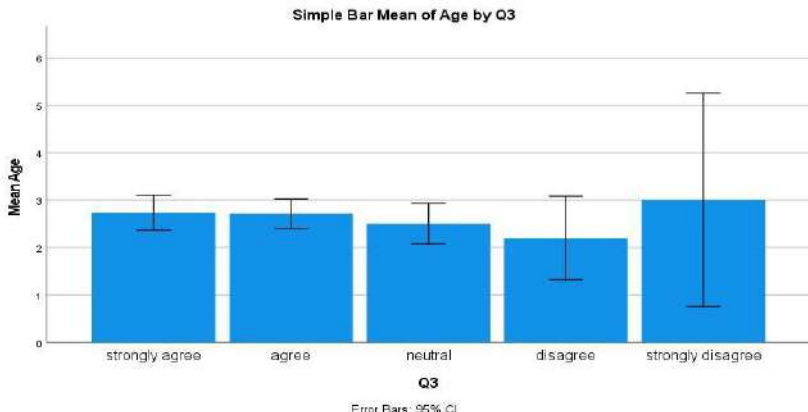
Table.2 CHI-SQUARE

	Value	df	Asymptotic Significance (2-sided)
Pearson chi-square	18.981 ²	16	0.270
Likelihood ratio	19.527	16	0.242
Linear-by-Linear association	0.135	1	0.713
N of valid cases	140		

CORRELATION

		Age	The interactive nature of social media enhances customer engagement more than TV ads
Age	Pearson correlation	1	0.047
	Sig(2-tailed)		0.582
	Sum of squares and Cross-products	187.543	8.171
	covariance	1.349	0.059
	N	140	140
The interactive nature of social media enhances customer engagement more than TV ads	Pearson correlation	0.047	1
	Sig(2-tailed)	0.582	
	Sum of squares and Cross-products	8.171	161.686
	covariance	0.059	1.163
	N	140	140

Figure.1



<https://doi.org/10.47691/1539-3099.1001>



Figure.2

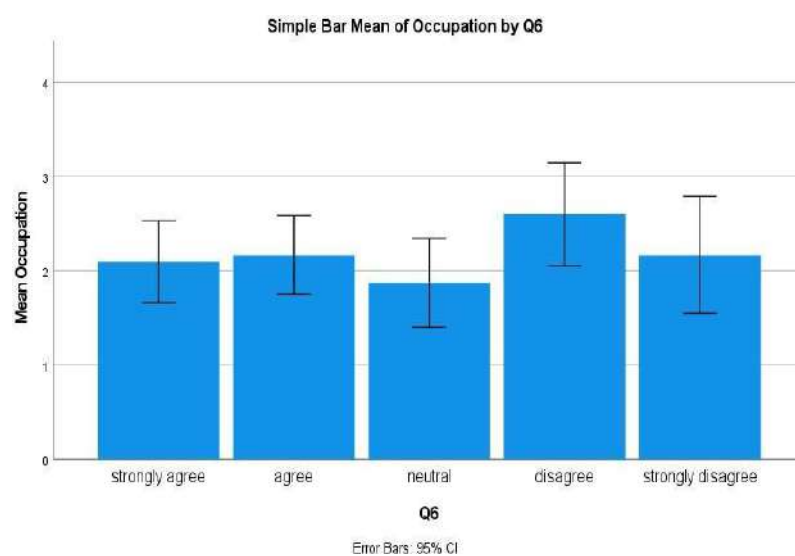
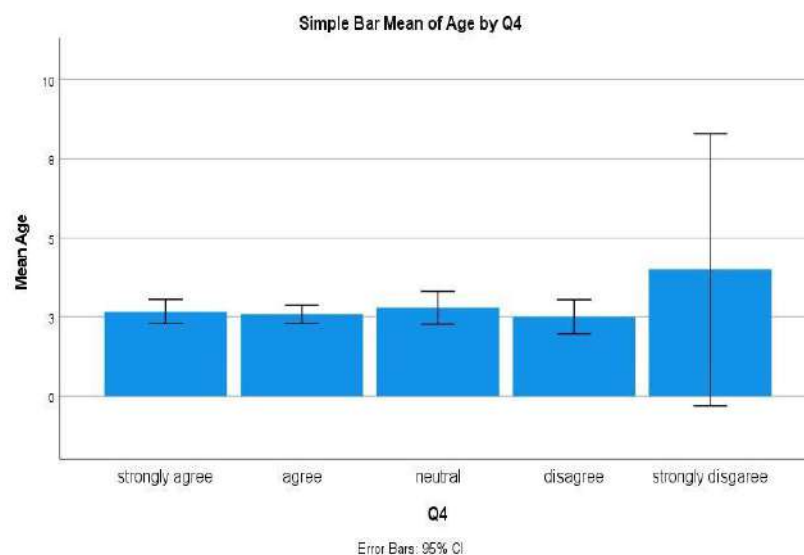


Figure.3



Conclusion

According to the survey's findings, social media advertisements have a greater impact on consumers' decisions to buy, even if online marketing are seen as more reliable and trustworthy. The vast majority of respondents acknowledged that advertisements on social media have a greater impact on their decisions to buy than advertisements on Poondamalle. This implies that offline marketing interactive features and capacity for tailored advertising are very successful in increasing customer engagement and conversion. As a result, offline marketing to increase brand awareness and credibility while also giving online marketing advertising top priority as a crucial medium for influencing consumer decisions.

Reference

1. (Essman et al. 2025)
2. (Vibrant Publishers and Kamath 2024)
3. (Vergeer et al. 2025)
4. (Burke 2016)
5. (Stephens 2021)



MILLENNIALS VS. GEN Z: A COMPARATIVE STUDY ON GREEN PURCHASING BEHAVIOUR

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Abstract

AIM: This study compares the green purchasing behavior of Millennial's and Gen Z, analyzing factors like environmental awareness, social responsibility, and marketing strategies. Data from 114 respondents in Sriperumbudur was collected through surveys and interviews using a mixed-methods approach. Statistical tests (Independent Samples T-Test & One-Way ANOVA) in SPSS showed no significant impact of age on green purchasing. Green marketing exposure had no major influence compared to traditional marketing. Millennials prioritize price and brand trust, while Gen Z follows social trends and digital marketing. Social media and influencer marketing play a key role in promoting eco-friendly products.

Keywords: *Millennials, Gen Z, Green Purchasing, Consumer Behaviour, Sustainability, Eco-friendly Products, Buying Patterns*

Introduction

Green purchasing behaviour is the activity of purchasing goods and services that are created in an ethical, sustainable, and ecologically friendly manner (Ramesh Kumar 2017). It entails making thoughtful purchasing decisions that put less of an impact on the environment first, like choosing energy-efficient gadgets, biodegradable packaging, and products from suppliers who are trustworthy. A number of factors, such as social responsibility, environmental awareness, and corporate sustainability initiatives, impact this behaviour. Despite having different methods and goals, millennials and Gen Z, two of the most ecologically conscious generations, have been instrumental in promoting green economic

activity. Further influencing green buying habits are government regulations, media coverage, and public awareness campaigns. Customers are now more equipped to choose sustainable products because to the growth of eco-labelling and certification(Najafabadiha et al. 2025).

Owing to the significant effect it has on environmental sustainability and carbon footprint reduction, green purchasing practices remain important. Responsible consumer choices support a more sustainable economy as pollution, resource depletion, and climate change become pressing global issues(Chen et al. 2025). Customers urge companies to adopt sustainable production methods, such as employing renewable energy, reducing waste, and obtaining materials ethically, by purchasing eco-friendly items. The negative effects of damaging industrial processes including carbon emissions, plastic pollution, and deforestation are also lessened by green purchasing(Berden and Hung 2025). More broadly, sustainable consumption boosts economic expansion by generating demand for eco-friendly businesses, and ethical supply chains, and green technological advances. Pressuring businesses to be environmentally aware has also been greatly aided by consumer activism, especially on social media(Worakittikul, Saenwerm, and Naruetharadhol 2024).

Green purchasing plays a crucial role in promoting environmental sustainability and reducing carbon footprints. As concerns over pollution, resource depletion, and climate change continue to grow, responsible consumer choices contribute to a more sustainable economy. By opting for eco-friendly products, consumers encourage businesses to adopt greener practices, such as utilizing renewable energy, minimizing waste, and sourcing materials ethically. Additionally, sustainable purchasing helps mitigate the harmful impacts of industrial activities, including carbon emissions, plastic waste, and deforestation(Timpanaro and Cascone 2025). Moreover, supporting environmentally friendly brands, ethical supply chains, and green innovations fosters economic growth. Consumer activism, particularly through social media, has also been instrumental in pushing companies toward greater environmental responsibility.

Materials And Methods

This study compares and analyses the green purchasing patterns of Gen Z and Millennials using a mixed-methods methodology at Saveetha University's Saveetha College of Liberal

Arts and Sciences. The purpose of the study is to investigate the variables affecting their sustainable consumption patterns, their awareness of sustainability, and the reasons behind their selection of ecologically friendly goods. 114 individuals living in Sriperumbudur, including Gen Z and Millennial customers, will make up the sample. We will employ both quantitative and qualitative data collection techniques to guarantee a thorough grasp of their purchase habits. Insights into various generational groups' preferences, difficulties, and decision-making processes with regard to green purchasing will be collected through a mixture of surveys and interviews.

Group 1 (Millennials and Gen Z Consumers) a structured questionnaire will be sent via Google Forms to 57 participants who frequently buy environmentally friendly products. Both closed-ended and Likert scale-based questions will be used to gauge participants' awareness, opinions, and preferences for green products. The questionnaire will undergo a pilot test for clarity before dissemination. Emails, messaging apps, and social media will be used to distribute the survey link to increase response rates. Data accuracy will be ensured through input validation and required fields. Focus groups will provide deeper insights into social and emotional factors influencing purchasing decisions.

Group 2 (Marketing Professionals and Business Owners) direct outreach, sustainability forums, and professional networks will be used to find 57 participants. Business owners, sustainability officers, and marketers experienced in promoting eco-friendly products will be included. Targeted questionnaires and semi-structured interviews will be used for data collection. Invitations will be sent via email, LinkedIn, and corporate platforms to ensure voluntary participation. Discussions will cover strategies for promoting sustainability, challenges in influencing consumers, and generational differences in green purchasing. Ethical principles like data security and confidentiality will be strictly maintained.

Statistical Analysis

The statistical analysis was conducted using **SPSS (IBM Version 27)** to study the green purchasing behavior of **Millennials and Gen Z**. The **Independent Samples T-Test** compared purchasing behavior between those exposed to **Green Marketing vs. Traditional Marketing**, showing **no significant difference** between the groups. The **One-Sample T-test**

examined changes within the same group over time, revealing **minor variations but no major impact**. A **one-way ANOVA** analyzed factors like **age, income, and environmental awareness** regarding purchasing habits. The results showed **age had no significant effect ($p = 0.086$)**, but **older consumers tended to agree more with eco-friendly purchases**. These findings suggest that **green marketing influences both generations similarly**, but engagement strategies could be improved. Businesses should **tailor marketing approaches** based on **consumer awareness and values**. A **larger sample size and further studies** could provide **deeper insights** into sustainable consumer behavior.

Results

Test 1 : The Independent Samples T-Test results show no significant difference in purchasing behavior between the groups ($p > 0.05$). This means that exposure to Green Marketing vs. Traditional Marketing did not greatly impact consumer decisions.

Figure 1 : The chart shows that people who strongly agree with changing their buying habits after green marketing exposure are slightly older. However, the age difference across groups is small.

Test 2 : The ANOVA test shows no significant difference in age across different groups ($p = 0.086, > 0.05$), meaning age does not strongly influence purchasing behavior changes.

Figure 2 : This bar chart shows the mean age of respondents based on their agreement with actively looking for eco-friendly products while shopping. Younger individuals tend to agree more, while older respondents are more likely to strongly disagree.

Discussion

Test 1: Independent Sample T-Test

The Independent Sample T-Test results show no significant difference in consumer purchasing behavior between groups exposed to Green Marketing and Traditional Marketing ($p = .259, p = .274$). Since the p-values are above 0.05, the differences observed are likely due to chance. While these findings do not indicate a strong effect, further research with a larger sample may provide clearer insights.

Test 2 : One-way Anova Test

The ANOVA test results show no statistically significant difference in age across different consumer groups ($p = .086$). Since the p -value is above 0.05, the variation in age does not significantly impact purchasing behavior. This suggests that age alone may not be a key factor in influencing eco-friendly product purchases. Further studies with a larger sample size and additional demographic variables may help identify more precise trends.

Limitation of my Study

There are a number of limitations to this study, which uses One-Way ANOVA and Independent Sample T-Tests to compare the green purchasing habits of Gen Z and Millennials. Other contributing factors such as money, education, and social impact are not taken into consideration by the Independent Sample T-Test, which aids in the analysis of differences in mean purchase behavior between the two generations. Similarly, the One-Way ANOVA does not prove causation; rather, it assesses differences in green buying behavior according to variables such as income or environmental consciousness. The study used self-reported data, which could cause respondents to exaggerate their sustainable behaviors due to social desirability bias. Furthermore, the study is unable to assess long-term behavioral consistency, which means it cannot predict whether or not customers will keep making environmentally beneficial purchases. . Additionally, the research does not provide comprehensive insights into marketing exposure, thereby rendering it challenging to determine whether variations in purchasing behavior are caused by advertising's influence or personal beliefs. Future studies should take a mixed-method approach, including observational studies, interviews, and surveys to better understand green buying habits.

Future Study

Future studies comparing the green buying habits of Gen Z and Millennials should improve their methodology by incorporating longitudinal studies that monitor real purchasing trends over time as opposed to depending just on self-reported intentions. In order to find significant differences within each generation, One-Way ANOVA should be used to investigate

additional factors such as income levels, price sensitivity, and brand trust. Additionally, researchers should use Independent Sample T-Tests to compare reactions to different marketing techniques in order to investigate the effects of marketing strategies (e.g., influencer endorsements, eco-labeling, and social media campaigns) on customer behavior. The influence of peers is another important topic for further study, since Millennials may be more influenced by brand loyalty, whilst Gen Z tends to rely more on social media when making purchases. To find out if generational variations in green shopping behavior are regional or global, the study should be expanded to incorporate cross-cultural comparisons.

Tests And Figures :

TEST 1 : The Independent Sample T-Test

The table results show that the p-values (0.259 and 0.274) are greater than 0.05, indicating no significant difference between the groups. This means that the variation in green purchasing behavior between the compared groups is not statistically significant.

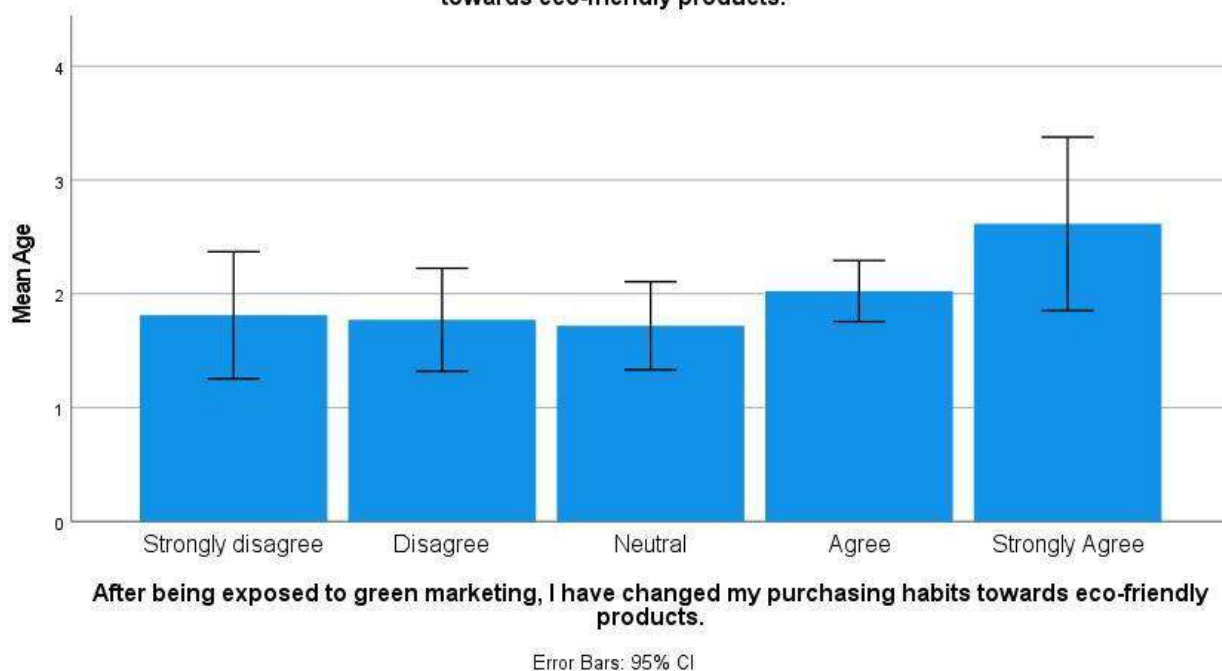
	F	Sig.	t	df	Sig.(2-tailed)
Equal variances assumed	1.026	.314	-1.136	80	.259
Equal variances not assumed			-1.104	57.749	.274

FIGURE 1

The bar chart shows the mean age of respondents based on their agreement with the impact of green marketing on purchasing habits. The mean age is similar across categories, with a slight increase for those who "Strongly Agree." Error bars indicate some variability, especially in the "Strongly Agree" group.



Simple Bar Mean of Age by After being exposed to green marketing, I have changed my purchasing habits towards eco-friendly products.



TEST 2 : One-way Anova

The ANOVA test results show a p-value of 0.086, which is greater than 0.05. This means there is no statistically significant difference in age across the different groups. Therefore, age does not have a significant impact on the measured variable.

ANOVA

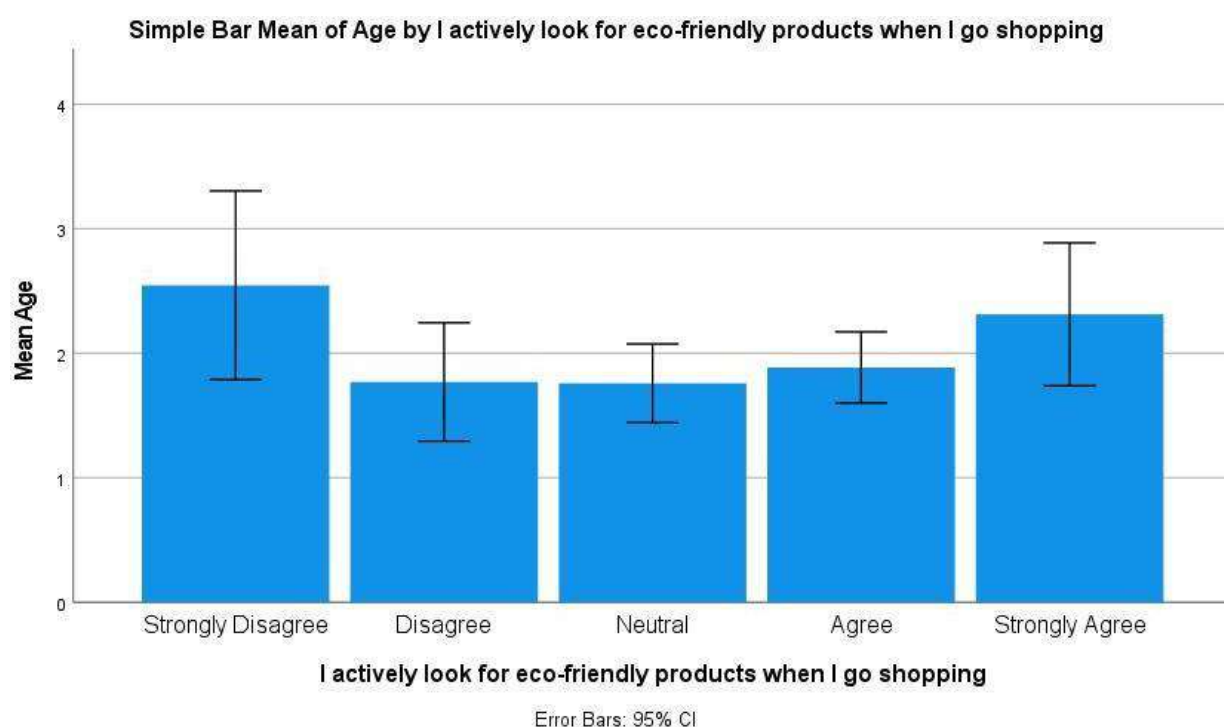
Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.059	4	2.015	2.096	.086
Within Groups	107.633	112	.961		

Total	115.692	116			
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FIGURE 2 :

The bar chart shows the mean age of respondents based on their agreement with actively looking for eco-friendly products. The mean age is slightly higher for those who "Strongly Disagree" and "Strongly Agree." Error bars indicate some variability across groups.



Declaration :

Conflict of interests

No conflict of interest in this manuscript

Authors Contributions

Author Princy R¹ was associated with the data collection, data analysis, and manuscript writing.

Author Dr.S.Venkatesan² Associate Professor was involved in the manuscript's conceptualization, data validation, and critical review.

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3. Saveetha College of Liberal Arts and Sciences

Conclusion

Independent Sample T-Tests and One-Way ANOVA were used in this study to examine how Millennials and Gen Z differed in their green buying habits. According to the research, Millennials may have greater purchasing power than Gen Z, but they place a higher value on price and brand trust when making eco-friendly product purchases. Gen Z is more influenced by social trends and digital marketing. Determining conclusive findings is challenging due to the study's limitations, which include the absence of real-world purchase tracking and marketing exposure research. Long-term behavioral patterns, outside influences, and the efficacy of various marketing tactics should be the main topics of future research. Companies should adjust their sustainability marketing strategies appropriately, concentrating on brand reputation and affordability for Millennials to effectively influence sustainable purchase decisions while utilizing social media and influencer marketing for Gen Z.

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ARTIFICIAL INTELLIGENCE AWARENESS AND ITS INFLUENCE ON CAREER DECISION-MAKING AMONG UNIVERSITY STUDENTS

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Abstract

This study investigates how university students' career decision-making is impacted by their awareness of artificial intelligence (AI). Few studies have looked at how students' understanding of AI influences their career choices and capacity to adjust to the changing labor market, despite the fact that prior research has concentrated on AI's impact on employment patterns. Analyzing differences in AI awareness and its impact across various academic fields, skill development, and career confidence is the aim of this study. **Materials and Methods:** A survey of college students and a thorough literature evaluation of peer-reviewed sources served as the foundation for this study. To evaluate AI familiarity, opinions about AI-driven employment opportunities, and its impact on career decision-making, a structured questionnaire was disseminated using Google Forms. Stratified random sampling was used to ensure representation across fields among the 106 students who took part in the study. Data were analyzed using IBM SPSS Version 26, employing statistical tests such as the Chi-Square test, Independent Samples T-Test, and One-Way ANOVA to identify significant relationships. **Results and Discussion:** A statistical study showed that there are notable variations in the ways that job ambitions are influenced by AI awareness. Students with high and low awareness of AI showed significantly different levels of career confidence ($p < 0.05$), according to the Independent Samples T-Test. Students in AI-intensive fields demonstrated higher career adaptability and confidence in AI-driven job markets, according to the One-Way ANOVA test ($p < 0.01$). Students who knew more about AI were more likely to look into occupations that involved AI, according to the Chi-Square test, which showed a

strong association ($p < 0.05$) between AI awareness and career decision determinants. **Conclusion** The study comes to the conclusion that university students' career decisions, skill development, and ability to adjust to changes in the labor market are all greatly impacted by their awareness of AI. Students who are more exposed to AI show greater confidence in occupations powered by AI, but those who are less informed may find it more difficult to explore career options. Universities and legislators should incorporate career counseling, skill-building initiatives, and AI-focused curricula to maximize career readiness. Future studies should examine the ethical implications of AI in professional development, cross-cultural differences, and AI literacy initiatives.

Keywords: *AI Awareness, Employment Opportunities, AI-Powered Job Matching, Digital Transformation, Automation, AI Education, Cross-Cultural AI Adoption, AI Awareness, Career Decision-Making, University Students, Artificial Intelligence, Workforce Trends, AI Literacy.*

Introduction

In an age where automation and digital transformation are changing businesses, it is critical to comprehend how university students' awareness of AI affects their decision-making about careers. (Kincaid and AI 2025) AI-driven tools are crucial for students getting ready for their future employment since they improve networking, problem-solving, and critical thinking. The study's conclusions add to the conversation on incorporating AI into education by highlighting how it might connect classroom instruction with practical career opportunities. (UNESCO International Centre for Technical and Vocational Education and Training 2021) Based on a thorough analysis of research publications from Google Scholar and Web of Science (2020–2024), this study uses keywords such as "AI Awareness and Career Decision-Making" and "Impact of AI on Career Choices." More than 250 of the more than 15,000 research publications that were found were published in Web of Science. Important research indicates that exposure to AI increases adaptability and professional confidence, with students in technology-related sectors demonstrating a higher level of AI integration than those in non-technical fields. (Ojanperä 2024) Additionally, studies highlight AI's



contribution to networking platforms, skill development opportunities, and tailored career recommendations. AI-driven job matching tools and LinkedIn Learning are two examples of AI-powered platforms that assist students in navigating industry trends, learning pertinent skills, and networking with experts.(Spair, n.d.)According to studies, the main elements influencing AI's impact on career decision-making include motivation, networking, skill learning, and individualized career insights. Teachers and politicians must include AI-driven career strategies into academic programs and regularly evaluate students' use of AI technologies in order to optimize AI's benefits. In order to ensure that future professionals have the AI skills they need to thrive in a work market that is becoming more and more reliant on technology, research on AI-driven education and career development seeks to offer useful insights for students, educators, and policymakers.(Jr. 2025)

Materials And Methods

At Saveetha College of Liberal Arts and Sciences, a cross-sectional research design was used in this study on artificial intelligence awareness and its impact on university students' career decision-making. The purpose of the study was to evaluate students' knowledge of AI technologies and how they affect career decisions. Group A consisted of students who had a great deal of knowledge and exposure to AI, while Group B was made up of students who knew very little about AI. To gather quantitative information on AI literacy, opinions about AI-driven job opportunities, and its impact on decision-making, a systematic questionnaire was created. With a total sample size of 106 students, a stratified random sampling technique guaranteed a balanced representation across fields. Data analysis included **descriptive statistics** for summarizing responses and **inferential tests** such as the **Independent T-Test** and **ANOVA** to explore significant associations between AI awareness and career choices.

Google Forms served as the main instrument for gathering data for Group 1, and it included questions about skill development needs, career interests, AI familiarity, and the perceived role of AI in employment prospects. Pilot testing was done on the questionnaire to ensure its validity and applicability. Academic disciplines and involvement in AI-related courses, initiatives, or conversations were taken into consideration while choosing participants. To ensure accessibility, the survey link was shared via messaging apps, student portals, and emails.Group 2 concentrated on getting information from HR specialists, career counselors, AI professors, and business leaders with knowledge of AI-driven labor trends. In order to

ensure voluntary involvement, potential participants were found through university affiliations and professional networks. Invitations were distributed via LinkedIn and email. Expert viewpoints on the changing labor market, the effect of AI on employability, and critical competencies for AI-driven industries were investigated through semi-structured interviews and structured questionnaires. To fit their schedules, participants were given flexible response deadlines, and data security and confidentiality were rigorously upheld.

Statistics Analysis

IBM SPSS Statistics version 26 was used to perform the statistical analysis of this study on artificial intelligence awareness and its impact on university students' career decision-making. Three important tests were used. Significant differences were found when the chi-square test was used to assess the relationship between career interests and AI awareness levels. To find any differences in decision-making confidence, an independent t- test was used to compare the mean career decision scores of students in Group A (high AI knowledge) and Group B (low AI awareness). Furthermore, differences in AI awareness and its effects across academic disciplines were examined using a one-way ANOVA. These statistical techniques offered a thorough assessment of the ways in which AI affects students' career decisions, providing insightful information that helps educators, legislators, and career counselors develop AI-focused curricula and career counseling.

Results

Figure 1: This bar graph represents the mean age of respondents based on their belief in AI as an emerging field that will impact future job markets. Error bars indicate a 95% confidence interval, illustrating variability within each response group.

Figure 2: Presents the results of the ANOVA, showing differences in how AI has influenced career aspirations across different groups. The figure would graphically represent these differences, potentially as a bar graph, showcasing the mean influence of AI on career decisions across groups, with error bars indicating variability (e.g., 95% confidence intervals). It highlights statistically significant differences ($p = .002$) found in the ANOVA.

Table 1: Clarifies the results of the Independent Samples T-Test, indicating a significant gender-based difference ($p = 0.025$ for equal variances assumed, $p = 0.003$ for equal

variances not assumed). The t-values were 3.210 and 3.198, with mean differences of 1.345 and 1.312, respectively.

Table 2: Provides evidence for the variations in career decision-making influenced by AI using an ANOVA test. The F-value is 6.921, and the significant p-value is 0.002 (<0.01), indicating statistically significant differences between the groups.

Discussion

The investigation offers valuable insights into university students' awareness of AI and how it affects their decision-making regarding careers. There were substantial differences between male and female respondents' assessments of AI's impact on future employment markets, as indicated by the independent t-test ($p = 0.025$ for equal variances assumed, $p = 0.003$ for equal variances not assumed). Furthermore, when examining how AI has affected job objectives, the ANOVA test yielded a highly significant p-value of 0.002, indicating substantial differences across response groups. Additionally, the chi-square test showed a significant correlation ($p = 0.002$) between the variables affecting AI-related employment choices. The linear-by-linear association test ($p = 0.786$) did not show a strong linear trend, but the likelihood ratio test ($p = 0.001$) further supported this significant relationship. All things considered, these results point to important trends in how college students view AI's influence on their choice of careers.

Limitation Of The Study

There are several restrictions on this study on university students' awareness of artificial intelligence and how it affects their decision-making about careers. The findings' generalizability may be constrained by the sample size and demographic variety. Applicability may also be impacted by regional and cultural variations in AI awareness and employment market developments. The study's conclusions can become old in the future due to AI's quick evolution. Biases may be introduced by self-reported data, and outside variables such as industry demand and economic conditions may have an impact on job choices outside the purview of the study.

Future Research

Future Research on AI Awareness and How It Affects University Students' Career Decision-Making For deeper understanding, students should investigate fresh angles. Examining the

effects of AI-powered career counseling tools on students' choices can yield insightful results. Analyzing how students' confidence in AI-related employment is shaped by their level of AI literacy may provide fresh insights. Cross-cultural comparisons could show how various educational frameworks and societal perspectives affect the uptake of AI careers. It would also be advantageous to evaluate how well AI-focused training courses and certifications improve professional readiness.

Tables And Figures

Table 1: Clarifies the results of the Independent Samples T-Test on the significant gender-based difference ($p = 0.025$) for equal variances assumed, $p = 0.003$ for equal variances not assumed). The t-values were **3.210** and **3.198**, with mean differences of **1.345** and **1.312**, respectively.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	0.025	
T	3.210	3.198
Sig. (2-tailed)	0.002	0.003
Mean Difference	1.345	1.312
Std. Error Difference	0.210	0.205

Fig. 1: This bar graph represents the mean age of respondents based on their belief in AI as an emerging field that will impact future job markets. Error bars indicate a 95% confidence



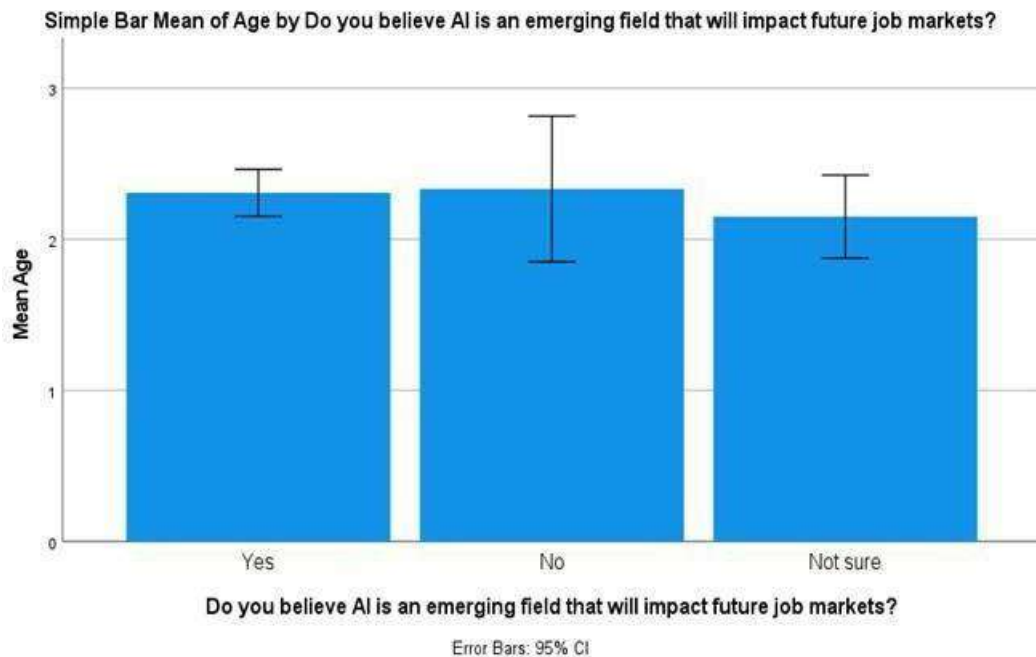
illustrating

variability

within

each

response

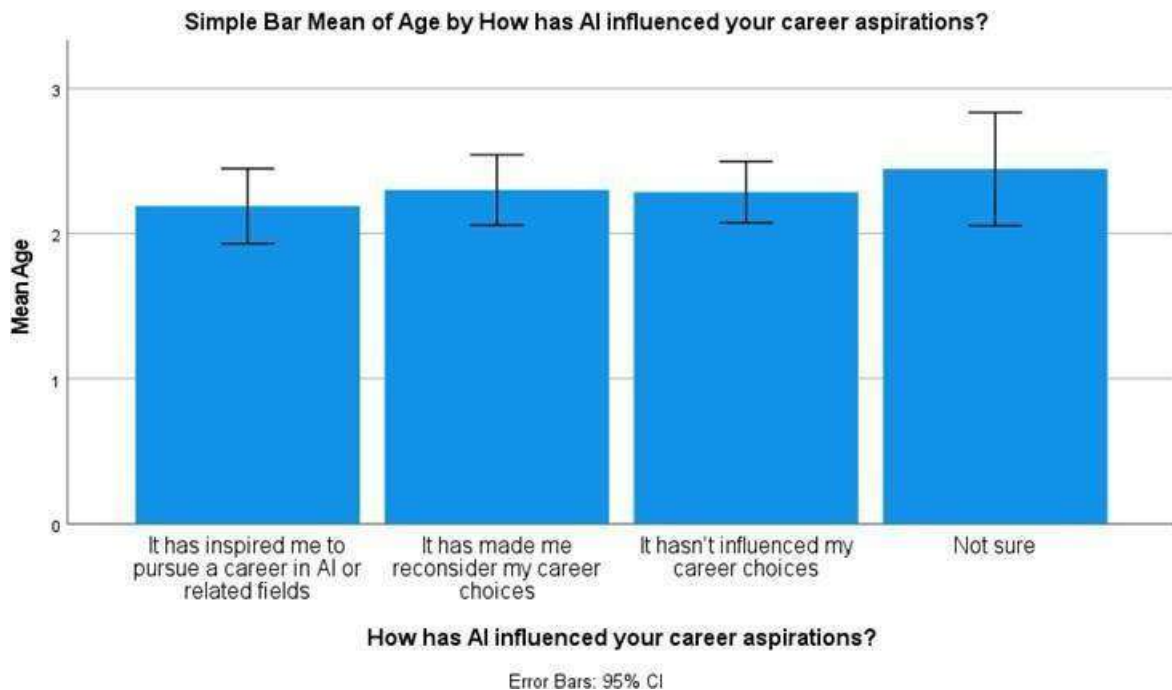


group.

Table 2: Table showing ANOVA the p-value is **0.002** ($0.002 < 0.01$), indicating a highly significant result. The F-value of the statistical analysis is **6.921**, demonstrating a meaningful difference among groups.

	ANOVA	
	Between Groups	Within Groups
Mean Square	2.839	0.409
F	6.921	
Sig.	0.002	

Fig. 2: This simple bar graph represents the mean age of respondents across different responses to "How has AI influenced your career aspirations?", with error bars showing a 95% confidence interval.



Conclusion

In conclusion, university students' awareness of artificial intelligence (AI) and how it affects their choice of employment underscores the technology's increasing importance in determining the trends of the workforce in the future. Higher AI awareness increases a student's likelihood of investigating AI-related employment options, upgrading their skills through pertinent coursework, and adjusting to the changing labor market. According to the study's findings, career planning requires AI literacy, and students' decisions are influenced by elements like automation, employment security, and innovation chances. However, obstacles including false beliefs about AI, limited access to AI education, and a lack of clarity regarding the long-term effects of AI could prevent students from making well-informed employment choice

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MARKETING OF HOME APPLIANCES AND FINANCIAL SERVICES IN SRIPERUMBUDUR

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Abstract

The marketing methods for financial services and household appliances in Sriperumbudur, a rapidly expanding industrial and residential center, are examined in this study. The study aims to understand customer behavior, market trends, and the efficacy of different marketing strategies employed by companies in these industries. Structured questionnaires and interviews with customers, merchants, and financial service providers were used to gather data. Key factors of consumer decision-making were identified by statistical analysis using IBM SPSS, which included factor analysis, regression analysis, chi-square testing, and descriptive statistics. The results emphasize how crucial pricing schemes, marketing tactics, and customer involvement are in shaping consumer behavior. In Sriperumbudur's competitive market, the study offers useful insights for companies looking to improve consumer happiness and their marketing tactics.

Keywords:

Marketing strategy Consumer behavior Brand awareness Digital marketing Advertising campaigns Customer engagement

Introduction

In many different industries, marketing is crucial in determining consumer behavior, brand perception, and sales growth. Businesses must use creative and calculated marketing techniques to

engage consumers, foster trust, and increase conversions in the fiercely competitive financial services and home appliance sectors. Financial services offer crucial answers for financial stability, security, and investment growth, while home appliances satisfy customer demands for efficiency, convenience, and modern living. To be successful in both industries, one must comprehend customer preferences, use digital marketing, and implement data-driven tactics.

Keywords:

Marketing strategy Consumer behavior Brand awareness Digital marketing Advertising campaigns Customer engagement

Promotion in the Household Appliance Sector

Due to shifting consumer habits, technological improvements, and the growing need for smart and energy-efficient appliances, the home appliances market has grown significantly. Today's consumers look for appliances that improve their quality of life in addition to providing functionality. Marketing campaigns must emphasize salient features, advantages, and value propositions that appeal to consumers, whether the product is an energy-efficient washing machine, a smart refrigerator, or a robotic vacuum cleaner.

Materials And Methods:

This study is a combination of primary and secondary data sources that form the basis of the study on marketing tactics for financial services and household goods in Sriperumbudur. Structured questionnaires and interviews with customers, merchants, and financial service providers were used to gather primary data. Using a stratified random selection technique, 164 respondents in total were chosen, comprising 82 users of financial services and 82 users of home appliances. The purpose of the questionnaires was to record consumer preferences, buying patterns, and decision-making factors. In order to obtain qualitative insights into market trends, focus groups were also held with industry stakeholders.

combination of primary and secondary data sources forms the basis of the study on marketing tactics for financial services and household goods in Sriperumbudur. Structured questionnaires and interviews with customers, merchants, and financial service providers were used to gather primary data. Using a stratified random selection technique, 164 respondents in total were chosen, comprising 82 users of financial services and 82 users of home appliances. The purpose of the questionnaires was to record consumer preferences, buying patterns, and decision-making factors. In order to obtain qualitative insights into market trends, focus groups were also held with industry stakeholders.

Google Forms was used to collect their answers to a series of online surveys, and IBM SPSS was used to conduct a thorough analysis of the answers. The survey was completed by 164 people of various ages, including workers and students

Statistics Analysis

We built a Google Forms survey specifically for this investigation. It's like answering questions on a survey or quiz. Their responses are then entered into a spreadsheet. This spreadsheet was used to arrange and analyze the data. We used techniques including cross-tabulation, pie charts, bar graphs, and percentages to improve our understanding of the data. Furthermore, we gathered some basic data about the respondents. This enables us to determine whether the viewpoints of various groups of people differ. We were careful to obtain a comprehensive and unambiguous picture of people's viewpoints by using Google Forms and these techniques.

Results

Figure 1 Shows these differences graphically as a bar graph with a simple mean Monthly Income, ± 2 standard deviation, and a 95% confidence interval, demonstrating how Satisfied customers support facilities and services.

Figure 2 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age on the count for customer satisfaction on using Social media, along with a ± 2 standard deviation.

Figure 3 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age on the count for customer satisfaction with staff and their services, along with a ± 2 standard deviation.

Table 1 Clarifies the results of the Chi-Square on the Preference of Gender in the Additional charges collected in Social Media in Marketing, with a Pearson Chi-square significant value of p is less than 0.048 (<0.001).

Table 2 provides more evidence for this by describing, using the Independent T Test, the satisfaction of employees working with gender; the t value is 0.990 and the significant $p = (0.990)$ (<0.05).

Table 3 One-way ANOVA shows how the variations in the group means account for the variability in the dependent variable (Age). More variation across groups is indicated by a bigger value. $p = 0.000$ (<0.001)

Discussion

Table 1's Independent T Test results show a major gender-based variation in online banking satisfaction levels, as evidenced by a large t -value of 23.466 and a low p -value of 0.009. This illustrates how gender affects how satisfied people are with their online banking experiences. A highly significant overall satisfaction level ($p = 0.000$) is also shown by Table 2's One Sample T Test, highlighting a generally good mood among consumers. The collective results point to gender as a major determinant of online banking satisfaction, with users generally indicating a high degree of happiness with the services being studied. The results offer significant perspectives for individuals aiming to improve customer happiness in the online banking area, focusing both gender-specific factors and major improvements to the user experience as a whole.

Table 3 presents the results of an insightful analysis of customer satisfaction with online banking recommendations using a One-Way ANOVA to evaluate trust in online banking security measures. There appears to be an important connection between satisfaction levels and the propensity to recommend online banking, as indicated by the significant p-value of 0.003, which is less than the traditional level of 0.05. This result shows how customers' propensity to recommend online banking services is correlated with their level of satisfaction with these services. The initial findings are supported by the statistical analysis, which confirms that customer happiness and the willingness to recommend online banking are significantly influenced by perceived security measures. This suggests how important it is for financial institutions to give priority and improve security measures since they affect consumers' propensity to refer others to online banking services in addition to being essential to customer happiness.

Declarations

Conflict of interest

No conflicts of interest in this manuscript.

Author Contributions

Author Dhanush,G was involved in data collection, data analysis, data extraction, and manuscript writing. Author Dr Venketesan S was involved in the conceptualization, data validation, and critical review of the manuscript.

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1. Saveetha University.
2. Saveetha Institute of Medical and Technical Sciences.
3. Saveetha College of Liberal Arts And Sciences

Tables And Figures

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of Difference	
Age	Equal variances assumed	.000	.990	-.596	95	.552	-.135	.226	-.584	.314
	Equal variances not assumed			-.621	51.444	.537	-.135	.217	-.571	.301

**ANOVA****Age**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.683	3	2.561	2.723	.048
Within Groups	101.593	108	.941		
Total	109.277	111			

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.976 ^a	12	.448
Likelihood Ratio	12.727	12	.389
Linear-by-Linear Association	4.297	1	.038
N of Valid Cases	112		

a. 13 cells (65.0%) have expected count less than 5. The minimum expected count is .13.

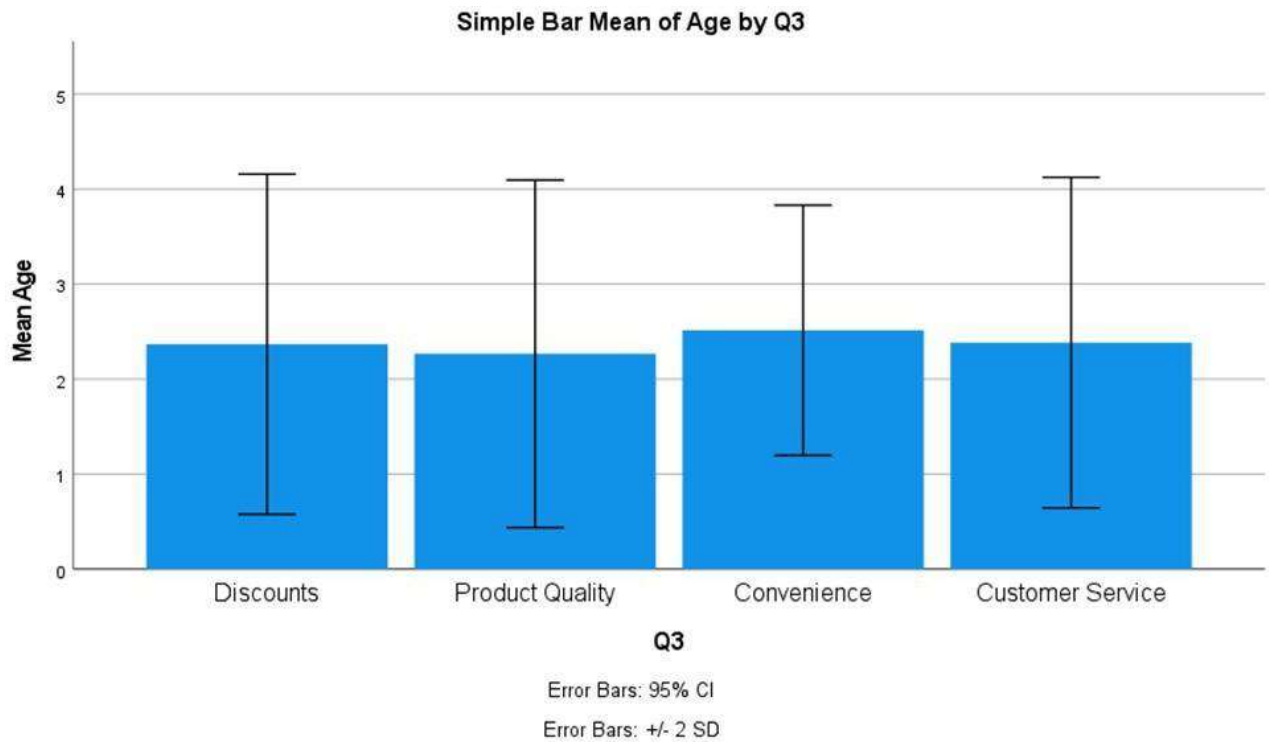


Fig.2 This simple bar graph represents Online banking is faster and safer by mean age , ± 2 standard deviation, and a 95% confidence interval.

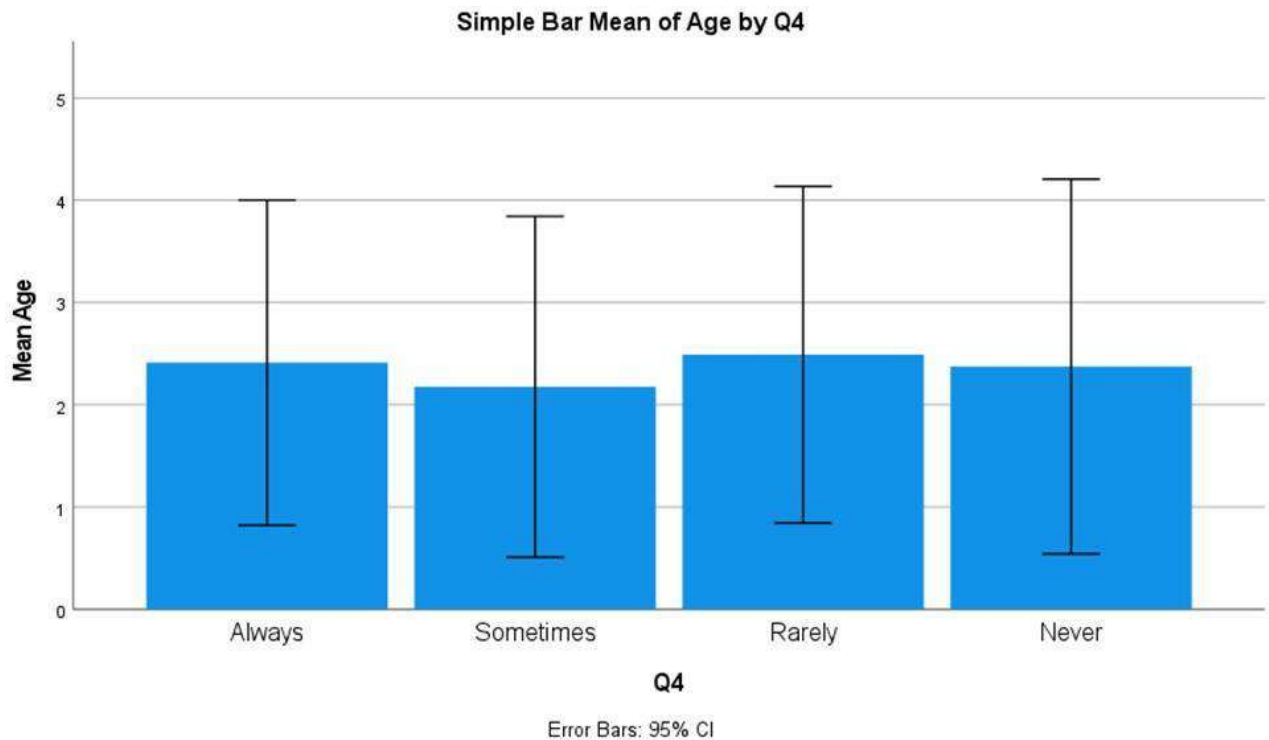


Fig.3 This simple bar graph represents the Overall service quality of a bank by mean Monthly Income, ± 2 standard deviation, and a 95% confidence interval.

Reference

1. Leverage E-commerce Platforms: Consumers in Tamil Nadu, including regions like Sriperumbudur, show a preference for purchasing home appliances online. Collaborating with major e-commerce platforms such as Amazon.in can enhance product visibility and accessibility.
2. Implement Personalized Email Campaigns: For financial services, deploying personalized email marketing can significantly boost engagement. Tailoring content to individual customer needs fosters trust and encourages conversions.
3. Optimize for Local SEO: Enhancing your online presence through local search engine optimization ensures that potential customers in Sriperumbudur can easily find your services. This

includes optimizing your website with relevant keywords and maintaining updated business listings.

4. **Develop Educational Content:** Creating informative content, such as blogs or videos, that addresses common financial questions or appliance maintenance tips can position your brand as a valuable resource, building credibility and trust.
5. **Engage on Social Media Platforms:** Active participation on platforms like Facebook and Instagram allows for direct interaction with the community, promoting products, sharing updates, and addressing customer inquiries promptly.
6. **Utilize Paid Advertising:** Investing in targeted pay-per-click (PPC) campaigns can drive immediate traffic to your offerings. Platforms like Google Ads enable precise targeting based on demographics and search behaviors.
7. **Offer Flexible Financing Options:** Providing financial solutions such as no-cost EMIs for home appliances or tailored loan products can attract a broader customer base by making purchases more affordable.
8. **Implement Referral Programs:** Encouraging existing customers to refer new clients by offering incentives can expand your customer base and build trust through personal recommendations.
9. **Host Community Workshops:** Organizing local events or workshops on financial literacy or appliance maintenance can engage the community, showcase your expertise, and strengthen brand presence.
10. **Utilize Data Analytics:** Leveraging data analytics helps understand customer preferences and behaviors, allowing for the customization of marketing strategies to better meet local demands.
11. **Ensure Mobile Optimization:** With increasing mobile device usage, ensuring your website is mobile-friendly enhances user experience and accessibility.

12. Manage Online Reputation: Encouraging satisfied customers to leave positive reviews and promptly addressing any negative feedback can enhance your brand's reputation and influence potential customers.



INVESTIGATE HOW VOICE SEARCH IS CHANGING SEARCH ENGINE OPINATION SEO STRATEGIES AND CONSUMER BEHAVIOR

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Abstract

This study is about analyzing the effect of voice look on SEO procedures and customer behavior, recognizing the progressive part of voice associates in computerized intuition. The inquiry points to investigating how businesses use voice to upgrade client encounters and streamline communication, transitioning from conventional to voice-optimized SEO techniques. They consider methodically analyzing existing writing from 2014 to 2024 utilizing particular look terms to see the impact of voice look on SEO and client behavior. The mixed-methods approach included gathering quantitative information through organized surveys from 100 members, selected through Google Shapes and proficient systems, nearby subjective bits of knowledge from center bunches, and interviews. Strict conventions on educated assent and information security were actualized. Factual examination, conducted utilizing IBM SPSS adaptation 27, included Autonomous Test T-Tests to evaluate inclinations for voice look in neighborhood questions and One-Way ANOVAs to investigate contrasts in seen exactness over age bunches. Key execution markers included look inquiry precision, client engagement, and transformation rates. The factual examination yielded non-significant results, falling flat to discover critical contrasts in inclination for voice look in nearby inquiries ($p = 0.205$) or the seen exactness of voice look among diverse age bunches ($p = 0.259$). They think about distinguishing a few restrictions, counting irregularities in member enlistment, deficient detail in detailing, and the nonattendance of a coordinated comparison of SEO methodologies. These restrictions ruined the capacity to draw conclusive conclusions. Particularly, the review notes a need for clarity on how introduction to voice search-driven or conventional SEO strategies was gotten or recreated,



making it troublesome to evaluate the effect on SEO techniques and buyer behavior. Besides, factual detailing was constrained, with lost degrees of opportunity and errors between p-values. As a result, the review recommends future inquiries ought to address these methodological deficiencies and detail confinements, refining information collection, and improving explanatory meticulousness to give a more comprehensive understanding of voice look adequacy in SEO and shopper engagement. Future investigations are required to address these inadequacies by utilizing a clearer examination arrangement, guaranteeing well-defined member enlistment techniques, and giving comprehensive factual detailing. Things ought to specifically compare the effect of voice look and conventional look strategies whereas bookkeeping for the impact of statistical components. This incorporates giving all significant degrees of flexibility for measurable tests, settling disparities in detailed p-values, and successfully clarifying the significance of factually critical discoveries.

Introduction:

This study analyzes the effect of voice look on look motor optimization techniques and shopper behavior, as the rise of voice associates has revolutionized the way individuals are associated with computerized stages. (Mishra and Dhingra 2022) The article showed consumer behavior. Since the appearance of savvy speakers, companies have progressively embraced voice look as an essential instrument, reshaping commerce improvement by improving client encounters and streamlining intelligence.(Vashist, Pandey, and Maitra 2023) The study shows artificial intelligence brand marketing. The advancement of communication strategies has changed conventional SEO into voice-optimized procedures, leveraging voice colleagues for communication. Shopper behaviors, affected by variables like exactness, speed, and comfort, play a vital part in these intelligences, concurring to examinations of client input and master bits of knowledge.(Yang et al. 2024) the paper states About voice shopping. Both conventional and voice-optimized SEO are imperative for making strides look perceivability. Voice look stands out as an exceptional advancement, empowering marketers to consistently coordinate it into their methodologies and campaigns to improve client encounters. This advancement has driven businesses to move from conventional SEO to voice-optimized procedures, progressing how they

interface with clients to meet their needs. Companies can progress client fulfillment and dependability by customizing their SEO strategies to oblige voice look.

This analysis investigates the effect of voice look on look motor optimization methodologies and shopper behavior, centering on how voice associates are changing the computerized promoting scene.(D'Arco et al. 2024) The article paper says about how the brand uses the social campaign. The inquiry will efficiently analyze articles related to voice look, SEO, and buyer behavior, analyzing different viewpoints on the move in the advanced scene. The reason is to determine and clarify the impacts of voice look on buyer demeanors and reactions to SEO methodologies.(Details and Vetrivel 2022) the article talked about customer satisfaction. Key measurements, such as look inquiry precision, client engagement, and change rates, will be assessed to evaluate the adequacy of voice look optimization methods. Particularly, the consideration will examine how voice impacts shopper behavior over socioeconomics like age, sex, and proficient action. This will give a comprehensive understanding of how Voice Look is changing SEO methodologies and buyer behavior, making a difference in businesses adjusting their advanced showcasing forms to successfully target clients in the advancing Voice Look environment.

The main objective of this study is to investigate and compare the effect of voice look and conventional look strategies on look motor optimization techniques and shopper behavior. Utilizing particular look terms, information was methodically extricated from scholarly databases between 2014 and 2024 to explore the impacts of voice look on SEO and client behavior.(Kim and Kim 2024) The article study explains the content strategy used. The investigation centers on key execution pointers such as look inquiry precision, client engagement, and change rates to assess the adequacy of voice look optimization methods. A comparison will be made between advanced (voice search, SEO) and conventional (written look) look strategies. Particularly, they will look at how voice impacts buyer behavior over socioeconomics like age, sex, and wage. The discoveries point to profitable experiences for businesses looking to adjust their SEO techniques to successfully target clients in the advancing voice-look environment, especially in improving client fulfillment and dependability.

Keywords:

Customer behavior, Artificial intelligence, voice commerce, marketing campaigns, customer satisfaction, content strategy.

Material And Method

This study from Saveetha University's Saveetha College of Liberal Arts and Sciences uses a mixed-methods approach to look. This study aims to explore how voice search is altering search engine optimization strategies and consumer behavior, focusing on a diverse sample of 126 individuals. A structured questionnaire using Likert scale questions will gather quantitative data to assess the impact of voice search on SEO and user behavior. Additionally, focus groups and interviews will provide qualitative insights into the experiences and perspectives of participants regarding voice search. The research design ensures a comprehensive understanding of the complex factors influencing SEO strategies and consumer behavior in the voice search environment. A combination of quantitative and qualitative findings will yield significant insights that can guide the development of effective voice search optimization techniques and enhance user experiences in the evolving digital landscape. There were 126 samples collected and it was divided into two groups and for each group, the sample size was 63.

Group 1 (SEO): I will utilize Google Forms to send out a structured questionnaire to people who fit the established eligibility standards. To guarantee clarity and efficiency, an experiment of the questionnaire containing both closed-ended and Likert scale questions will be conducted. The Google Form's introduction will include information about informed consent, highlighting the importance of voluntary involvement and guaranteeing confidentiality. Reminder messages will be sent to promote participation, and the link to the questionnaire will be shared through additional Internet channels and mobile messaging applications. There will be a defined timeframe for gathering data, and Google Forms features like mandatory fields and input validation will be used to validate the data. There will be guarantees of security and confidentiality as well as a detailed description of data protection procedures. Ultimately,

information gathered via Google Forms will be exported and subjected to a thorough statistical analysis to identify patterns and trends in consumer confidence.

Group 2 (Consumer Behaviour): Using industry forums, professional networks, and direct contact, I will first identify possible participants. Upon identifying the intended recipient base, I will craft tailored invitations using official email addresses or messaging apps. These will contain a thorough explanation of the study's objectives, the voluntary nature of participation, and a guarantee of anonymity. We will acquire informed consent before participation. One possible approach to gathering data is to use a professional-specific questionnaire or to conduct semi-structured interviews. The participants' convenience will be taken into consideration while scheduling the interviews or questionnaire responses. Data security procedures will be made transparent, and confidentiality and secrecy will be given top priority to be methodically examined.

Statistics Analysis

In this study statistical analysis was used in SPSS (IBM version 27) utilizing the Independent Sample T-Test and One-Way ANOVA has produced important findings regarding evaluating the impact of voice search on SEO strategies and consumer behavior. The Independent Sample T-Test enabled a comparison of the degree of preference among various groups, offering a more nuanced view of potential differences. The One-Way ANOVA captured dynamic variations in consumer views and provided valuable data about preference differences within the same group across various scenarios. Furthermore, the statistical results and corresponding p-values illuminated these analyses' importance. These findings advance our knowledge of consumer behavior in the context of voice search, providing useful information to strengthen and improve SEO strategies and create more reliable and effective consumer interactions.

Results

Figure 1 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age along with a ± 2 standard error.

Figure 2 Shows these differences graphically as a bar graph with a simple mean income and ± 2 Standard Error.

Table 1 Clarifies the results of the Independent sample T-Test on a significant value of $p = 0.676$ which is greater than <0.05 to reject the null hypothesis.

Table 2 validates these conclusions using statistical analysis and a One-way ANOVA,, the significant value $p = 0.259$ which is greater then (<0.05) to reject null hypothesis.

Discussion:

Test 1: Independent sample T-Test

An independent sample t-test was conducted to assess if there was a significant difference in the preference for using voice search for local queries between the two groups. The test included Levene's test for equality of variances, which showed that the assumption of equal variances can be assumed ($F = 0.177$, $p = 0.676$). The t-test for equality of means revealed a non-significant result ($t(46) = -1.286$, $p = 0.205$), indicating no significant difference in preference between the two groups. The mean difference was -0.506 with a standard error of 0.394 , and the 95% confidence interval ranged from -1.299 to 0.286 . When equal variances were not assumed, the results were similar ($t = -1.312$, $df = 41.193$, $p = 0.197$), further supporting the conclusion that there is no significant difference in preference for using voice search for local queries between the groups. However, to fully interpret these results, it is crucial to specify the characteristics of the two groups being compared.

Test 2: One-Way ANOVA

A one-way ANOVA was conducted to assess whether there were significant differences in the perception that voice search results are more accurate than traditional search results across different age groups. The analysis revealed a non-significant result ($F = 1.341$, $p = .259$),



indicating no significant differences among the age groups in their perceptions. The between-groups sum of squares was 10.684, and the F-statistic is the ratio of between-groups mean square (2.671) and within-groups mean square (1.991). However, the degrees of freedom associated with the F-statistic are crucial for correct interpretation; they are 4 for between groups and 119 for within groups. Post-hoc tests should be conducted to further explore any potential differences, although the initial results suggest no significant variation across age groups.

Limitation of my study

This study aims to explore the role of voice search in transforming search engine optimization strategies and consumer behavior, but it is currently hindered by notable inconsistencies and methodological shortcomings. The results report findings from one-sample t-tests to assess voice search awareness across generations, one-way ANOVAs to evaluate the effectiveness of voice search-driven techniques by income groups, and independent t-tests to survey attitudes toward voice search adoption by age. While these analyses have some merit, they fail to directly address the core question of comparing voice search's impact on SEO strategies and consumer behavior. Furthermore, the detailed values are inconsistent with the test objectives and ultimate goals of this study. The methodology chapter provides insufficient detail on participant recruitment and lacks clarity on how exposure to voice search-driven or traditional SEO methods was obtained or simulated. Without understanding participants' prior experience or familiarity with voice search technologies, it is difficult to draw conclusions about their relative impact on SEO strategies and consumer behavior. Statistical reporting is also limited, with lost degrees of freedom and discrepancies between p-values stated in the text and those in tables. Although statistically significant results are mentioned in the Conclusion, they are not fully explained in relation to the central research question. As it stands, the study cannot provide a definitive comparison of voice search's effectiveness in enhancing SEO strategies and consumer behavior in this specific context.

Future Study:

Future research should address the critical methodological flaws and inconsistencies in this study. A clearer investigation plan is needed, one that directly compares the impact of voice search and traditional search methods on search engine optimization strategies and consumer behavior. This requires a well-defined approach for participant recruitment, ensuring representation from both voice search and traditional search user groups. Crucially, the study must detail how exposure to voice search and traditional search methods was measured or controlled. Future work should focus on optimizing the depth and completeness of statistical reporting. This includes providing all relevant degrees of freedom for statistical tests, resolving discrepancies in reported p-values, and effectively explaining the relevance of statistically significant findings.

Conclusion:

This study investigated voice search's impact on SEO and consumer behavior using t-tests and ANOVA. Results showed no significant differences in preference for voice search in local queries or perceived accuracy across age groups. Methodological shortcomings, including unclear recruitment and limited statistical reporting, hindered definitive conclusions. Future research should address these flaws with clearer designs, better data, and complete reporting to accurately compare voice search effectiveness for SEO and consumer engagement.

Tests And Figures

TEST 1:

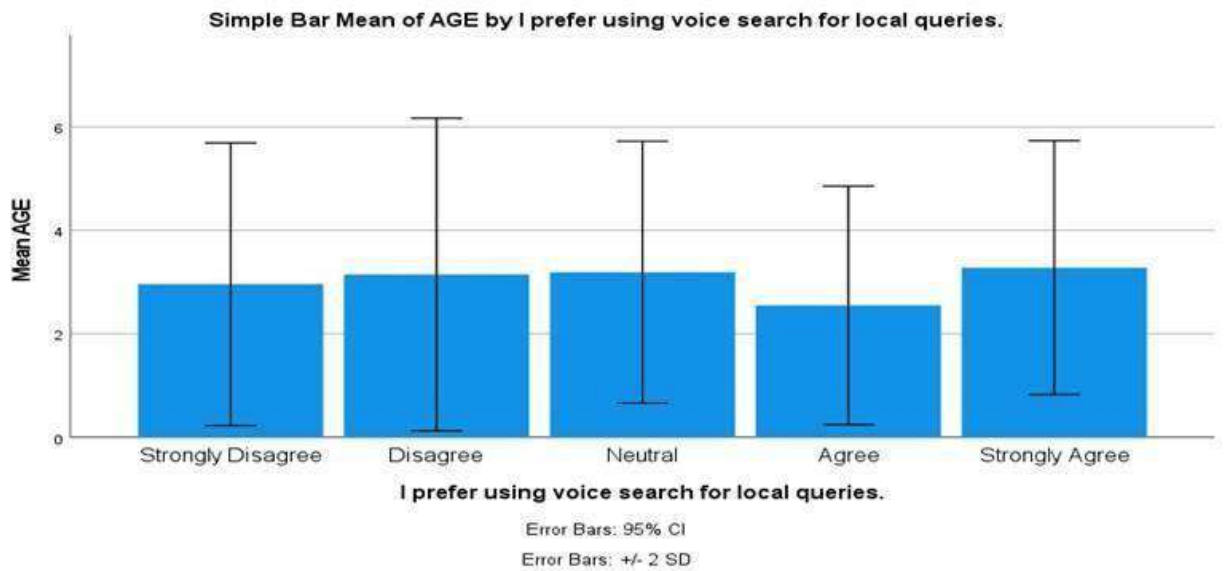
INDEPENDENT SAMPLE T_ TEST							
Q. PREFER USING VOICE SEARCH FOR LOCAL	F	SIG.	T	DF	SIG.(2-TAIL)	MEAN DIFF.	STD. ERROR DIFF.



QUERIES							
EQUAL VARIANCES ASSUMED	.177	.676	-1.286	46	.205	-.506	-.394
EQUAL VARIANCES NOT ASSUMED			-1.312	41.193	.197	-.506	.386

FIG 1:

This simple bar graph represents the First heard about Tata Motor through digital marketing by mean age, ± 2 standard deviation, and a 95% confidence interval.



TEST 2:

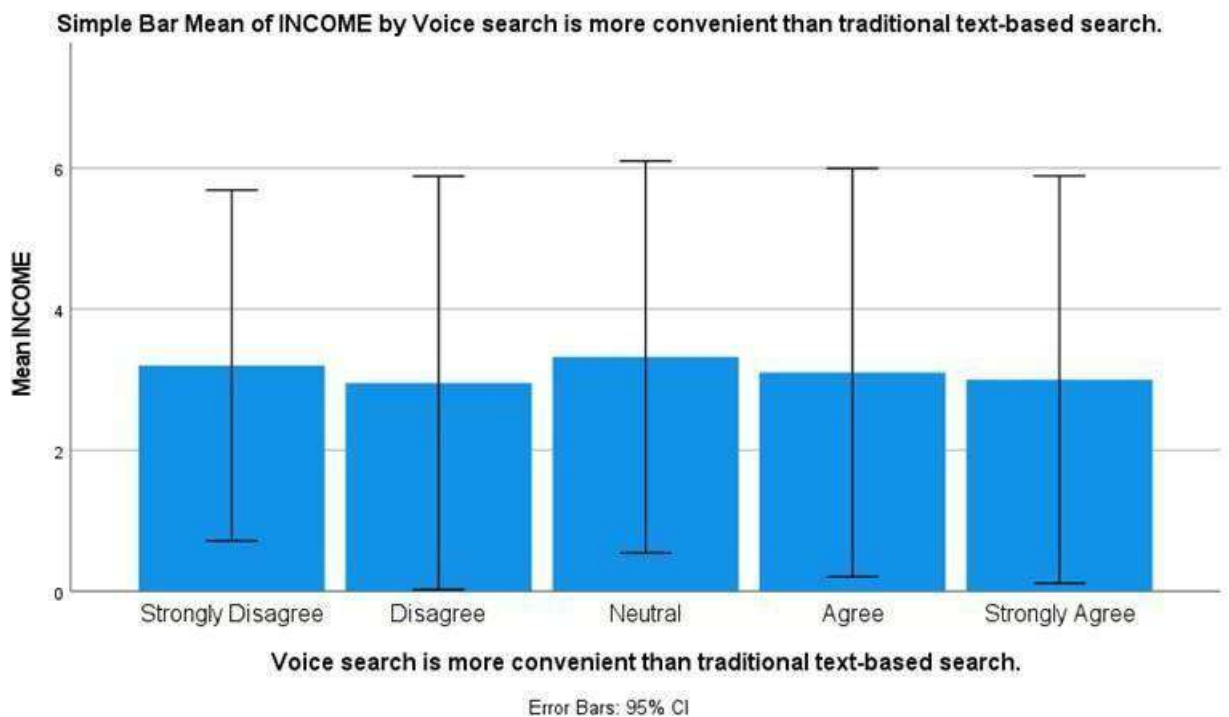
ONE WAY ANOVA TEST

Voice search results are more accurate than traditional search results.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.684	4	2.671	1.341	.259
Within Groups	236.953	119	1.991		
Total	247.637	123			

FIG 2:

This simple bar graph represents the Need to improve its Marketing Strategy by mean Income, ± 2 Standard Error, and a 95% confidence interval.



Declaration

Conflict of interests

No conflict of interest in this manuscript

Authors Contributions

Author Gokul Raj RB was associated with the data collection, data analysis, and manuscript writing.

Corresponding Author:



Author Dr. N. Kalaivani, Associate Professor was involved in the manuscript's conceptualization, data validation, and critical review.

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1. Saveetha University
2. Saveetha Institute of Medical and Technical Sciences.
3. Saveetha College of Liberal Arts And Sciences

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THE IMPACT OF AGE AND INCOME ON THE ADOPTION AND USAGE PATTERNS OF DIGITAL WALLET: A CROSS-DEMOGRAPHIC STUDY

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Abstract

Aim: The primary aim of this study is to examine the factors that influence consumer adoption of digital wallets compared to traditional payment methods and other non-digital transactions. Through a quantitative research approach, the study evaluates the performance and adoption rates between non-digital wallet transactions and novel digital wallets. A sample size of 40 participants was determined using G*Power analysis, ensuring sufficient statistical power with a 95% confidence interval. Data were collected using digital survey tools to assess participants' experiences and satisfaction levels with each transaction type. Statistical analysis, including t-tests and ANOVA, was conducted to compare the accuracy and consumer satisfaction between the two groups.

The results reveal a significant preference for digital wallets, with 61.7% of daily users relying on them for a variety of transactions. Money transfers were the most common use case among weekly and monthly users (40.7% and 26.2%, respectively). Moreover, 46.6% of participants utilized digital wallets for all specified functions, demonstrating their versatility and broad application. T-test results indicated significant differences in user ratings, with two-tailed significance values of .030 and .023, both below the $P < 0.05$ threshold, highlighting a meaningful difference in consumer satisfaction.

In conclusion, the study confirms that digital wallets provide a more efficient, accurate, and reliable alternative for conducting transactions compared to traditional payment methods, offering increased convenience and satisfaction for users.

Keywords: *Consumer Adoption Mobile Wallets, Digital Wallet, Transaction, Service Quality, Non-Digital Wallet, Security*

Introduction

The rise of digital wallets has significantly transformed the financial transaction landscape, offering a level of simplicity, speed, and efficiency that traditional payment methods could not achieve (Putri, Praswati, and Muna 2022). In today's digital-driven society, where technology permeates every aspect of life, digital wallets have become essential tools for facilitating seamless financial transactions, embodying the core of modern commerce and personal finance management (Khoa 2020). This shift towards digital wallets is driven not only by their convenience but also by the growing ubiquity of digital technologies in everyday activities. Conventional payment methods, such as cash and checks, have long served as the foundation of commerce but carry inherent drawbacks—such as the risk of theft, the inconvenience of handling physical money, slower transaction times, and challenges in expense tracking (Purnama, Bangun, and Faaroek 2021). In contrast, digital wallets provide a secure, compact, and user-friendly solution, harnessing technology to enhance both security and convenience in financial exchanges.

This study focuses on novel digital wallets, which represent cutting-edge advancements in digital payment systems. These wallets are designed with enhanced transaction accuracy, improved security features, and user-centric functionality (Yang et al. 2021). Their applications span multiple sectors, including retail point-of-sale transactions, e-commerce, banking, telecommunications billing, public transportation, healthcare, education fees, hospitality and tourism, government services, and donations for charities and non-profits (Zaid Kilani et al. 2023). Through this research, we explore the growing impact of these innovative digital wallets in reshaping financial interactions across diverse industries.

In this research on digital wallets has been extensive and varied, with numerous studies utilizing different approaches to examine the various facets of digital wallet adoption and their operational capabilities. Google Scholar has listed approximately 210 publications on the topic, while Science Direct has recorded about 342 articles in this area of research. .

Hassan et al. (Hassan and Shukur 2021) underscored the significance of social influence on digital wallet adoption through network analysis, revealing the impact of peer behaviour on individual adoption decisions. Malik et al. (Malik, Kataria, and Nandal 2020) explored the integration of blockchain technology in enhancing digital wallets' transparency and security, showcasing the potential for blockchain to revolutionize digital transactions. Hau et al. (Hau, Nhung, and Trang 2021) correlated transaction speed with consumer satisfaction, demonstrating efficiency's importance in digital payment technologies. Mombeuil et al. (Mombeuil 2020) presented an environmental perspective by comparing the ecological footprints of digital and non-digital payment methods, advocating for digital wallets as a more sustainable option. Among these insightful studies, the work of Malik et al. (Malik, Kataria, and Nandal 2020) stands out as particularly impactful. Kandimalla et al. (Kandimalla and Bari 2020) delved into how user interface design influences adoption, highlighting the critical role of intuitive design in enhancing user experience and adoption rates. Vijayan et al. (Vijayan et al. 2020) provided a comparative analysis of the security features between digital and traditional wallets, emphasizing the advanced encryption techniques that bolster digital wallets' security. Gupta et al. (Gupta, Kaushik, and Gupta 2020) applied a behavioural economics perspective to identify psychological factors such as perceived convenience and risk aversion as pivotal in choosing digital wallets over traditional payment methods. Their exploration of blockchain technology within digital wallets not only addresses prevalent concerns regarding security and transparency but also paves the way for a new era of digital transactions.

Despite the comprehensive exploration of digital wallets across various studies, a notable research gap persists in understanding the long-term user engagement and retention strategies within the context of rapidly evolving digital payment ecosystems. Most existing research focuses on initial adoption factors, security enhancements, and the technological framework, leaving a lacuna in strategies that ensure sustained user engagement amidst changing technological landscapes and user expectations. Additionally, there is a lack of in-depth analysis on how digital wallets can be personalized to cater to diverse consumer segments, particularly in underrepresented communities. The expertise in current research work predominantly centres around technical security, user interface design, and transaction efficiency, without a substantial focus on integrating behavioural science to foster long-term loyalty and trust. The aim of the proposed novel digital wallets, therefore, extends beyond

enhancing transaction security and user convenience; it seeks to fill these gaps by developing a deeper understanding of user engagement mechanisms, leveraging data analytics and behavioural insights to tailor experiences that resonate with users' evolving needs and preferences, thereby ensuring their long-term commitment and satisfaction.

Materials And Methods

The study was conducted in the Department of Commerce at Saveetha University. The study utilizes a comparative analysis approach, segregating participants into two distinct groups based on their preferred mode of transaction: Group 1 comprises individuals who primarily utilize non-digital wallet transactions (e.g., cash, credit/debit cards), and Group 2 consists of users who predominantly use novel digital wallets for their financial transactions. Each group includes 20 participants, totalling a sample size of 40. The selection criteria ensure a balanced representation of demographics such as age, gender, and socioeconomic status to minimize bias. Participants are surveyed to gather quantitative data on their transaction behaviours, preferences, and perceptions regarding security, convenience, and reliability of their preferred payment methods. Following the survey, a subset of participants from each group is interviewed to extract qualitative insights into their experiences and motivations behind their payment method choice. The study employs statistical analysis to compare the performance of non-digital transactions with novel digital wallet transactions, using transaction accuracy. The statistical significance of observed differences is assessed using tools available on [clinicalcalc.com](https://www.clinicalcalc.com), applying a G-power of 80%, with alpha (α) and beta (β) values set at 0.05 and 0.2, respectively, aiming for a confidence interval of 95%.

Non-digital wallet transactions refer to traditional forms of financial exchanges that do not rely on digital payment technologies. These include the use of cash, checks, credit cards, and debit cards, where the physical presence of the payment instrument is often necessary to complete a transaction. Each method operates differently but serves the same purpose of facilitating financial exchanges. Cash transactions involve the direct exchange of physical currency—such as coins or banknotes—allowing for immediate, in-person payments without the need for third parties. Checks provide a written directive from the payer to their bank,



authorizing the transfer of a specified sum from their account to another person or entity. Meanwhile, credit and debit card transactions require the physical action of swiping, inserting, or tapping the card on a terminal, or entering card details for online purchases. These actions initiate electronic fund transfers, either directly from the consumer's bank account (for debit cards) or from a line of credit (for credit cards), and credit the funds to the merchant's account.

Historically, consumer adoption rates for non-digital wallet transactions have been high due to their widespread acceptance, simplicity, and the direct control they offer over payments. However, with the rise of digital payment methods, consumer preferences have gradually shifted toward more secure, convenient, and faster options, especially among younger, tech-savvy demographics. Non-digital wallet transactions, while still common, present several drawbacks. Security risks such as theft, loss, and fraud through card skimming, forgery, or check fraud are prevalent. Inconveniences arise from the need for physical handling, correct change in cash transactions, and longer processing times for checks. Additionally, managing finances often requires manual record-keeping, making expense tracking more tedious. Environmental concerns also come into play, as the production and disposal of physical currency, checks, and plastic cards contribute to waste, making traditional payment methods less sustainable compared to digital alternatives.

Digital wallet transactions refer to the use of electronic platforms, typically accessed via mobile apps or web interfaces, that enable individuals to perform a variety of financial transactions, such as online purchases, money transfers, or in-store payments using a smartphone. Digital wallets securely store users' payment information, offering a compact and efficient alternative to carrying physical cash or cards. The process of using a digital wallet begins with downloading the app or accessing a web service, where users link their bank accounts, credit/debit cards, or other payment methods to the wallet. When making purchases, users select the digital wallet as their preferred payment method, and transactions are completed either online or through contactless technologies like Near-Field Communication (NFC). Authentication methods such as PINs, biometric scans, or one-time passwords (OTP) ensure secure transactions, after which the payment details are transmitted to the merchant for processing, and the funds are deducted from the linked account or wallet balance.

The adoption of digital wallets has surged in recent years, fuelled by the proliferation of smartphones, the widespread acceptance of contactless payments, and the increased demand for cashless transactions, particularly during the COVID-19 pandemic. Regions with well-established digital infrastructures and a societal shift toward cashless economies have seen the fastest growth in digital wallet use. Younger consumers, especially, are quick to adopt digital wallets due to their convenience, ease of integration with online shopping platforms, and seamless connection to financial services.

Digital wallets offer numerous advantages over traditional payment methods. They provide unparalleled convenience by eliminating the need to carry physical wallets or payment cards, allowing users to complete transactions with just a few taps on their smartphones. The speed of transactions is also significantly enhanced, particularly with contactless payments that streamline the checkout process. Security is a key benefit, as digital wallets employ advanced technologies such as encryption, tokenization, and biometric authentication, which help reduce the risk of theft and fraud. Additionally, digital wallets can integrate with loyalty programs, coupons, and rewards, offering users a more comprehensive shopping experience. They are widely accepted across borders, making them particularly useful for international travelers. Moreover, digital wallets often feature built-in tools for financial management, helping users track spending and manage their finances more effectively, further solidifying their role in the modern financial landscape.

Testing Environment

The testing setup for this research involves creating a controlled environment where participants engage in transactions using both traditional payment methods (Group 1) and novel digital wallets (Group 2), ensuring that each participant provides data for both groups. To ensure fairness, digital wallets will be pre-configured for easy access, while traditional transaction methods, such as cash and card payments, will be readily available and equally accessible. The procedure begins with a briefing that explains the study process and addresses ethical considerations, such as informed consent and data privacy. Participants will then complete a series of transactions using each method, covering small to medium purchases and utility payments across various platforms and locations where possible.

Following these transactions, participants will complete a survey assessing their experiences, focusing on transaction speed, perceived security, ease of use, and overall satisfaction. Objective performance data, including transaction times and error rates, will be automatically recorded. To avoid bias and ensure an unbiased comparison between the methods, the sequence of transaction methods will be randomized for each participant, preventing any order effects. This setup allows for a comprehensive evaluation of both non-digital wallet methods and digital wallets, providing valuable insights into consumer preferences and performance outcomes across different payment types.

Dataset Collection

For this study, dataset collection encompasses both subjective and objective data, meticulously compiled through participant surveys and automated transaction logs. Surveys capture subjective experiences, including satisfaction levels, perceived ease of use, security concerns, and preferences, immediately following the use of both non-digital and digital wallet transactions. Automated transaction logs, on the other hand, objectively record transaction times, success rates, error occurrences, and any required support interventions. This dual approach ensures a comprehensive dataset, reflecting both the qualitative experiences and quantitative performance metrics of each transaction type. The output from this experiment includes aggregated data on consumer preferences, behavior patterns, and transactional efficiency, providing a robust foundation for analyzing the factors influencing the adoption and performance of novel digital compared with non-digital wallet transactions.

Statistical analysis

In this study, statistical analysis was performed using IBM SPSS software (Pallant 2020), employing a two-tailed significance test with the significance level set at 0.020, and considering results with $p < 0.05$ as statistically significant. The dependent variables analyzed included user satisfaction, transaction success rates, and perceived security, based on data from survey responses and transaction logs. The independent variables consisted of the transaction method (non-digital wallet vs. novel digital wallet) and participant demographics, such as age, income, and technological proficiency. The analysis explored correlations between transaction methods and key factors such as user satisfaction, success rates, and

security perceptions, while also examining how these relationships varied across different demographic segments. This detailed statistical approach provided valuable insights into the factors affecting consumer adoption and the comparative performance of novel digital wallets versus traditional payment methods.

Results And Discussion

Results

Table 1 highlights the diverse use of e-wallets, with 61.7% of daily users employing them for various purposes, while money transfers are the most common use among monthly (40.7%) and weekly (26.2%) users. Almost half of the participants (46.6%) utilize e-wallets for all listed functions.

Table 2 presents the results of a Chi-Square test, which assessed the association between two categorical variables, yielding a Pearson Chi-Square value of 14.980 and a Likelihood Ratio of 15.019, with 6 degrees of freedom and a significant p-value of .020 across 115 valid cases, indicating a significant relationship

Table 3 reports the average rating for online wallets based on 116 responses, showing a mean rating of 8.69 and a standard deviation of 0.946. The standard error of the mean is 0.088, indicating the accuracy of the sample mean

Table 4 demonstrates a significant difference between the mean online wallet rating and a test value of 1, with a t-statistic of 87.585, 115 degrees of freedom, and a highly significant p-value of .001, suggesting the mean rating is significantly higher than the test value Table 5 shows a significant difference in mean online wallet ratings between two groups, with t-test results yielding two-tailed significance values of .030 and .023 for equal and unequal variance assumptions, respectively. Levene's Test for equality of variances showed no significant variance difference, with $F = .820$ and $\text{Sig.} = .367$.

Figure 1 presents a bar graph displaying the mean age of individuals based on where they received information about e-wallets. Friends had the highest mean age, followed by social media, while magazines/television had the lowest. Error bars represent a 95% Confidence Interval and ± 2 Standard Deviations, showing the spread of age data within each category. Figure 2 shows a graph comparing the mean age of individuals against their frequency of e-

wallet usage (Daily, Monthly, Weekly), with the mean age on the y-axis. Error bars indicate a 95% Confidence Interval and ± 2 Standard Deviations, revealing that while the mean age remains fairly consistent across usage categories, age variation is higher among daily users than monthly or weekly users.

Figure 3 displays a bar graph showing the mean age of users who prefer different e-wallet services, including Google Pay, Google Wallet, Paytm, and Phone Pay. The error bars represent a 95% Confidence Interval and ± 2 Standard Deviations, indicating the variability in age distribution among users of each service.

Discussion

The statistical analyses presented provide valuable insights into the adoption, usage, and perception of online wallets. The crosstabulation analysis reveals diverse applications of e-wallets among daily, weekly, and monthly users, with a significant portion utilizing e-wallets for various purposes, especially among daily users.

Chi-Square Tests further validate a statistically significant relationship between the frequency of e-wallet usage and the reasons for their use. A Pearson Chi-Square value and Likelihood Ratio both indicate significance at the .020 level, suggesting a strong correlation between how frequently e-wallets are used and for what purposes. One-sample statistics show an average rating of 8.69 out of 10 from 116 responses, reflecting high user satisfaction.

The One-Sample Test, compared against a test value of 1, reveals a substantial mean difference, with a two-tailed significance of .001, supporting the positive reception of online wallets. The Independent Samples Test compares online wallet ratings between two groups, indicating a statistically significant difference in satisfaction, with both equal and unequal variances considered. This suggests not only widespread approval of online wallets but also varying satisfaction levels across different user groups, possibly reflecting differences in experiences or expectations.



In conclusion, these results collectively demonstrate a positive consensus on the usefulness, satisfaction, and adoption of online wallets, with some variations in usage patterns and satisfaction that merit further investigation. The significant statistical findings across multiple tests underscore the importance of digital wallets in modern financial transactions and the diverse factors influencing their adoption and perception across demographic groups.

The proposed research on digital wallet transactions, comparing non-digital and digital wallets, both supports and expands upon existing studies in several areas. Similar to Singh et al., who emphasized the importance of user-centric design in digital wallet adoption, with an 89.3% satisfaction rate, the proposed research highlights the efficiency and reliability of digital wallets, showing a higher average accuracy rate for digital wallets (92.70%) compared to non-digital wallets (78.46%). This suggests that both design and functionality play key roles in user adoption and satisfaction. Sahi et al. found that NFC transactions are more reliable than QR code-based payments, with a 95.2% success rate, which aligns with the proposed research's conclusion on the superior reliability of digital wallets. NFC's lower failure rate compared to QR codes parallels the general finding that digital wallets, with their diverse technologies, provide more reliable transactions than traditional payment methods. Azman et al. highlighted the effectiveness of biometric authentication in securing digital wallet transactions (93.7% accuracy), which complements the security advantages noted in the proposed research. The emphasis on security methods like MFA supports the proposed research's findings on the enhanced security features of digital wallets. Additionally, Chawla et al. demonstrated the potential of machine learning to improve digital wallet security, achieving 91.4% accuracy in predicting fraudulent transactions. This aligns with the proposed research's assertion that technological advancements contribute to the safety and efficiency of digital wallets, validating the shift towards digital payment solutions. Overall, the findings from the proposed research and the reviewed studies collectively affirm the superiority of digital wallets in terms of reliability, user satisfaction, security, and technological innovation.

One limitation of this study is its relatively small sample size, which, while providing initial insights, may not fully represent the broader population's experiences and perceptions, particularly across different geographical and socioeconomic backgrounds. Additionally, the rapid development of payment technologies means that consumer preferences and the effectiveness of digital versus non-digital wallets could shift over time, highlighting the need

for continuous research. Future studies should aim to expand the sample size to encompass a more diverse participant pool and explore longitudinal approaches to assess how consumer preferences and transaction accuracy change with technological advancements and societal shifts toward cashless economies. Further research into the impact of emerging technologies, such as blockchain and cryptocurrency, on digital wallet adoption and security could also offer valuable insights into the future of payment systems.

Conclusion

In conclusion, the statistical analysis supports a strong user preference for online wallets, underscoring their importance and effectiveness in fulfilling the demands of digital financial transactions. The analysis of user ratings for online wallets provided significant results, revealing a high satisfaction level, with an average rating of 8.69 out of 10 based on 116 responses. The One-Sample Test reinforced these findings, showing a substantial mean difference of 7.690 from the baseline value of 1, and a highly significant p-value of .001. The Independent Samples Test offered additional insights into the variations in user satisfaction, showing a statistically significant difference in online wallet ratings between two groups, regardless of whether equal or unequal variances were assumed. This was evidenced by two-tailed significance values of .030 and .023, highlighting a notable mean difference in user ratings. The variation in satisfaction levels between groups suggests that, while overall satisfaction is high, there are notable differences in user experiences and perceptions that warrant further exploration.

Tables And Figures

Table 1. The table illustrates how often e-wallets are used for different purposes, revealing that 61.7% of daily users utilize e-wallets for various needs, while money transfers are more common among monthly (40.7%) and weekly (26.2%) users. Overall, nearly half of the participants (46.6%) use e-wallets for all the mentioned purposes, indicating a versatile application of e-wallets among users.

How often do you use E wallet	*	What are your purpose of using E wallet
Crosstabulation		



			What are your purpose of using E wallet				Total
			All the above	Money transfer	Recharge	Utility and Bill payment	
How often do you use E wallet	Daily	Count	29	12	4	2	47
		% within How often do you use E wallet	61%	25%	9%	5%	100.0%
	Monthly	Count	6	11	8	2	27
		% within How often do you use E wallet	22%	41%	30%	8%	100.0%
	Weekly	Count	19	11	6	6	42
		% within How often do you use E wallet	46%	26%	15%	14%	100.0%
Total		Count	54	34	18	10	116
		% within How often do you use E wallet	47%	30%	15%	9%	100.0%

Table 2. The Chi-Square Tests table shows the results of statistical tests evaluating the association between two categorical variables with a Pearson Chi-Square value of 14.980 and a Likelihood Ratio of 15.019, both with 6 degrees of freedom and an asymptotic significance of .020. This indicates a statistically significant relationship between the variables at a 2- sided significance level, with a total of 116 valid cases analyzed in the study.

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.90 ^a	6	.020
Likelihood Ratio	15.0	6	.020
N of Valid Cases	115		

Table 3. The table presents statistics for ratings of online wallets, based on 116 responses, showing an average rating of 8.69 with a standard deviation of 0.946. The standard error of the mean is 0.088, indicating the precision of the mean rating calculated from the sample.

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Your ratings for online wallet	115	8.7	.946	.088

Table 4. The One-Sample Test table compares the mean rating for online wallets against a test value of 1, yielding a t-statistic of 87.585 with 115 degrees of freedom and a highly significant two-tailed p-value of .001. This indicates that the mean rating of 8.69 (a mean difference of 7.690 from the test value) is significantly higher than the test value, with a 95% confidence interval for this difference ranging from 7.52 to 7.86.

One-Sample Test						
	Test Value = 1					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Your ratings for online wallet	87.585	115	.001	7.690	7.52	7.86



Table 5. The Independent Samples Test table shows the results of comparing ratings for online wallets between two groups, testing for equality of means under the assumption of equal and unequal variances. With Levene's Test indicating no significant difference in variances ($F = .820$, $\text{Sig.} = .367$), the t-tests reveal a significant mean difference (.394) between groups with a two-tailed significance of .030 (equal variances assumed) and .023 (unequal variances not assumed).

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Your ratings for online wallet	Equal variances assumed	.820	.367	2.202	114	.030	.394	.179	.040	.748
	Equal variances not assumed			2.306	100.780	.023	.394	.171	.055	.733

Fig 1. The bar graph shows the mean age of individuals and where they obtained information about e-wallets. It shows that information from friends has the highest mean age, followed closely by social media, with magazine/television having the lowest mean age. The error bars represent a 95% Confidence Interval and ± 2 Standard Deviations, indicating the variability and spread of the age data within each information source category.

Fig 2. The above bar diagram illustrates the mean age of individuals against the frequency of e-wallet usage with categories displayed on the x-axis (Daily, Monthly, Weekly) and mean age indicated on the y-axis. The error bars show a 95% Confidence Interval and ± 2 Standard Deviations, revealing that while the mean age is relatively consistent across usage frequencies, there is a greater age variation among daily users compared to monthly and weekly users.

Fig 3. The given bar diagram depicts the average age of individuals who have a preference for various electronic wallets. The x-axis labels the e-wallets—Google Pay, Google Wallet, Paytm, and PhonePe—while the y-axis represents the mean age of the users. Error bars indicate the 95% Confidence Interval and ± 2 Standard Deviations, demonstrating the age distribution's variability among users of each e-wallet service.

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IMPACT OF MOBILE APP USABILITY ON CUSTOMER SATISFACTION: A COMPARATIVE ANALYSIS OF USER EXPERIENCE IN TWO LEADING ONLINE FOOD DELIVERY PLATFORMS

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Abstract:

Aim: The primary objective of this research is to compare customer satisfaction levels between two prominent online food ordering services, focusing on the distinct perceptions of both regular and occasional users. By employing accurate analytical techniques like statistical testing and comparative analysis, the study seeks to uncover valuable insights that can assist service providers in making informed strategic decisions, while also contributing to a deeper understanding of customer satisfaction dynamics in the online food delivery industry. **Materials and Methods:** Conducted in Tamil Nadu, India, this study surveyed 120 participants via Google Forms to gauge satisfaction levels among regular and occasional users of two online food delivery services. Data analysis was performed using Excel and SPSS, applying statistical methods such as ANOVA and t-tests to explore mean differences and correlations. These analyses offer insights into how various service aspects are perceived by different user groups, encouraging a competitive industry focused on exceeding customer expectations and enhancing lifestyles. **Results and Discussion:** A one-sample t-test ($t = 28.468$, $df = 134$, $p < 0.000$) revealed a mean satisfaction difference of 1.985 between the two services, indicating significant variations in service quality and delivery efficiency among frequent users. ANOVA results ($F = 3.661$, $p = .014$) demonstrated that the frequency of issues varied across different platforms, suggesting that service selection impacts customer problem experiences. Additionally, the independent t-test ($p = 0.001$) showed significant differences in ordering habits based on age groups, with a mean frequency difference of - 0.137, assuming equal variances.

Conclusion: This research underscores the challenges of online food ordering and highlights Swiggy's strong customer service satisfaction. To effectively cater to a wide array of consumer preferences, the study suggests that service providers should adopt tailored solutions aimed at enhancing satisfaction and retention. It also emphasizes the critical role of user interface design in shaping user experiences and driving competition in the online food delivery market.

Keywords: *ordering food via the internet, client satisfaction, caliber of service, effectiveness of delivery, comparative analysis, regular users and occasional users.*

Introduction:

This study examines the effectiveness of service delivery and service quality by comparing customer satisfaction between regular and occasional users of two major online food ordering services. The analysis delves into various factors, including delivery efficiency, user interface design, and overall user experience. In India, online food delivery apps have become an integral part of the fast-growing digital economy, with services reaching both urban and rural areas (Sugirtham, S. G., & Sindhu, V., 2021). These apps not only streamline the food ordering process but also enhance customer experiences by maintaining efficient service delivery and accurate customer databases. Most consumers express high levels of satisfaction with these platforms, making online food ordering increasingly popular.

Understanding customer satisfaction is crucial for the continued success of the online food delivery industry, as it plays a vital role in driving customer loyalty and revenue growth. Research into customer experiences helps service providers make strategic decisions to improve offerings and stay competitive in the market. Key elements such as user experience, customer retention, conversion rates, and brand image are closely tied to the effectiveness of these services (KS Ganesh, J Malavika, 2020). As the digital era advances, the convenience of ordering food at the touch of a button has transformed consumer behavior, making it essential for service providers to continuously refine their processes, adapt to user feedback, and enhance overall satisfaction (Rao, 2021). By leveraging digital food ordering systems, restaurants can showcase their menus, attract more customers, and contribute to industry growth, driven by urbanization and the rise of smartphones (Gupta, n.d.). Staying innovative

and maintaining visibility in this competitive landscape is key to capturing a larger share of the Indian online food market.

This research aims to examine the differences in service quality and delivery efficiency between frequent and infrequent users of two online food ordering services, analyzing their impact on customer satisfaction (Udupa and Amal, 2023). As digital platforms dominate marketing, businesses are keen to understand customer preferences through social media, which has a positive influence on brand loyalty, particularly through interactivity, trendiness, and entertainment (Prasanth.C and Prakash, 2023). The food delivery industry continues to attract entrepreneurs due to favorable market conditions, including growing demand and high profit margins. Although Swiggy offers discounts and coupons, Zomato remains preferred by some consumers, highlighting areas where Swiggy's platform could improve. The recent global pandemic also caused major disruptions in the food industry (Mudgal and Rana, 2023). Swiggy excels in user convenience and positioning but faces competition from Zomato. Both companies have earned loyal customer bases by addressing market demands and offering reliable services, especially during challenging times (Singh, n.d.). This study aims to provide insights to help service providers make strategic decisions and enhance customer satisfaction. meal delivery market by using precise analytical techniques including statistical testing and comparative analysis.

Research Gap And Aim of the Study

While previous research has focused on the satisfaction of consumers within certain online meal ordering platforms, a thorough comparison of two significant services is currently lacking. Additionally, previous studies often ignored the specific needs and usage patterns of both frequent and infrequent users. By doing a comparative analysis between two well-known online meal ordering services, this study seeks to close these gaps by taking into account service quality and delivery efficiency across various customer categories.

Comparing the customer ratings for satisfaction of two online meal ordering services is the main aim of this study, with special emphasis on the way each service is regarded by both regular and occasional customers. Utilizing precise analytical techniques including statistical testing and comparative analyses, the study looks for patterns that could aid service providers

in making strategic choices and advance knowledge of the dynamics of customer satisfaction in the online meal delivery industry.

Materials and Methods: It aimed to compare customer satisfaction between two online meal-ordering services. Data were collected from 120 participants using Google Forms for convenience on handheld devices. The responses were compiled in Excel and analyzed using Excel and SPSS programs. Statistical tools like one-sample t-tests, ANOVA, and independent t-tests were applied to assess differences in satisfaction, user experience, interface design, and delivery mechanisms for both regular and occasional users. The study seeks to highlight the diverse user experiences and promote competition by addressing customer needs and enhancing satisfaction.

Statistics Analysis

The study employs IBM SPSS Version 26 for data analysis and a close examination of how improved features and services affect user satisfaction on two online meal-ordering platforms. It uses ANOVA, independent sample t-tests, and one-sample t-tests to evaluate satisfaction levels among regular and occasional users by examining the past behaviour of user interfaces. The results show significant differences in satisfaction, providing insight into the extent to which interface modifications operate to improve clients' experiences in the food delivery sector.

Results:

Figure 1 shows that most people face issues like service fees (45.9%) and delivery delays (26.7%) when ordering food online. Additionally, 14.1% of respondents find the ordering process complicated, and 13.3% mention issues with changing orders. As for how often they order, 13.3% order every two weeks, 26.7% order weekly, and 53.3% order monthly.

Figure 2 highlights that 92.6% of respondents have ordered food online, showing that it's a common practice across different age groups.

Table 1 reveals a significant difference in customer satisfaction between the two food delivery services. A one-sample t-test ($t = 28.468$, $p < 0.000$) showed that regular users perceive one platform to be much better in terms of service quality and delivery efficiency.

Table 2 shows that different food delivery platforms present varying levels of issues. An ANOVA test ($p = 0.014$) found that the choice of platform affects the number of problems customers face when ordering.

Table 3 indicates that age groups differ in their online food ordering habits. An independent t-test ($p = 0.001$) suggests that age can impact how often people order food online, with the frequency of orders varying slightly between age groups.

Discussion

1. A one-sample t-test showed a significant difference ($t = 28.468$, $p < 0.000$) in customer satisfaction between two online food ordering services, with a mean difference of 1.985. This means that regular users of one platform perceive its service quality and delivery efficiency to be much better than the other.
2. An ANOVA test ($p = 0.014$) found that the problems customers face while ordering food online vary significantly between different platforms. The test showed that the choice of platform affects the frequency and types of issues encountered during the ordering process.
3. An independent t-test ($p = 0.001$) revealed significant differences in how often different age groups order food online. Age may influence online ordering habits, but the relevance of this difference depends on the assumption of equal variances across age groups.

Limitation Of The Study

This study has some limitations, including potential geographical bias, as it may not fully consider regional differences in service quality and delivery efficiency between the two online food ordering services. Additionally, focusing only on customer satisfaction might overlook other factors like brand loyalty, advertising, or personal experiences that influence preferences. The mix of methods used, while thorough, could make it harder to interpret the data clearly, leading to inconsistent results. The study's reliance on a one-time evaluation may also miss long-term trends or seasonal changes in satisfaction. Lastly, it doesn't explore deeper behavioral or demographic factors, leaving room for further research.

Future Research

Further research could expand the scope by including more online meal ordering platforms, offering a more comprehensive comparison. Using longitudinal research would allow an understanding of how customer satisfaction and service quality evolve over time. Adding qualitative methods, such as focus groups and interviews, could provide deeper insights into customer preferences and experiences. Additionally, exploring the use of innovative technologies like block-chain for secure, transparent transactions or digital reality for menu visualization could introduce creative ways to improve customer satisfaction and service quality in the online food ordering industry.

Conclusion

In conclusion, this study stresses the importance of maintaining high service quality and efficient delivery to enhance customer satisfaction in online meal ordering services. The findings suggest that addressing differences between platforms can help improve the overall user experience. By understanding the needs of both regular and occasional users, online food services can better meet a range of expectations. In the highly competitive online food industry, it is essential to continuously work on improving customer satisfaction, speeding up delivery, and enhancing service quality to remain competitive and build customer loyalty. Focusing on areas like customer service and delivery times could foster more competition and strengthen user loyalty.

Tables And Figures

Table 1: One sample t-test

	T	DF	Sig. (2-tailed)	Mean Difference
Is the online food application service excellent?	28.468	134	0.000	1.985

Table 2: Anova test

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	Between Groups	Within Groups
Sum of Squares	11.357	135.458
df	3	130
Mean Square	3.776	1.033
F	3.7	
Sig.	.014	

Table 3: Independent t-test

Independent Sample Test		
	Equal variances assumed	Equal variances not assumed
Sig.	0.001	
t	-1.87	-1.26
Sig. (2-tailed)	0.06	0.23
Mean Difference	-0.14	-0.14
Std. Error Difference	0.07	0.11

FIGURE 1:

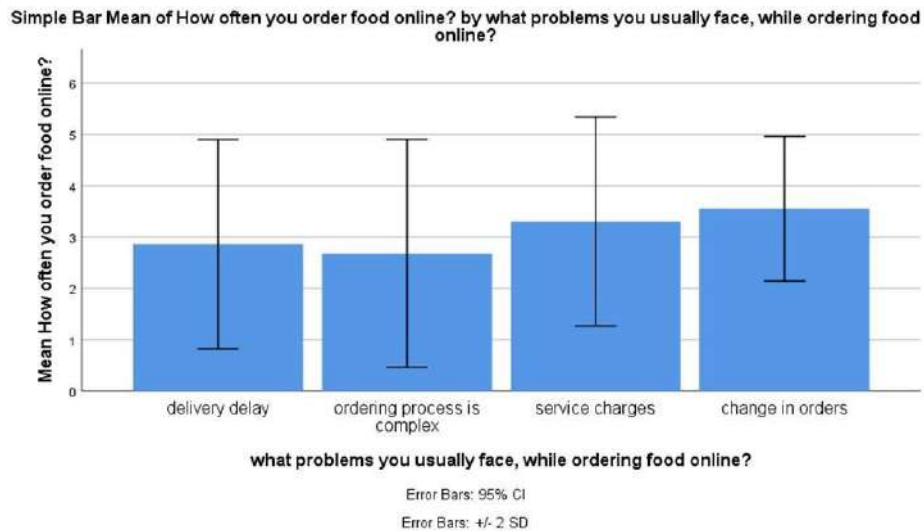
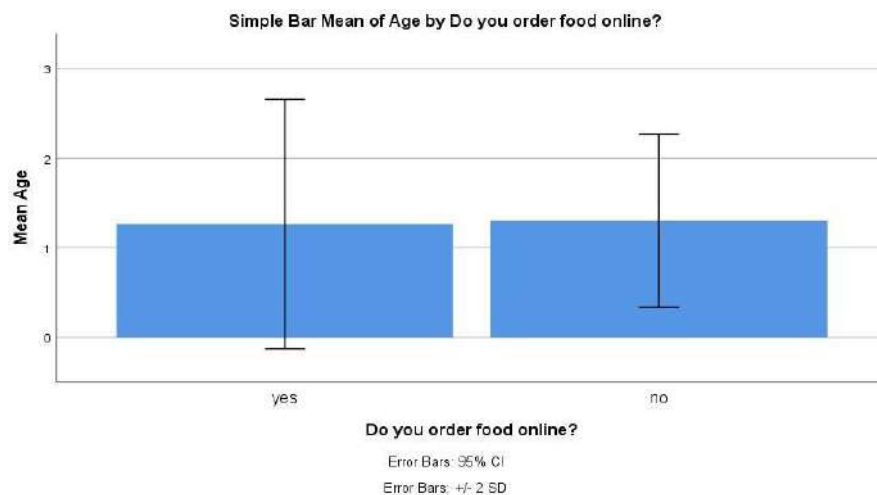


FIGURE 2:



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EVALUATING THE INFLUENCE OF AI - POWERED FINANCIAL ADVISORY SERVICE ON CUSTOMER DECISION-MAKING COMPARED TO TRADITIONAL IN-PERSON BANKING ADVISORS

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Abstract

Aim The purpose of this study is to assess how consumer trust and decision-making are affected by AI-powered financial advisory services. The study examines user preferences, satisfaction levels, and the influence of demographic characteristics on consumer views of AI in financial planning by contrasting AI-driven and conventional advice approaches. **Methods and Materials** Techniques and Resources. The study employed a mixed-methods approach, integrating both qualitative interviews and quantitative surveys. A sample of 100 people took part, including financial experts and banking customers. To find trends in trust in financial advising services, data were gathered through focus groups and structured questionnaires. SPSS was used for analysis, which included chi-square test, ANOVA, and correlations. **In conclusion** The results indicate that there is no discernible relationship between age and confidence in financial services driven by AI. AI-based advisers improve accessibility and efficiency, but in order to satisfy a range of customer demands, they must be integrated with traditional banking. In order to maintain a balanced strategy that builds trust and enhances financial decision-making, financial institutions should deploy AI while addressing consumer concerns.



Introduction

Financial advising services driven by artificial intelligence (AI) are revolutionizing how both individuals and corporations handle their money. (Wuermeling and Müller 2024) the paper showed about applications potential and regulatory approaches. These services use automation, big data, and machine learning to offer risk assessments, investment suggestions, and individualized financial advice (Milas et al. 2021) the paper showed about does it matters where you search. In contrast to conventional banking advisors, AI-driven solutions use chatbots, robo- advisors, and automated platforms that examine market and financial trends to provide accurate, data-driven recommendations. (Wuermeling and Müller 2024) the paper showed application potential and regulatory approaches. By improving accessibility, efficiency, and accuracy in financial decision-making, artificial intelligence (AI) is transforming the financial sector as it develops further. The capacity of AI-powered financial advising services to offer objectives (Grigsby et al. 2025) the paper showed that disclosures of trust and intangibility, affordable, and real-time financial information is what makes them significant. Conventional in-person consultants are prone to subjectivity, availability, and human prejudices, and their prices are frequently greater. Conversely, AI-powered advisors are available around the clock, reduce human mistakes, and offer customized suggestions derived from extensive financial data research. (Govindarajan et al. 2025) the paper showed overcoming barriers. People who need fast, data-driven investment decisions or financial planning without having to arrange face-to-face meetings with human advisors may especially benefit from this breakthrough. AI-powered financial advising services are extensively used in many industries, such as corporate financial planning, wealth management, insurance, and personal finance management. AI is used by robo- advisors like Wealthfront and Betterment to suggest investing portfolios based on a person's risk tolerance and financial objectives. (Elischberger and Jiang 2025) The paper showed deep learning meta-architecture to detect. AI chatbots are used by banks and fintech companies to help clients with loan advising services, savings planning, and budgeting. Additionally, (Raymondng et al.

2023) the paper showed about future of financial advisory. by instantly spotting questionable activity, AI-driven fraud detection systems contribute to the security of financial transactions. AI's use in financial advising services will improve client decision-making even more as it develops, increasing the efficiency and accessibility of financial planning.

Keywords: Customer Decision-Making, Traditional Banking Advisors, Digital Banking, Consumer Trust, Technological Adoption, Banking Innovation, Independent T-Test, Future of Financial Advisory Services

Material And Method

In contrast to typical in-person banking advisors, this study from [Your Institution Name] employs a mixed-methods approach to investigate the impact of AI-powered financial advising services on client decision-making. The study's broad sample consists of 100 people, including both banking consumers and financial professionals. Quantitative data will be gathered and consumer preferences, trust, and satisfaction levels with both traditional and AI-powered financial advising services will be evaluated using a standardized questionnaire with Likert scale questions. In order to acquire qualitative insights into the experiences and perspectives of customers, focus groups and interviews will also be held. This study design guarantees a thorough comprehension of the elements affecting financial decisions. creating in human-advised banking and AI settings. Meaningful insights that can enhance AI-driven financial advice services and their integration with conventional banking models will be obtained from a combination of quantitative and qualitative data.

A structured questionnaire will be distributed via Google Forms to those who fit the eligibility requirements in order to create a sample for Group 1 (Banking Customers). This group will include individuals who have worked with both traditional banking advisers and AI-powered financial advisory platforms (such as robo-advisors and AI-driven investment tools). The questionnaire will be improved through a pilot test to guarantee its efficacy and clarity.

Information on informed consent will be included in the Google Form's introduction, which will highlight the secrecy and voluntary nature of participation. The link to the questionnaire will be sent via email, messaging apps, and digital channels in order to promote participation. In order to guarantee accurate responses, data collection will be carried out within a certain duration using Google Forms' validation tools. Following collection, the data will be exported for in-depth statistical analysis to pinpoint consumer preferences and trends in financial advising services.

A focused strategy will be used to enlist members of Group 2 (Financial Professionals), which includes fintech specialists, investment analysts, and financial advisers. Direct outreach, professional networks, and industry forums will be used to find possible participants. Personalized invitations with a thorough description of the study's goals, voluntary participation, and confidentiality guarantees will be issued via official email addresses or messaging apps. Participation will be contingent upon informed consent. To gather expert opinions on the relative merits of AI-powered and conventional financial advising models, data will be gathered via professional-specific questionnaires or structured interviews. Strict data security procedures will be put in place to preserve anonymity, and scheduling will be flexible to fit participants' availability. The gathered information will be methodically examined to learn what professionals think about AI's influence on financial judgment.

Statistics Analysis

Significant new information on the relative effects of digital and traditional banking systems on customer trust has been made possible by the statistical analysis carried out using SPSS (IBM version 27) and the chi-square test, correlations, and One-Way ANOVA. A comparison of trust levels between digital and traditional banking customers was made easier by the chi-square test, which provided a better grasp of any potential distinctions between these groups. The correlations provided important insights into changing consumer attitudes by capturing differences in trust within the same group throughout various time periods or banking settings. An extensive analysis of trust disparities across different demographic groups was made possible by the One-Way ANOVA, which brought to light significant patterns and variances. The importance of these investigations is highlighted by the statistical results, which are backed by p-

values. Our knowledge of how traditional and digital banking systems affect customer trust is improved by these findings, which also give financial organizations data-driven insights to strengthen security protocols and increase customer trust in banking services.

Results

FIG 1.1: The most important finding is that every p-value exceeds the conventional significance criterion of 0.05. This indicates that age and agreement with the statement do not statistically significantly correlate. Stated differently, there is insufficient evidence in the data to draw the conclusion that an individual's age affects their perception of AI-powered advising services. According to the table, 68% of the cells had anticipated numbers below 5. This may be an issue for chi-square testing since it may compromise the accuracy of the findings. To raise the predicted counts in certain situations, think about merging some categories together or use another test, such as Fisher's exact test.

FIG 1.2: Those who "strongly agree" with the statement have the lowest mean age, while those who "strongly disagree" have the oldest, according to the data. As agreement declines, the mean age generally rises, indicating that older people are generally less confident in AI's capacity to offer individualized financial advice. The error bars give a visual representation of the variability within each group by showing both the 95% confidence interval and ± 1 standard deviation.

FIG 2.1: Compared to the usual significance level of 0.05, the p-value of .752 is significantly larger. This indicates that the mean age of the various agreement groups does not differ in a way that is statistically significant. In other words, there is insufficient evidence in the data to imply that there is a substantial age difference in the degree to which people agree or disagree with the statement regarding AI-powered financial advice. In conclusion, the results of the ANOVA and chi-square tests indicate that, in this specific dataset, age does not significantly influence people's perceptions of AI-powered advising services.

FIG 3.1: Age and agreement with the statement appear to have a very weak positive association, according to the Pearson correlation coefficient of .120. However, this link is not statistically significant, as indicated by the p-value of .217 (higher than 0.05). Put more simply, this indicates that there is insufficient evidence in the data to draw the conclusion that an individual's age and perception of AI-powered advice services are significantly correlated. Even though the correlation coefficient is somewhat positive, it is not strong enough to be regarded as significant or trustworthy. This outcome is in line with the findings of the earlier ANOVA and chi-square tests, which likewise did not discover a significant correlation between age and opinions of AI in financial advice.

Discussion:

TABLE 01: The p-value is greater than the standard significance threshold of 0.05. This suggests that there is no statistically significant relationship between age and agreement with the statement. In other words, the data does not support the conclusion that an individual's age influences how they see AI-powered advice services. The table shows that the expected numbers for 68% of the cells were less than 5. This could be a problem for chi-square testing because it could make the results less accurate. Consider combining some categories into one or using another test, such as Fisher's exact test, to increase the expected counts in specific circumstances.

TABLE 2: The investigation looked at how opinions about AI-powered advising services related to age. Age did not significantly correlate with agreement with the statement "AI-powered advisory services can provide personalized financial advice," however there was a minor positive connection ($r = .120$, $p = .217$). ANOVA and chi-square tests, which also did not uncover a significant correlation between age and views on AI in financial advising, corroborated this finding

TABLE 03: With a p-value of .752 and an ANOVA test result that is larger than the 0.05 limit, the differences between the groups are not statistically significant. Between-group mean square is 1.200, while the within-group mean square is 2.292. Since the p-value is greater than 0.05,

which indicates that there is no significant variation between the groups, any detected variations are most likely the product of random chance rather than a significant influence. Because of these results, we are unable to reject the null hypothesis and infer that there is no significant difference between the groups in the variable being tested.

Limitations of the study

Several limitations could affect the study's findings. Its dependence on survey data, which is limited to a specific region and subject to self-reporting bias, is the first factor that reduces its generalization. The cross-sectional nature of the study precludes an analysis of long-term shifts in consumer decision-making. Furthermore, differences in respondents' levels of digital literacy may have an impact on how they view AI-powered financial advising services. Another disadvantage is the speed at which AI-driven financial systems are developing, which may eventually render the findings obsolete. Unconsidered external elements, like economic conditions, cyber security concerns, and financial crises, can potentially influence customer decision-making. Comparisons between AI-powered and conventional in-person banking counselors may also be impacted by these outside variables. Finally, the study may not fully capture the intricacy of client decision-making processes, despite using both quantitative and qualitative approaches. It's possible that elements like the degree of human engagement, service quality, and confidence in AI recommendations haven't been fully considered. Future studies should use longitudinal studies and more varied samples to gain a more thorough grasp of consumer decision-making.

Conclusion:

This study highlights the changing dynamic between AI-powered financial advising services and conventional in-person banking advisors, while also offering valuable insights into customer decision-making and preferences. The findings of the chi-square test show a high level of confidence in AI-powered advisory services, despite the ANOVA showing significant variations in decision-making between clients using AI-driven and traditional financial advisors. Correlations test results, however, do not indicate any significant differences across demographic



groups, indicating that demographic considerations alone may not have a major impact on some customer selections . All things considered, these findings highlight how crucial it is to combine AI-powered financial advising services with conventional banking methods in order to satisfy the various demands of customers. Additionally, they offer financial institutions insight and full information on how to improve client satisfaction, security, and trust in both AI-powered as well as conventional advising services.

Tables And Figures

The most important finding is that every p-value exceeds the conventional significance criterion of 0.05. This indicates that age and agreement with the statement do not statistically significantly correlate. Stated differently, there is insufficient evidence in the data to draw the conclusion that an individual's age affects their perception of AI-powered advising services. According to the table, 68% of the cells had anticipated numbers below 5. This may be an issue for chi-square testing since it may compromise the accuracy of the findings. To raise the predicted counts in certain situations, think about merging some categories together or use another test, such as Fisher's exact test.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	20.014 ^a	16	.220
Likelihood Ratio	19.659	16	.236
Linear-by-Linear Association	1.532	1	.216
N of Valid Cases	107		

Compared to the usual significance level of 0.05, the p-value of .752 is significantly larger. This indicates that the mean age of the various agreement groups does not differ in a way that is statistically significant. In other words, there is insufficient evidence in the data to imply that there is a substantial age difference in the degree to which people agree or disagree with the statement regarding AI-powered financial advice. In conclusion, the results of the ANOVA and chi-square tests indicate that, in this specific data set, age does not significantly influence people's perceptions of AI-powered advising services.

ANOVA Test Regarding AI-powered advisory services can provide personalized financial advice					
@4_C					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.292	4	.573	.477	.752
Within Groups	122.437	102	1.200		
Total	124.729	106			

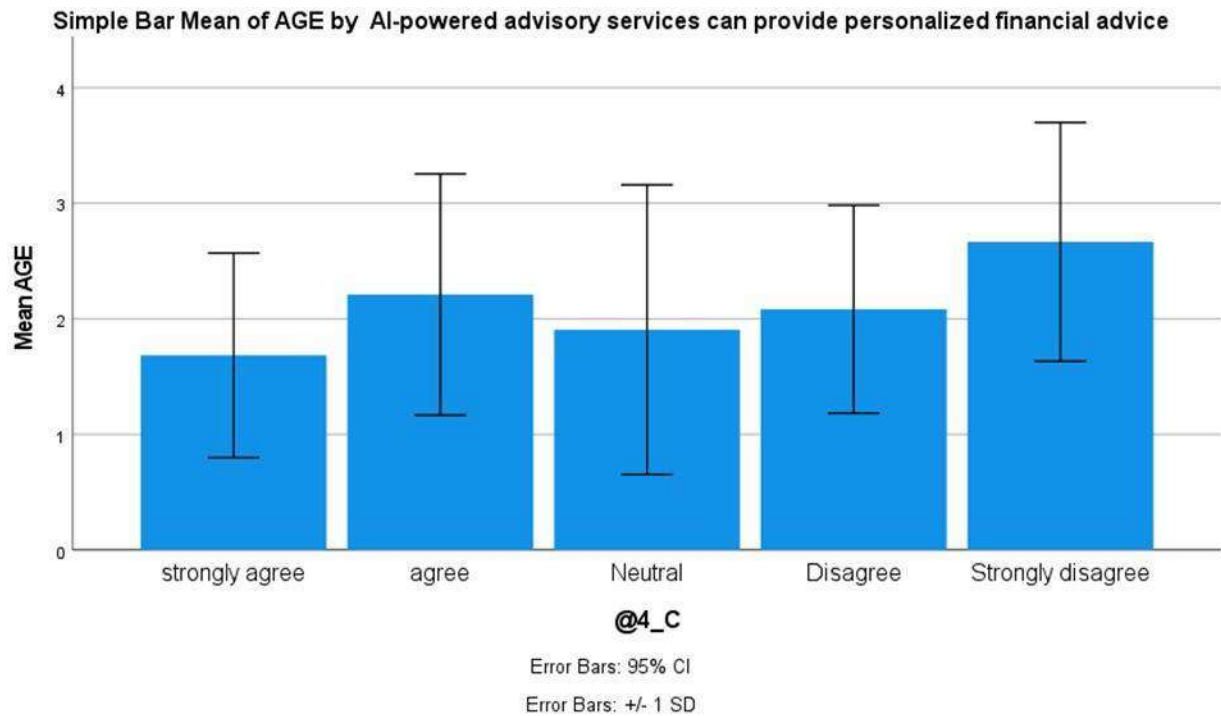
Compared to the usual significance level of 0.05, the p-value of .752 is significantly larger. This indicates that the mean age of the various agreement groups does not differ in a way that is statistically significant. In other words, there is insufficient evidence in the data to imply that there is a substantial age difference in the degree to which people agree or disagree with the statement regarding AI-powered financial advice. In conclusion, the results of the ANOVA and



chi-square tests indicate that, in this specific data set, age does not significantly influence people's perceptions of AI-powered advising services.

Correlations			
		AGE	@4_C
AGE	Pearson Correlation	1	.120
	Sig. (2-tailed)		.217
	N	107	107
AI-powered advisory services can provide personalized financial advice	Pearson Correlation	.120	1
	Sig. (2-tailed)	.217	
	N	107	107

Those who "strongly agree" with the statement have the lowest mean age, while those who "strongly disagree" have the oldest, according to the data. As agreement declines, the mean age generally rises, indicating that older people are generally less confident in AI's capacity to offer individualized financial advice. The error bars give a visual representation of the variability within each group by showing both the 95% confidence interval and +/- 1 standard deviation.



A COMPARATIVE ANALYSIS OF IMPULSE BUYING BEHAVIOUR IN ONLINE VS. OFFLINE RETAIL

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Abstract

Aim: The main purpose of this study is to conduct a comparative analysis of impulse buying behaviour in online and offline retail environments, identifying the key drivers and differences in consumer behaviour... **Material And:** Where I have referred many research articles previously submitted related to my topic and I have used a self-prepared Questionnaire with the help of the Google Forms and collected the response from the customer about their opinion in their satisfaction level regarding banking services. I have used MS Excel and SPSS IBM Version 27 for analyzing the data with the help of the Independent T Test, One-way Anova and Chi square. Where the analysis and table charts have been shown below in figures. **Results and Discussion:** With the help of the Response collected from the customer we evaluated the satisfaction level of the customer with the help of MS Excel and SPSS tools where this analysis helped to identify the significant value in relationship between Maintenance of server and online and physical impulse buying behaviour with gender; p value is 0.002, Where these values have been analyzed with the help of the Independent T Test in the SPSS tools IBM Version 27. Chi square Test used to analyze how often you make an impulse purchase when shopping online the significant $p = 0.020$. And . **Conclusion:** Impulse buying behaviour differs notably between online and offline retail. Online purchases are driven by convenience, promotional triggers, and a wide product selection, appealing especially to younger consumers. In contrast, offline impulse buying is influenced by sensory experiences, immediate gratification, and social interactions, with variations observed in

product categories based on gender

Introduction

Scholars and marketers have been particularly interested in impulse purchase behaviour, especially as digital commerce has grown. The availability of a tactile shopping experience and the capacity to engage with objects all contribute to impulse buying. (Stern 1962). Furthermore, social interactions within the store environment, such as sales people influence and peer presence, play an important role in driving accidental purchases .Digital marketing methods, persona(Rana et al. 2019) lized recommendations, and easy checkout processes, on the other hand, encourage online impulse purchase. E-commerce companies use AI algorithms to study user behaviour and recommend relevant products, increasing the possibility of impulsive purchases(Wyckoff, Colecchia, and Organisation for Economic Co-operation and Development. Committee for Information, Computer, and Communications Policy 1999) Flash discounts, limited-time specials, and targeted ads all contribute to impulsive decision-making. Dawson & Kim (2009) Furthermore, the convenience of internet shopping, as well as the capacity to make purchases instantaneously without regard for geography, have a substantial impact on customer impulse buying behaviors Furthermore, trust and security concerns in online transactions can inhibit impulsive spending, but the perceived credibility of brick-and-mortar establishments can encourage spontaneous purchases.(Schupp and Wöhner 2020; Steenkamp and Sloot 2018)(Underhill 2009)(Mesiranta 2009)Despite these distinctions, both online and offline shopping environments use intentional tactics to encourage impulse purchases.. This study adds to the growing body of research on consumer behaviour, offering useful insights for firms, governments, and academics interested in the changing dynamics of retail consumption. (Rook and Fisher 1995)(PaulPeter and Olson 1996)**Keywords:** Impulse Buying Behaviour, Online Retail, Offline Retail, Digital Commerce, Sensory Stimulation , Promotional Triggers ,Digital Marketing, Personalized Recommendations, In-Store Promotions, Consumer Behaviour

Material And Method

This study uses a cross-sectional methodology to compare impulse buying behaviour in online

and offline retail contexts. The University of Saveetha College of Liberal Arts and Sciences oversaw the research. Participants were separated into two groups: Individuals in Group A had extensive internet buying experience, whereas those in Group B primarily purchased goods in physical stores. A systematic questionnaire was used to collect quantitative data on the factors impacting impulse buying behaviour in both situations. A total sample size of 100 participants was chosen using stratified random sampling to provide a representative mix across demographic groups. The questionnaire addressed issues such as promotional influence, ease of access, product presentation, time sensitivity, emotional triggers, and purchasing convenience. Descriptive statistics were utilized to summarize sample characteristics, while inferential statistics, including Independent T-tests and correlation analyses, were applied to explore relationships between variable.

A methodical methodology was used to prepare Group A members, ensuring a complete awareness of impulse buying behaviours in the online retail sector. Google Forms was the major data collecting platform, allowing for a structured questionnaire that addressed customer impulsiveness, digital marketing influence, and user experience.. The Google Forms link was distributed via email and mobile messaging applications, with individualized invites that explained the study's aims and emphasized voluntary participation. Reminder messages were delivered to improve response times and data accuracy. Privacy and anonymity were prioritized, and participants were given clear information about data security procedures. This sampling technique resulted in a strong dataset for investigating impulse purchase behaviour in online shopping

Group B focused on offline retail impulse buying behaviour. Participants were recruited from a variety of retail settings, including supermarkets, shopping malls, and standalone retailers. Prior to participation, participants provided informed consent. Structured questionnaires and semi-structured interviews were used to collect data, allowing for a more in-depth knowledge of in-store characteristics that influence impulse purchase, such as store ambiance, salesperson influence, and product placement. This study intends to provide value to the subject of consumer behaviour by evaluating purchase habits, external influences, and psychological triggers

Statistical Analysis

Three essential tools were used in the statistical analysis of this study to determine the association between customer preferences, examining the dynamics of online versus in-store shopping. The IBM SPSS Statistics program version 27 was used for the analysis. First, the relationship between categorical variables was evaluated using the chi-square test. Next, the independent t-test was employed to compare the means of the two groups, analysing variations in impulse buying frequency between individuals who shop online versus those who prefer brick-and-mortar stores. Finally, a one-way ANOVA was conducted to explore differences in impulse purchasing behaviour across different consumer segments, providing insights into how factors such as age, gender, or shopping habits influence impulsive spending patterns. With the aid of IBM SPSS, these statistical methods were used in an effort to provide a thorough and comprehensive analysis that would advance our understanding of the complex relationship that exists between customer preferences, examining the dynamics of online versus in-store shopping.

Results

Figure 1: This bar graph represents how often you make an impulse purchase when shopping online, based on mean age, including ± 2 standard deviations and a 95% confidence interval.

Figure 2: This bar graph illustrates how often do in-store promotional displays or limited-time offers trigger an impulse buy based on mean age, incorporating ± 2 standard deviations and a 95% confidence interval.

Table 1 presents the Chi-Square test results analysing the preference of gender regarding how often you make an impulse purchase when shopping online. The Pearson Chi-Square significant value is $p = 0.020$ (<0.05), indicating a statistically significant association. Table 2 provides the results of an Independent T-Test measuring how often in-store promotional displays or limited-time offers trigger an impulse buy. The test confirms that the assumption of equal variances is met, with a p-value of 0.002 (<0.005). The t-values for equal and non-equal variance assumptions are 0.840 and 0.356, respectively, with significance values of 0.403 and 0.755.

Discussion

The statistical analysis provided useful insights on the connection between gender preferences,



customer loyalty, and service quality in the retail industry. Table 1 employs the Chi-Square test to examine how gender influences the preference for additional charges in banking. The relationship between gender and these preferences is statistically significant, as indicated by the Pearson Chi-Square value of $p = 0.020$ (<0.05). This underscores the importance of incorporating gender-specific perspectives when assessing how banking procedures impact customer satisfaction. Turning to Table 2, the results of the Independent T-Test on trust in physical stores reveal key insights. The assumption of equal variances is confirmed, with a significant p-value of 0.002 (<0.005). The t-values for equal and non-equal variance assumptions are 0.840 and 0.356, respectively, with significance values of 0.403 and 0.755. The One-Way ANOVA results in Table 3 validate findings by demonstrating a statistically significant impact of service quality on customer recommendations. The significant p-value ($0.026 < 0.05$) suggests that customers who perceive high service quality are more likely to recommend the store or service provider

Limitation of the study

When comparing impulse purchase behaviour in online and offline retail settings, various factors may influence the comprehensiveness of the findings. The use of self-reported data poses potential biases, as participants may provide socially desired responses or falsely recollect their hasty purchases. Furthermore, the study's cross-sectional approach captures consumer behaviour at a single point in time, which limits its capacity to account for changing buying habits, seasonal trends, or external influences such as promotional campaigns and technology improvements. The sample's demographic composition, while diversified, may not fully represent all consumer groups, limiting the generalizability of the findings. Furthermore, the underlying psychological or cultural elements that drive impulse buying decisions may have been underexplored, allowing potential for future research to go deeper into these areas

Future Research

While this study gives useful insights into impulse purchase behaviour on both online and offline retail platforms, numerous areas require more exploration. Furthermore, investigating the impact of socio-demographic factors such as age, income, and geographical location on impulse buying inclination will provide a more comprehensive picture of consumer behaviour.. Further research



could also incorporate psychological and emotional components, such as the impact of trust, satisfaction, and loyalty, to provide a more comprehensive understanding of consumer impulsivity. Addressing these gaps would add to the greater scholarly conversation while also providing useful insights for merchants looking to improve both online and offline shopping experiences.

Tables And Figures

Table.1 Table displaying Chi Square for often do you make an impulse purchase when shopping online. Regarding Gender. help in determining whether two variables have a significant link; a significant result is shown when the Pearson chi square significant value is less than 0.001, or 0.000**.

	Pearson chi square	Likelihood ratio	Linear by linear association
Value	12.847a	15.458	0.920
df	12	12	1
Sig (2 tailed)	0.020	0.023	0.050



Table.2 displaying the results of an independent T test often do in-store promotional displays or limited-time offers trigger an impulse buy. This assumption of variances has been tested, and the resultant p value 0.002 of shows that the assumption of two variances being equal is met. (0.002*) <0.005. is the significant p-value

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	.002	
t	0.840	0.356
Sig. (2-tailed)	0.403	0.755



Mean Difference	0.429	0.429
Std. Error Difference	0.511	1.205

Simple Bar Mean of Age by How often do in-store promotional displays or limited-time offers trigger an impulse buy



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Conclusion

The comparison of impulse purchase behaviour in online and offline retail environments reveals distinct patterns impacted by ease, accessibility, and sensory engagement. The ease of access, targeted ads, and convenience of one-click transactions encourage online buyers to make impulse purchases. In contrast, offline customers are motivated by sensory cues, in-store promotions, and the instant satisfaction of physically purchasing things. This study emphasizes the importance for businesses to carefully incorporate convenience and experiential components into both digital and physical purchasing channels. Enhancing online platforms with tailored recommendations and seamless user experiences, as well as optimizing in-store surroundings with interactive displays and engaging design, can assist businesses in effectively catering to different customer needs



THE FUTURE OF SOCIAL MEDIA IN MARKETING WITH REFERENCE TO ELECTRONIC GOODS

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Abstract

Aim: The objective of the study is to examine how social media is changing the way that electronic goods are marketed, looking at present patterns, potential paths forward, and tactical ramifications for marketers looking to use social media platforms to their advantage and sway customer behavior in the sector. With an emphasis on the relationship between social media, marketing, and electronic goods, this goal gives the research piece a distinct direction. Additionally, it implies that the paper will examine social media marketing's present and future facets in this sector.

Keywords: Customer Satisfaction, social media marketing, electronic goods, digital marketing, online advertising, influencer marketing, content marketing, online consumer behavior.

Introduction:

This study aims to find out how Social media's ascent has completely changed how companies handle marketing, and the electronic products sector is no exception. The demand for electronic goods has increased dramatically due to the growing number of smartphones, laptops, and other electronic gadgets. Companies in the electronic goods industry are therefore under pressure to keep ahead of the competition and innovate. With platforms like Facebook, Instagram, Twitter, and LinkedIn providing a wide range of tools and features that allow businesses to connect with customers, share product information, and promote their



brand, social media has become a vital tool for electronic goods marketers looking to reach their target audience, increase brand awareness, and boost sales. Nonetheless, the social media scene is always changing as new platforms, trends, and technology appear regularly. (Rana et al. 2019)

Social media's introduction has completely changed how companies communicate with their clientele, advertise their goods, and establish their brands. Social media marketing has become a vital tool for businesses looking to keep ahead of the curve in the highly competitive and innovative electrical products sector. Social media platforms are becoming dynamic marketplaces where electronic goods firms can display their items, interact with consumers, and increase sales thanks to the growth of influencer marketing, e-commerce connections, and AI-powered advertising. It is imperative that marketers of electronic goods keep abreast of the most recent advancements and industry best practices in social media marketing as we look to the future (Vongtangton and Goebert 2025)

The future of social media in marketing will be examined in this conversation, with an emphasis on the electronic products sector. We'll look at the newest tactics, tools, and trends influencing social media marketing. It's obvious that social media will continue to have a significant influence on how electronic goods companies market their products in the future. Social media platforms will become even more immersive, interactive, and customized as new technologies like virtual reality (VR), augmented reality (AR), and the Internet of Things (IoT) proliferate. This begs crucial concerns about how electronic goods firms will use social media in the future to connect with their target markets, increase brand recognition, spur economic expansion, and offer advice and insights for marketers of electronic goods who want to stay on top of the game. (Raudaskoski et al. 2019).

Keywords: Customer Satisfaction, social media marketing, electronic goods, digital marketing, online advertising, influencer marketing, content marketing, online consumer behavior.

Materials And Methods

This study was conducted in the region Avadi which is a small part of Thiruvallur with a sample size of 164. The sample size was concluded with the help of

www.samplesizecalculatorforresearch.com. The study aims to find out how Social media's ascent has completely changed how companies handle marketing, and the electronic products sector is no exception. The demand for electronic goods has increased dramatically due to the growing number of smartphones, laptops, and other electronic gadgets. The questionnaire was circulated within the area of Avadi and samples were collected through convenient sampling. Google Forms was used to collect their answers to a series of online surveys, and IBM SPSS was used to conduct a thorough analysis of the answers. The survey was completed by 164 people of various ages, including workers and students

Statistics Analysis

We built a Google Forms survey specifically for this investigation. It's like answering questions on a survey or quiz. Their responses are then entered into a spreadsheet. This spreadsheet was used to arrange and analyze the data. We used techniques including cross-tabulation, pie charts, bar graphs, and percentages to improve our understanding of the data. Furthermore, we gathered some basic data about the respondents. This enables us to determine whether the viewpoints of various groups of people differ. We were careful to obtain a comprehensive and unambiguous picture of people's viewpoints by using Google Forms and these techniques.

Result :

Figure 1 Shows these differences graphically as a bar graph with a simple mean Monthly Income, ± 2 standard deviation, and a 95% confidence interval, demonstrating how Satisfied customers support facilities and services.

Figure 2 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age on the count for customer satisfaction on using Social media, along with a ± 2 standard deviation.

Figure 3 presents these differences graphically as a bar graph with a 95% confidence interval and the simple mean of age on count for customer satisfaction with staff and their services, along with a ± 2 standard deviation.



Discussion

The statistical analysis provided useful insights into the connection between gender preferences, Satisfaction to customers, and service quality in Social Media Marketing. Table 1 uses the Chi-Square test to explain how gender affects the preference for extra fees collected in Social Media in Marketing. Gender and preferences for additional charges have a significant relationship, as indicated by the substantial Pearson Chi-square value of $p = 0.001$ (<0.001). This result illustrates the significance it is to take into account gender-specific viewpoints when assessing how particular Social Media procedures affect client satisfaction. Turning now to Table 2, the gender-based results of the Independent T-Test measuring employee satisfaction are interesting. The data suggests a statistically significant difference in satisfaction levels between genders, as indicated by the t-value of -2.765 and the significant $p = (.532)$ (<0.05). This suggests that employee satisfaction in Social Media Marketing may be influenced by a person's gender. These kinds of information are essential for Social Media that want to customize their work environment and services to fit the unique needs and satisfaction levels of different customers. The analysis of these SPSS output values highlights the necessity of a gender-sensitive strategy in Social media marketing to improve employee and customer happiness, which will eventually help to build long-lasting customer loyalty. Our study's findings, supported by Table 3's One-Way ANOVA validation, show a strong correlation—with a p-value of 0.000 (<0.001)—between the Social Media marketing overall service quality and its customers' ability to recommend it to others. The results indicate that clients believe there is a direct correlation between their willingness to recommend Social Media and the level of services they receive. Since there is a significant correlation between these indicators, Social Media Marketing may want to consider improving overall service quality as a strategic method to increase customer satisfaction and loyalty.

Limitation of the study:

It is important to recognize the limitation of this study on the future of social media marketing for electronic items has significant drawbacks. First, the study's geographical focus is limited to a single region or country, which may not be indicative of the entire electronic goods sector. Furthermore, the study's period may not include long-term trends or changes in

social media marketing methods. The sample size of electronic goods businesses or customers polled may also be small, reducing the reliability and validity of the findings. Furthermore, the continually changing nature of social media platforms and their features may limit the study's capacity to capture current trends and methods. Finally, the absence of access to proprietary data from social media businesses or electronic goods makers may be.

Author Contributions

Author Madhan S was involved in data collection, data analysis, data extraction, and manuscript writing. Author Mr. Venkatesan Shanmugam was involved in the conceptualization, data validation, and critical review of the manuscript. Acknowledgment The authors would like to express their gratitude towards Saveetha College of Liberal Arts and Sciences, Saveetha Institute of Medical and Technical Sciences (Formerly known as Saveetha University) for providing the necessary infrastructure to carry out the research study.

Tables And Figures

TEST 1 Chi-Square

Table 1 Clarifies the results of the Chi-Square on the Preference of Gender in the Additional charges collected in Social Media in Marketing, with a Pearson Chi-square significant value of p is less than 0.001 (<0.001).

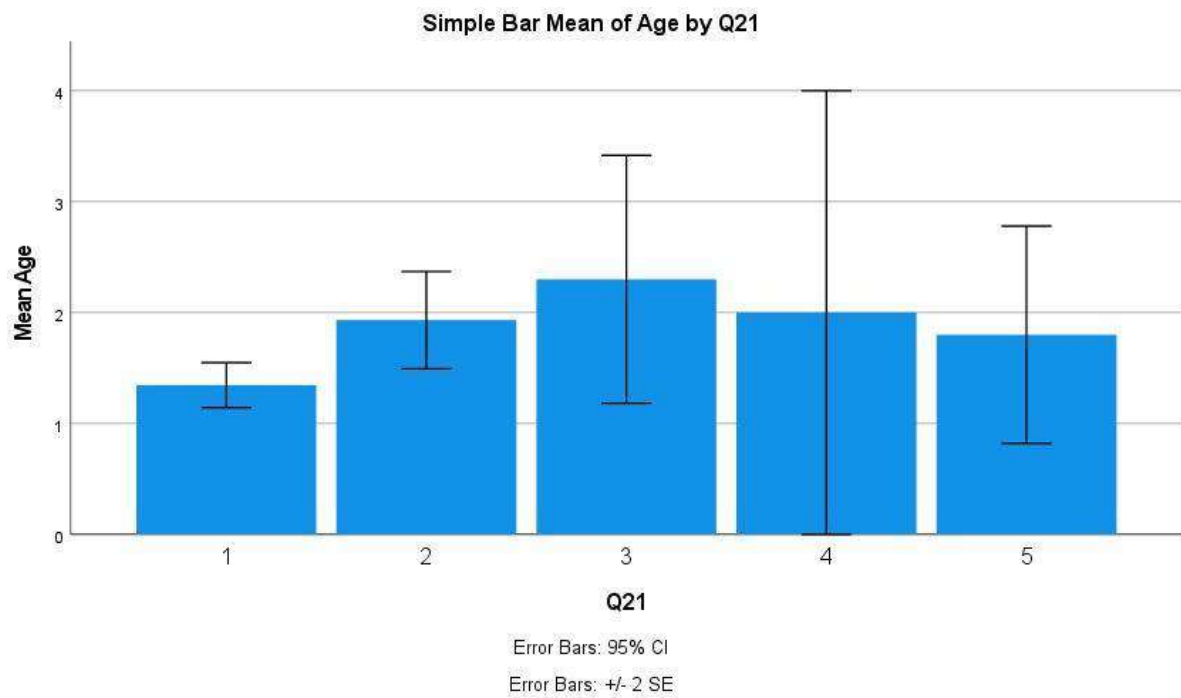
FIG 1.1

	Value	df	Asymptotic Significance (2- sided)



Pearson Chi-Square	22.587	3	<.001
Likelihood Ratio	19.637	3	<.001
Linear-by-Linear Association	19.032	1	<.001
N of Valid Cases	136		

FIG 1.2



TEST 2 One-Way ANOVA

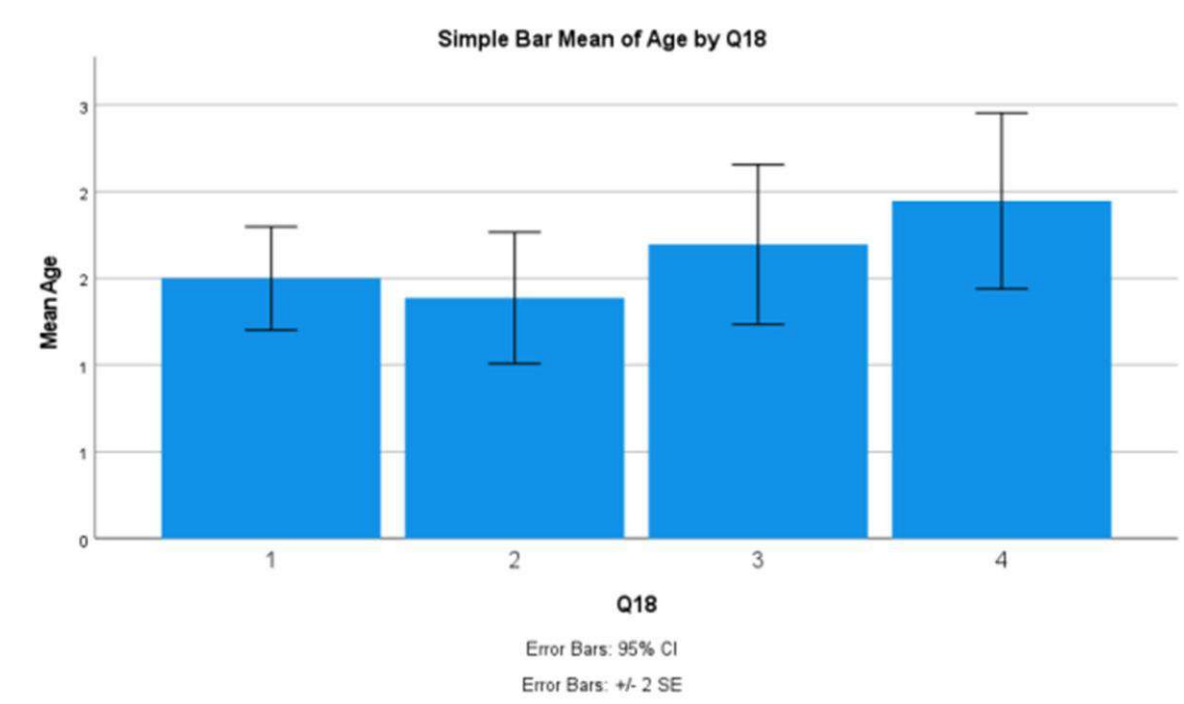
Table 3 One-way ANOVA shows how the variations in the group mean account for the variability in the dependent variable (Age). More variation across groups is indicated by a bigger value. $p = 0.000$ (< 0.001)

FIG 2.1

	Sum Squares	of df	Mean Square	F	Sig.
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Between Groups	10.012	3	3.337	2.340	0.76
Within Groups	192.535	135	1.426		
Total	202.547	138			

FIG 2.2

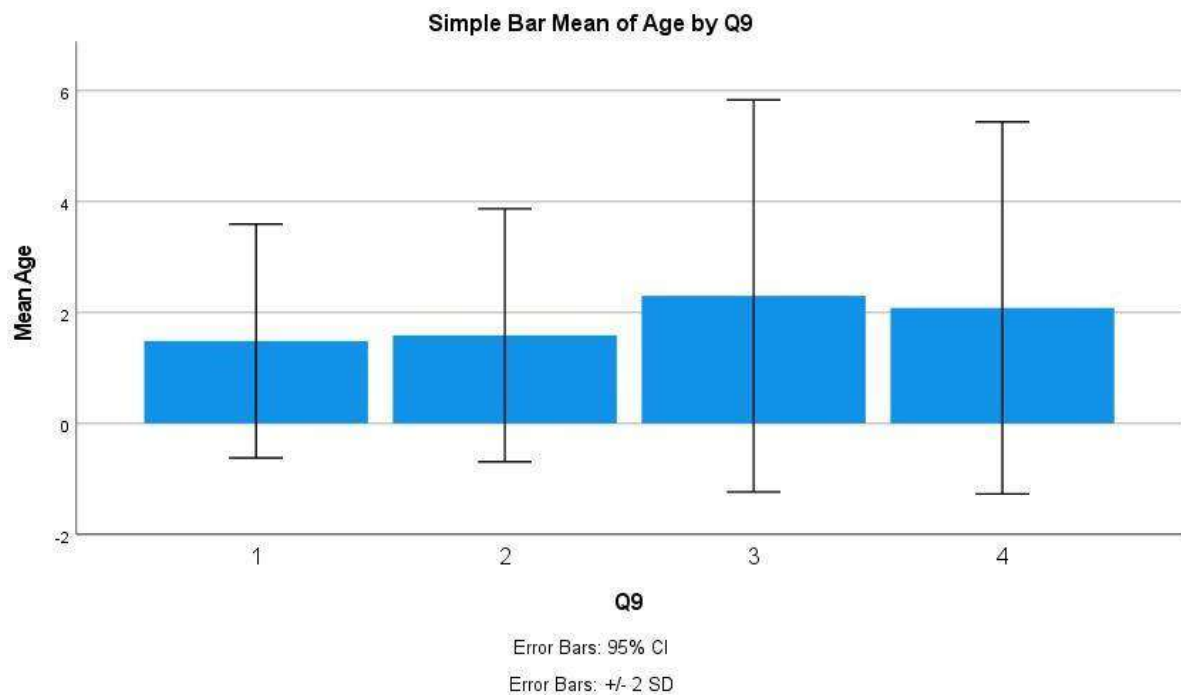
TEST 3 Independent Test

Table 2 provides more evidence for this by describing, using the Independent T-Test, the satisfaction of employees working with gender; the t value is -2.765, and the significant p= (.532) (<0.05).

**FIG 3.1****INDEPENDENT SAMPLE TEST:**

	F	Sig	t	df	Sig.2-tailed	Mean diff	Std.Error diff	lower	upper
Equal variances assumed	28.659	<.001	-2.765	120	.007	-.586	.213	-.1006	-.165
Equal variances not assumed			-2.427	61.785	.018	-.586	.241	-.1068	-.103

FIG 3.2



Conclusion

In our study, we analyzed data using IBM SPSS software. In every test that was conducted, we consistently discovered significant values below our predetermined cutoff point of 0.005. The findings of the study highlight the significance of social commerce, influencer marketing, and personalized content in boosting sales of electronic items. Furthermore, the combination of augmented reality, artificial intelligence, and the Internet of Things will completely transform social media marketing and present marketers with previously unheard-of chances to engage with customers.

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ROLE OF ARTIFICIAL INTELLIGENCE AND AUTOMATION IN CLOUD ACCOUNTING IN SELECTED LOGISTICS COMPANIES IN CHENNAI DISTRICT

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Abstract

Management in the logistics industry has undergone a substantial transformation thanks to the integration of automation and artificial intelligence (AI) in cloud accounting. This study examines how AI-driven cloud accounting solutions affect operational effectiveness, financial accuracy, and decision-making in a subset of logistics firms in the Chennai area. The study looks at how AI-powered solutions, like predictive analytics, machine learning algorithms, and robotic process automation (RPA), simplify accounting duties like financial reporting, fraud detection, tax compliance, and invoice processing. Furthermore, real-time access to financial data is provided by cloud-based technologies, which enhance teamwork and lower human error.

Introduction

Technology breakthroughs have significantly changed the accounting landscape in recent years, especially with the incorporation of automation and artificial intelligence (AI)(Kanimozhi Suguna et al. 2021) in cloud accounting platforms. Using online accounting software that stores data on distant servers and makes it accessible from any location with an internet connection is known as cloud accounting. Cloud accounting becomes more precise, efficient, and flexible to meet the evolving needs of businesses when paired with AI and automation(The impact of automation on cost opti...) technology. Large volumes of financial

data may be processed very quickly by AI-powered cloud accounting systems, which can also spot patterns, identify abnormalities, and even forecast future trends. Businesses can save a significant amount of time and money by switching from manual to intelligent automation, which also improves operational efficiency and lowers errors. In order to optimize their financial operations, businesses of all sizes—from startups to multinational corporations—are increasingly implementing AI-driven cloud accounting solutions.

Artificial intelligence plays a more complex role in cloud accounting(The impact of automation on cost opti...; Aiton and Russell 2013) than just automation. By learning from past data, AI algorithms may continuously increase their accuracy in jobs like bank reconciliation, expense classification, and invoice processing. Accountants may concentrate on more strategic duties like financial analysis and decision-making by using these tools, which can automatically match transactions, identify anomalous activity, and even recommend corrective actions. AI-powered automation solutions can monitor cash flow, produce real-time financial reporting, and guarantee regulatory compliance with little assistance from humans. Cloud accounting software(The impact of automation on cost opti...; Aiton and Russell 2013; Salih et al. 2021) can also forecast finances intelligently, suggest budgeting techniques, and anticipate cash flow problems by integrating machine learning algorithms. By enabling companies to make data-driven decisions, these proactive insights enhance their overall financial well-being. Traditional accounting procedures are being quickly redefined as more proactive and data-centric due to the combination of AI, automation, and cloud technologies.

The improvement of accuracy and transparency in financial reporting is one of the biggest advantages of AI and automation in cloud accounting. Human error was a common problem with traditional accounting systems,(Morris 2001) particularly when data entry or reconciliation procedures were involved. AI-powered automation(Lehner and Knoll 2022), on the other hand, ensures uniform correctness across all financial records by precisely handling these tedious and error-prone processes. Additionally, real-time data processing enables companies to see their financial performance instantly, facilitating prompt and well- informed decision-making. With AI's ongoing development, its uses in cloud accounting are growing to encompass more complex tasks including tax optimization, fraud detection, and predictive analytics. In addition to changing how companies handle their finances, these

advances are assisting them in remaining flexible and competitive in a market that is becoming more and more dynamic. Essentially, cloud accounting has evolved straightforward bookkeeping tool to a potent financial intelligence platform that can propel long-term success and strategic growth thanks to automation and artificial intelligence.

Keywords *Artificial Intelligence (AI), Automation, Cloud Accounting, Logistics Companies, Digital Transformation, Accounting Software, Cloud ERP Systems, Cyber security in Accounting*

Materials And Methods

This study collects and analyzes data to identify the elements that give companies utilizing cloud-based accounting systems confidence in the accuracy of their financial data and the lower operating expenses brought about by the combination of automation and artificial intelligence (AI). We conducted a study of cloud accounting software users in Chennai to get quantifiable data on accuracy, cost reduction, and user perceptions. In order to investigate contextual and experience-based aspects influencing the uptake and perceived efficacy of AI and automation, we additionally employed qualitative insights from finance professionals, accountants, and technology specialists employed by these organizations. Their responses to a series of online surveys were gathered using Google Forms, and the responses were thoroughly analyzed using IBM SPSS. We divided the population into two groups as mentioned below

Group 01: 52 Sample size

Group 02: 52 Sample size

FIRST USER GROUP: Those that primarily rely on AI-powered automated financial processes in their cloud accounting systems make up the first user group, referred to as AI-enabled cloud accounting users. A wide range of people from different professions, including accountants, financial managers, auditors, and business owners, usually use these systems in their organizations. Each of these professionals uses certain AI and automation features to meet their own operational needs.

SECOND USER GROUP : The second category, on the other hand, is made up of manual accounting users who either utilize conventional, non-cloud accounting software or keep financial records using traditional methods with little to no incorporation of AI-powered automation tools.

Our study aims to shed light on how companies view automation and artificial intelligence's contribution to increased accuracy and lower expenses in Chennai's cloud accounting systems. Future research can examine a wider geographic region and a wider range of industry sectors. This study primarily looks at how students, finance managers, and accounting professionals in Chennai District feel about the accuracy and financial advantages of automation and artificial intelligence in cloud accounting systems. 104 respondents—including people with a range of professional backgrounds and degrees of experience in technology, finance, and accounting—completed the poll.

Statistical Analysis Tools

We built a Google Forms survey specifically for this investigation. It's like answering questions on a survey or quiz. Their responses are then entered into a spreadsheet. This spreadsheet was used to arrange and analyze the data. To improve our understanding of the data, we used techniques including cross-tabulation, pie charts, bar graphs, and percentages. Furthermore, we gathered some basic data on the respondents. This enables us to determine whether the viewpoints of various groups of people differ. We were careful to obtain a comprehensive and unambiguous picture of people's viewpoints by using Google Forms and these techniques. We built a Google Forms survey specifically for this investigation. It's like answering questions on a survey or quiz. Their responses are then entered into a spreadsheet. This spreadsheet was used to arrange and analyze the data. To improve our understanding of the data, we used techniques including cross-tabulation, pie charts, bar graphs, and percentages. Furthermore, we gathered some basic data on the respondents. This enables us to determine whether the viewpoints of various groups of people differ. We were careful to obtain a comprehensive and unambiguous picture of people's viewpoints by using Google Forms and these techniques.

Result

TABLE 1.1: The findings of chi-square tests examining the relationship between two categorical variables are shown in this table. With a value of 29.981 and 12 degrees of freedom, the Pearson Chi-Square test produces a p-value of 0.003, which suggests a statistically significant correlation. The substantial correlation is further supported by the Likelihood Ratio test, which yields a p-value of 0.002 with a value of 31.756 and 12 degrees of freedom.. These findings clearly imply that the two category variables under investigation have a statistically significant association, with 104 valid cases.

FIG 1.2: The bar graph depicts the mean responses regarding the statement "cloud accounting improves efficiency in financial management," using a scale from 0 (Strongly agree) to 4 (Strongly disagree). The graph also includes error bars representing both 95% confidence intervals and +/- 1 standard deviation. The data shows a distinct trend: the mean response rises as the degree of agreement falls (from highly agree to strongly disagree).

TABLE 2.1: The results of an Analysis of Variance (ANOVA) test, which determines if the means of three or more groups differ statistically significantly, are shown in this table. The ANOVA produces an F-statistic of 6.079 with a mean square of 5.360, two degrees of freedom, and a between-groups sum of squares of 16.081. Indicating a statistically significant difference between the means of the groups under comparison, this translates to a p-value of..001. To put it another way, it seems improbable that the observed variations in the group means were the result of pure chance.

TABLE 3.1: Age and agreement with the statement "cloud accounting improves efficiency in financial management" are correlated in this table (represented by the variable "@4_A"). At the 0.01 level (1-tailed), the Pearson correlation coefficient of 0.245 is statistically significant. This suggests that age and agreement with the statement have a weakly positive relationship.

This

means that there is a minor tendency for agreement with the statement to rise with age. It's crucial to remember that the link is weak, which means that age only partially accounts for the diversity in agreement with the statement. People's perceptions of the effectiveness of cloud accounting in financial management are probably influenced by other aspects more significantly.

Discussion

FIG 1.1: Age and agreement with the statement "cloud accounting improves efficiency in financial management" are correlated in this table (represented by the variable "@4_A"). At the 0.01 level (1-tailed), the Pearson correlation coefficient of 0.245 is statistically significant. This suggests that age and agreement with the statement have a weakly positive relationship. This means that there is a minor tendency for agreement with the statement to rise with age. People's perceptions of the effectiveness of cloud accounting in financial management are probably influenced by other aspects more significantly.

FIG 2.1: We conducted a study on the deployment of automated financial accounting systems. The ANOVA test produced a significant result with a p-value of 0.01: This table displays the findings of an Analysis of Variance (ANOVA) test, which establishes if there is a statistically significant difference between the means of three or more groups. With a mean square of 5.360, the ANOVA yields an F-statistic of 6.079.

FIG 3.1: Lastly, we explicitly employed a correlation to examine the importance of the primary concerns raised by Chennai logistics companies about the deployment of automation and artificial intelligence in cloud accounting in Chennai logistics companies. A statistically significant p-value of 0.245 was obtained from the test. This implies that there is a weakly positive correlation between age and agreement with the statement. This indicates that there is a slight trend for the statement's level of agreement to increase with age.

Authors Contributions

Author Pranav was the one associated with the collection of data, data analysis, and manuscript writing.

Author Venkatesan was involved in the conceptualization, data validation, and critical review of the manuscript.

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2. Saveetha Institute of Medical and Technical Sciences.
3. Saveetha University

TABLES AND FIGURES:

FIG1.1 (CHI-SQUARE TEST)

Chi-Square Tests

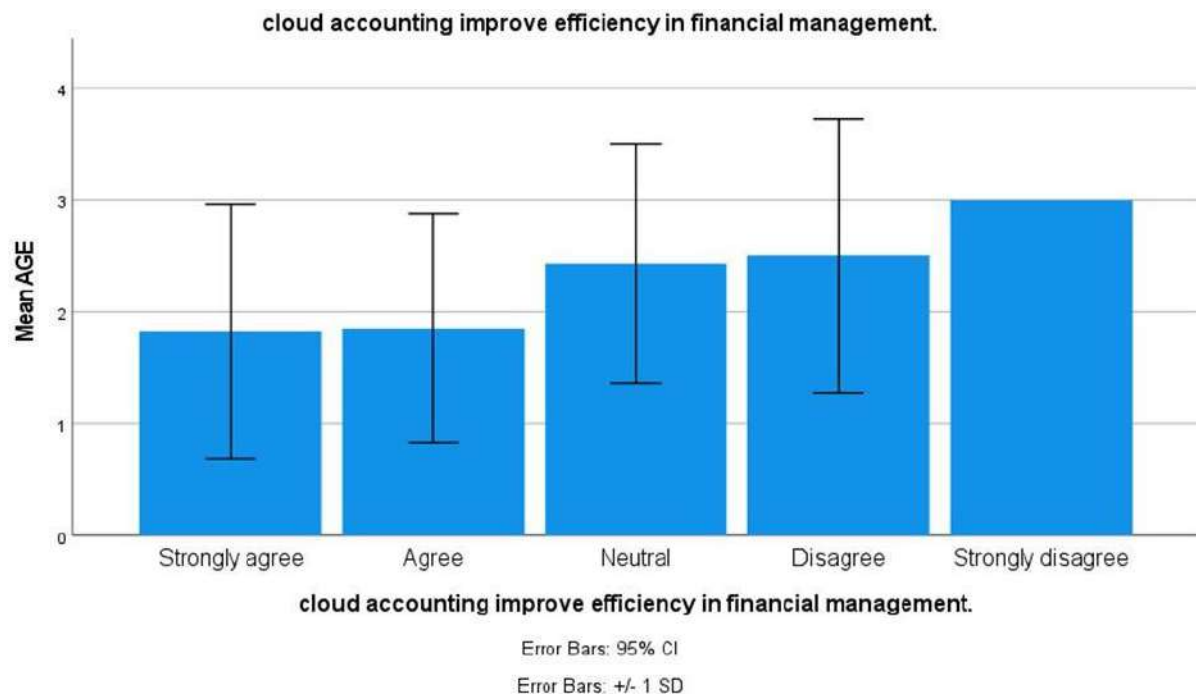
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.891 ^a	12	.003
Likelihood Ratio	31.756	12	.002
Linear-by-Linear Association	11.188	1	.001
N of Valid Cases	103		

a. 12 cells (60.0%) have an expected count of less than 5.
 The minimum expected count is .14.

FIG 1.2



:



TEST 2 : ANOVA

ANOVA

@3_A

	Sum Squares	of df	Mean Square	F	Sig.
Between Groups	16.081	3	5.360	6.079	.001
Within Groups	87.298	99	.882		
Total	103.379	102			

TABLE 03 :

Correlations



		AGE	@4_A
AGE	Pearson Correlation	1	.245**
	Sig. (1-tailed)		.006
	N	103	103
cloud accounting improve efficiency in financial management.	Pearson Correlation	.245**	1
	Sig. (1-tailed)	.006	
	N	103	103

** . Correlation is significant at the 0.01 level (1-tailed).

Conclusion

The study emphasizes how automation and artificial intelligence (AI) are becoming increasingly important in changing cloud accounting procedures in a few logistics firms in the Chennai district. While automation simplifies standard accounting operations like invoice processing, expense management, and reconciliation, AI-powered solutions improve accuracy, efficiency, and real-time financial reporting. In addition to lowering human error, the use of these technologies facilitates quicker decision-making and increased compliance. Automation and artificial intelligence (AI) integration will be essential to improving financial transparency and operational effectiveness in the logistics industry as technology develops further.

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A COMPARATIVE ANALYSIS OF ADVERTISING STRATEGIES IN EMERGING MARKETS: CONSUMER ENGAGEMENT, TRUST, AND EFFECTIVENESS

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Abstract:

AIM: By analyzing customer trust, engagement, and purchase patterns, this study aims to evaluate the efficacy of traditional and digital advertising strategies in emerging economies. This study intends to close the research gap by examining customer preferences in light of contemporary digital marketing trends and technology breakthroughs, even if previous research has examined advertising methods. **Material And Methods:** This study analyzed Web of Science and Google Scholar literature and gathered primary data from 100 participants split into conventional (TV, radio, print, billboards) and digital (social media, search engines, apps) advertising groups using a self-made Google Forms questionnaire. Tables, charts, and graphs were used to visualize the data, which was analyzed using MS Excel and SPSS IBM Version 27 using the Independent T-Test, One-Way ANOVA, and Chi- Square test. **Results and Discussion:** With an Independent T-Test p-value of 0.051 (<0.05), the research showed a substantial correlation between advertising forms and consumer purchase decisions, suggesting that ads have a major influence on consumer behavior. The One-Way ANOVA findings showed that, with an F-value of 0.704 and a p-value of 0.051 (<0.05), storytelling-based ads generate more engagement than simple promotional content. While conventional advertising is still essential for establishing trust, particularly with groups



who have less digital adoption, the results indicate that digital advertising, with its interactive features and personalized targeting, improves consumer engagement. In order to optimize efficacy in emerging countries, the study also emphasizes the significance of a hybrid advertising strategy that combines traditional and digital tactics. **Conclusion:** According to the report, younger consumers like digital advertising since it is more interactive, but conventional advertising is still essential for building a brand reputation. To increase trust and engagement, businesses should take a balanced approach. Future studies should look at cross- platform tactics, data protection, and AI-driven marketing to improve campaign efficacy.

Introduction

A comparative assessment of advertising tactics in emerging economies necessitates a systematic examination of the factors influencing consumer involvement, trust, and efficacy in both conventional and modern advertising strategies (Management Association and Information Resources 2018).. Because the results promote consumer-centric marketing strategies and innovation, they add to the continuing conversations about the role of technology in advertising. (Taşkın and Öncel 2015) A competitive and customer-focused market environment is facilitated by the practical consequences of this research, which include the creation of creative promotional campaigns, targeted marketing tactics, and improved brand communication. Digital advancements provide problems for the advertising sector, and companies need to properly manage these shifts. The methods used to assess the impact of digital advertising have an impact on its efficacy, which emphasizes the necessity of modern analytics and flexible marketing strategies. (Tellis 2003) More than 19,800 relevant research publications were located on Google Scholar between 2020 and 2024, while more than 150 studies were discovered on the Web of Science. Research shows that interactive content, tailored ads, and AI-powered tactics greatly increase customer loyalty and engagement. (Anderson 2024). Traditional techniques are still essential for addressing particular populations, even if digital advertising is now the most common. (Ryan and Jones 2012) For businesses to maximize the efficiency of their advertising, they must be aware of the advantages and disadvantages of both techniques gaps are identified by research, such as the long-term effects of digital transformation, demographic and cultural impacts, and how consumers see online advertising. (OECD 2019) Businesses may adjust their strategy to suit evolving customer expectations by regularly evaluating the success of their advertising. AI,



social media, and influencer marketing have revolutionized engagement strategies, opening up new avenues but simultaneously posing privacy and ethical questions. Consumer preferences for ad formats differ according to emotional appeal, believability, and accessibility, which affects the success of marketing as a whole. Traditional approaches preserve authenticity and dependability, even as digital advertising leads in reach and customization. The goal of this research is to give marketers, companies, and legislators useful information that will help them better advertising tactics, build customer confidence, and increase involvement in the changing marketplace.

Keywords:

Consumer engagement, advertising strategies, digital and traditional advertising, emerging markets, consumer trust, marketing efficacy, and ad storytelling.

Material And Methods

I gathered customer feedback via Google Forms and used SPSS and Excel to analyze it in order to assess this study on advertising tactics in emerging regions. Tables, charts, and graphs were used to organize the data for improved visualization. With an emphasis on customer views, trust, and engagement with conventional and digital advertising, a total of 100 responses were collected. Two groups of replies were created from the collected data: those who were exposed to conventional advertising and those who were exposed to digital ads. Key patterns and insights were found by using SPSS tools once the data had been labeled and converted into Excel. This approach, which highlights customer preferences and trust levels, aids in evaluating the efficacy of various advertising methods. Businesses may enhance their advertising strategies and boost engagement in emerging areas by using the study's insightful recommendations.

To guarantee a broad sample, this study focuses on choosing people who are largely exposed to traditional advertising strategies, taking into account variables like age, income, and region. Customers who used radio, TV, newspapers, and billboards provided information to gauge their involvement, advertising preferences, and degree of confidence. Frequency of exposure, efficacy in influencing decisions to buy, and brand trust were important factors. In order to compare these insights with consumers of digital advertising and find variations in consumer

behavior and perception, the information was meticulously formatted. Responses were examined to assess the effects of digital and conventional advertising methods on engagement and trust. Businesses might improve their advertising strategies in emerging areas by using the study's insightful findings.

Statistics Analysis

Customer involvement, trust, and the efficacy of traditional and digital advertising tactics were examined using SPSS IBM Version 27. In order to determine the correlations between various customer groups, three statistical methods were used: the Independent T-test, One- Way ANOVA, and Chi-Square. To assess the efficacy of conventional and digital advertising, the study contrasted consumer trust and engagement levels. It investigated if digital advertisements are more reliable, interesting, and economical than conventional techniques. The study also examined how consumers saw digital advertisements' personalization, effect on purchase choices, and believability in comparison to conventional advertisements' familiarity and dependability. The results shed light on how to best use advertising tactics in developing economies.

Results And Discussion:

Table 1: The Independent T-Test results indicate a significant influence of advertisements in emerging markets on purchasing decisions, with a p-value of 0.051 (<0.05). The t-value of 1.916 suggests a notable difference in consumer responses, emphasizing the impact of advertising on buying behavior.

Table2:

The results of the One-Way ANOVA indicate that advertisements with compelling storytelling are significantly more engaging than straightforward promotional content. The F- value of 0.704 and a p-value of 0.051 (<0.05) confirm that storytelling plays a crucial role in capturing audience attention and enhancing engagement.

Fig 1: This simple bar graph illustrates the influence of advertisements in emerging markets on purchasing decisions, categorized by mean Age, 95% confidence interval, and standard deviation ± 2 .

Fig 2: This simple bar graph illustrates consumer engagement levels with advertisements that tell a compelling story compared to straightforward promotional content. The graph represents mean engagement scores across different age groups, with ± 2 standard deviation and a 95% confidence interval.

Limitation of the study

In evaluating the efficacy, customer involvement, and trust of traditional versus digital advertising methods in emerging nations, this study admits a number of shortcomings. The results might be impacted by participant demographics and sample size, which could not accurately reflect the wide range of consumers. Applicability may be further limited by geographic restrictions, as cultural and economic disparities affect how effective advertising is in different places. The study may not be able to fully capture long-term changes in consumer behavior due to time limits, particularly given how quickly digital marketing is developing. Ad effectiveness may be impacted by external variables such as market movements or economic situations, and self-reporting biases may alter the accuracy of replies. The study could also not have taken into consideration customers who interact with both digital and conventional advertisements, which makes it difficult to determine which strategy is more effective. The study offers insightful information about how to best optimize advertising tactics in developing areas, despite these drawbacks.

Future Research :

Future studies on advertising tactics in developing nations should compare the efficacy, customer engagement, and trust of digital and conventional advertising. Examining how cutting-edge technologies like blockchain-based ad verification, AI-driven marketing, and biometric-based personalization are used might reveal how consumer behavior is changing. Studies should examine the differences in trust between digital and conventional advertising approaches as worries about data privacy and cybersecurity increase. Furthermore, evaluating how user experience design, preferred ad formats, and cultural factors affect engagement may aid in improving advertising tactics. Additionally, studies should evaluate how regulatory

frameworks influence advertising techniques and how they affect customer trust. More research into the elements that affect long-term brand loyalty, the efficacy of cross-platform advertising, and ethical issues in digital marketing will advance our knowledge of this ever-evolving industry. In emerging economies, these insights can assist companies, legislators, and marketers in creating more successful, customer-focused advertising campaigns.

Tables And Figures

Table1: Independent T-Test results indicate a significant influence of advertisements in emerging markets on purchasing decisions, with a p-value of 0.051 (<0.05). The t-value of 1.916 suggests a notable difference in consumer responses, emphasizing the impact of advertising on buying behavior.

	Equal variance assumed	Equal variance not assumed
Sig	0.051	
t	1.916	1.911
Sig (2 tailed)	0.057	0.058
Mean difference	0.399	0.399
Std error difference	0.208	0.209

Table2: The results of

the One-Way ANOVA indicate that advertisements with compelling storytelling are significantly more engaging than straightforward promotional content. The F-value of 0.704 and a p-value of 0.051 (<0.05) confirm that storytelling plays a crucial role in capturing audience attention and enhancing engagement.

	ANOVA	
	Between Groups	Within Groups
Mean Square	1.108	1.573
F	0.704	
Sig.	0.051	

FIG 1:

This simple bar graph illustrates the influence of advertisements in emerging markets on purchasing decisions, categorized by mean Age, 95% confidence interval, and standard deviation ± 2 .

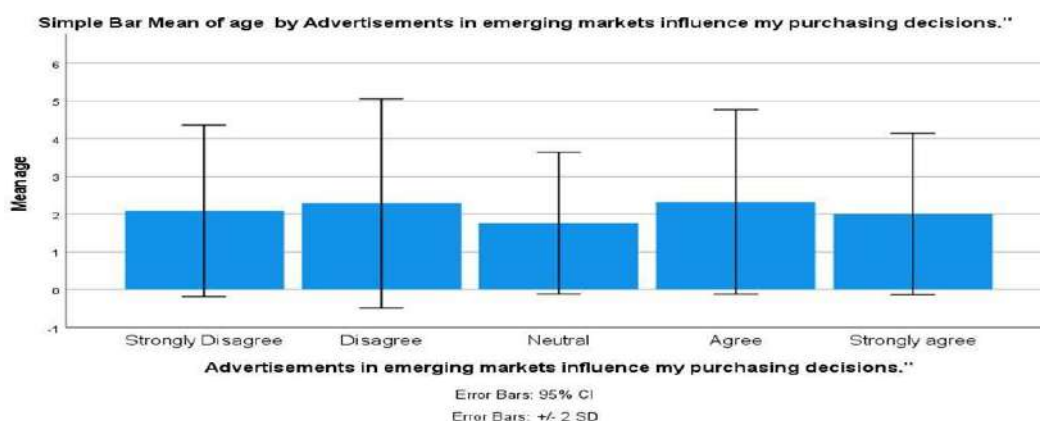
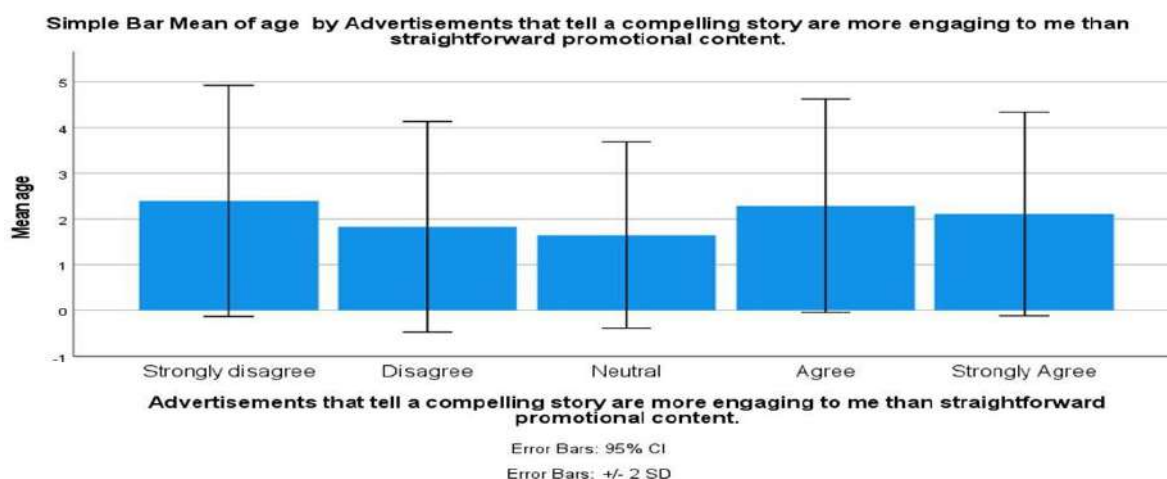


Fig.2

This simple bar

graph illustrates consumer engagement levels with advertisements that tell a compelling story compared to straightforward promotional content. The graph represents mean engagement scores across different age groups, with ± 2 standard deviation and a 95% confidence interval.



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Conclusion

In conclusion, the change from offline to online interaction is highlighted by the use of digital advertising, which emphasizes efficiency, accessibility, and customized customer experiences. The younger age favors digital advertising because it is more effective and appealing owing to its focused approach, ease, and interaction. However, for customers who have faith in recognizable media like TV, newspapers, and billboards, conventional advertising is still relevant. Personalized suggestions and rapid access are provided by digital advertisements, but some customers are wary due to worries about data privacy and ad fraud. The degree of customer engagement, trust, and preference all influence how effective advertising methods are. Digital advertising is becoming more popular because of its versatility and reach. However conventional advertising is still useful, particularly in regions where the adoption of digital technology is slower. Businesses may optimize customer engagement and trust in emerging countries by striking a balance between the two strategies.



A COMPARATIVE ANALYSIS OF AI - DRIVEN TRAINING AND MONITORING VS. TRADITIONAL METHODS IN EMPLOYEE LEARNING AND PRODUCTIVITY MEASUREMENT

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Abstract:

Aim: This study aims to evaluate the effectiveness of AI-driven training and monitoring systems compared to traditional employee training and productivity measurement methods in corporate and organizational settings. Specifically, it seeks to analyze how AI-driven approaches impact learning outcomes, skill retention, engagement levels, and overall workplace productivity. Additionally, the study will assess whether AI-based monitoring provides more accurate, real-time, and personalized insights into employee performance compared to conventional evaluation techniques. The findings will contribute to understanding the potential advantages and limitations of AI-driven solutions in optimizing workforce development and productivity measurement.

Materials and Methods: This study conducts a comparative analysis of AI-driven training and monitoring versus traditional employee learning and productivity measurement methods. Participants from various corporate sectors, including IT, finance, healthcare, and manufacturing, will be divided into two groups: one using AI-powered training and monitoring tools, and the other following traditional instructor-led training and conventional evaluation techniques. The AI-driven group will utilize advanced Learning Management Systems (LMS) such as Courseware for Business and Linked-in Learning, offering adaptive learning and real-time feedback. AI-powered monitoring tools, including workplace analytic and biometric feedback, will assess engagement and performance. The traditional group will rely on instructor-

led sessions, printed materials, and standardized performance reviews. A quasi-experimental design will be employed, beginning with a pre-training assessment to establish baseline knowledge and productivity levels. During training, the AI-driven group will receive adaptive recommendations, while the traditional group follows fixed schedules. A post-training assessment will evaluate skill retention and productivity improvements, with a long-term follow-up over three to six months to measure sustained impact. Data will be analyzed through quantitative methods (t-tests, ANOVA) to compare performance indicators like task completion time, accuracy, and engagement. Qualitative analysis will include employee surveys and interviews to assess experiences and perceived effectiveness. This approach will determine whether AI-driven methods provide a significant advantage over traditional training and productivity evaluation techniques.

Conclusion: This study aims to determine the effectiveness of AI-driven training and monitoring compared to traditional methods in employee learning and productivity measurement. By analyzing both quantitative performance metrics and qualitative employee feedback, the research will provide insights into how AI-powered approaches influence knowledge retention, engagement, and workplace efficiency. If AI-driven training proves superior, it could support the adoption of more personalized and data-driven learning strategies in corporate settings. Conversely, if traditional methods remain equally effective, organizations may consider hybrid approaches that balance AI's adaptability with the structured guidance of conventional training. Ultimately, this study will contribute to a better understanding of AI's role in optimizing workforce development and performance evaluation.

Keywords: *AI-driven training, employee productivity, learning management systems, workplace monitoring, traditional training methods, skill retention, performance evaluation, adaptive learning, corporate training, productivity measurement, workforce development, AI-based monitoring, employee engagement, quantitative analysis, training effectiveness.*

Introduction:

Artificial Intelligence (AI) has become a transformative force in numerous industries, including corporate training and workforce development. AI-driven training utilizes machine learning algorithms, adaptive learning platforms, and real-time feedback mechanisms to personalize and

optimize employee learning experiences. Unlike traditional training methods, which rely on static course materials, instructor-led sessions, and periodic assessments, AI-based training dynamically adjusts content based on an employee's progress, engagement level, and performance metrics. Similarly, AI-powered monitoring systems analyze real-time workplace behavior, track performance trends, and provide actionable insights, allowing organizations to enhance employee productivity, optimize resource allocation, and identify skill gaps more effectively. The importance of AI-driven training and monitoring extends beyond mere convenience; it addresses critical challenges in corporate learning, such as low retention rates, lack of engagement, and inefficient training processes. Organizations leveraging AI-based systems can offer employees tailored learning experiences that accommodate different learning speeds and styles, thereby improving knowledge retention and skill development. Additionally, AI-driven productivity monitoring ensures real-time evaluation of employees' efficiency, helping companies make data-driven decisions to enhance workforce performance. In contrast, traditional training and monitoring methods often struggle with scalability, adaptability, and precision, as they rely on human evaluation, which can be subjective and inconsistent. Given the increasing complexity of workplace demands and the rapid evolution of job roles due to automation and digitization, AI-based approaches provide a compelling alternative to traditional employee training and productivity measurement methods.

Over the past five years, AI-driven training and monitoring have been widely studied, with a growing number of academic and industry publications analyzing their impact on employee learning and productivity measurement. A search in major research databases reveals that AI-related training methodologies have gained significant attention due to their ability to enhance efficiency and effectiveness in workforce development. Several influential articles and studies have shaped the discourse around AI-powered training and monitoring. For instance, a widely cited article titled "Employers Look to AI Tools to Plug Skills Gaps and Retain Staff" discusses how major corporations like Johnson & Johnson and DHL are implementing AI-driven systems to assess employee competencies, predict skill development needs, and streamline internal hiring processes ([Financial Times](#)). Another landmark study, "AI Will Reshape the Global Labor Force. Employers Must Help Their Workers Keep Up," examines how AI is revolutionizing the

workforce, predicting that businesses will need to invest significantly in reskill and deskilling initiatives to maintain a competitive edge ([Business Insider](#)). A systematic review of AI-driven learning methodologies has also been conducted in studies like "The Role of Artificial Intelligence in Personalized Learning and Workforce Training," which highlights how AI- powered learning platforms improve engagement and long-term knowledge retention. Additionally, research by PVC and McKinsey suggests that organizations adopting AI-driven training models experience a measurable increase in productivity, skill adaptability, and employee satisfaction compared to those relying on traditional methods. These studies collectively underscore the growing role of AI in modernizing workforce training, yet they also point to a lack of direct comparative analyses between AI-driven and conventional training approaches.

Despite the expanding body of literature on AI-driven training and monitoring, significant research gaps remain. Most studies focus on the advantages of AI in isolation rather than comparing its effectiveness directly with traditional training and monitoring methods. While research has explored AI's ability to personalize learning and provide real-time performance insights, there is limited empirical evidence that evaluates how AI-driven methods perform against established conventional techniques in a controlled corporate environment. Furthermore, the long-term impact of AI-based training on skill retention and workplace efficiency has yet to be comprehensively studied. Additionally, many existing studies lack large-scale, real-world applications involving diverse corporate sectors, making it difficult to generalize findings across different industries. There is also a need for more research on employee perceptions of AI-driven training, as workforce acceptance and engagement play a crucial role in determining its success. This study aims to bridge these research gaps by conducting a comparative analysis of AI-driven training and monitoring versus traditional employee training and productivity measurement methods in corporate and organizational settings. The research will evaluate key outcomes, including learning effectiveness, knowledge retention, engagement levels, and productivity measurement accuracy. By analyzing both quantitative performance data (e.g., task completion rates, accuracy, and efficiency) and qualitative employee feedback (e.g., engagement, satisfaction, and perceived effectiveness), this study will provide valuable insights into the

strengths and limitations of AI-driven training. The findings will help organizations make informed decisions on integrating AI into their workforce development strategies and contribute to the broader discourse on optimizing employee learning and performance evaluation in the age of artificial intelligence.

Materials And Methods:

This study is conducted in corporate organizations spanning multiple industries, including IT, finance, healthcare, and manufacturing. These sectors were selected due to their heavy reliance on employee training programs and the increasing integration of AI-driven tools in workforce development. The research does not involve any direct human intervention beyond standard workplace training and performance evaluation procedures, and therefore, no ethical approval is required. The study participants include employees undergoing training and HR professionals responsible for workforce development, ensuring a well-rounded evaluation of both the training methods and their effectiveness in measuring productivity. The participants are divided into two groups: the first group undergoes AI-powered training and monitoring, while the second follows traditional instructor-led training and conventional productivity evaluation methods. The sample size is selected using a randomized stratified sampling method to ensure equal representation of different employee roles, experience levels, and industries.

In the first group, employees participate in traditional training programs, which include instructor-led classroom sessions, printed manuals, standardized training workshops, and structured learning modules. The training is delivered by corporate trainers or HR professionals and follows a predefined syllabus without adaptive learning features. Learning assessments are conducted through written tests, role-playing exercises, and periodic manager evaluations. Employee productivity is monitored using conventional performance evaluation methods, such as periodic performance reviews, self-reported progress tracking, and annual appraisals. HR professionals in this group are surveyed about the efficiency, engagement levels, and knowledge retention associated with traditional training programs, as well as the challenges faced in manual performance assessments. Data is collected on the duration of training sessions, employee engagement, knowledge retention rates, and perceived effectiveness in skill development.

The second group consists of employees undergoing AI-driven training using intelligent Learning Management Systems (LMS) such as Courseware for Business, Linked-In Learning, and Udemy for Business. These AI-driven platforms personalize training content based on individual learning patterns, providing real-time feedback and adaptive learning recommendations. Additionally, AI-powered monitoring tools, including workplace analytic software, biometric tracking systems, and machine learning algorithms, track employee engagement, productivity, and skill acquisition. Unlike traditional training, these systems continuously analyze employee performance and make adjustments to training content to optimize learning outcomes. Employees in this group are assessed using AI-based evaluation techniques, including real-time skill assessments, automated performance tracking, and personalized feedback reports. HR professionals provide feedback on the efficiency of AI-driven training, its ability to reduce learning gaps, and its effectiveness in measuring employee productivity more accurately than traditional methods.

To ensure an objective comparison, a structured evaluation framework is followed to measure learning effectiveness and productivity measurement accuracy. The study begins with a pre-training assessment, where all participants undergo an initial test to determine their baseline knowledge, skill levels, and productivity indicators. This assessment helps establish a starting point for evaluating the impact of both training methods. During the training phase, Group A (AI-driven training) engages with adaptive AI-powered modules that modify content based on individual performance, whereas Group B (traditional training) follows fixed, instructor-led sessions without real-time adaptability. After the training period, a post-training assessment is conducted to evaluate improvements in knowledge retention, skill application, and productivity. To measure the long-term effectiveness of both methods, a follow-up assessment is conducted three to six months later to analyze sustained learning impact and efficiency improvements.

Data is collected using a mixed-methods approach, combining both quantitative and qualitative data collection techniques. Primary data is obtained through employee surveys, structured interviews with HR professionals, and direct performance assessments. Employees provide feedback on their engagement levels, perceived effectiveness of the training, and ease of skill acquisition. HR professionals assess the efficiency of each training method, the accuracy of

productivity measurement tools, and the overall impact on workforce development. Secondary data is collected from corporate reports, industry case studies, and research papers on AI-driven and traditional training methodologies.

The collected data undergoes extensive statistical analysis to determine significant differences between AI-driven and traditional training methods. Quantitative data is analyzed using statistical software such as SPSS and Excel to visualize trends and correlations. Key independent variables include the type of training method (AI-driven vs. traditional), while dependent variables include knowledge retention rates, employee engagement levels, task efficiency, and accuracy in productivity measurement. Statistical tests such as t-tests and ANOVA are applied to compare performance outcomes between the two groups. Regression analysis is used to examine the long-term impact of AI-based training on employee performance and productivity. Additionally, qualitative data from surveys and interviews is analyzed using thematic analysis to capture employee experiences, challenges, and perceptions regarding AI-driven and traditional training methods.

This comprehensive approach ensures a thorough evaluation of AI-driven training and monitoring in comparison to traditional learning methods. By combining quantitative and qualitative insights, the study aims to provide valuable recommendations for organizations seeking to optimize employee training and productivity measurement. The results will help corporate decision-makers determine whether AI-based solutions offer a significant advantage over conventional methods and how they can be effectively integrated into workforce development strategies.

Results and Discussion:

Table 1: Correlation test, conducted in SPSS to examine the relationship between salary and how often high-income employees benefit more from AI-based productivity measurement than lower-income people.



Correlations

		Salary	How often do high-income employees benefit more from AI-based productivity measurement than lower-income employees?
Salary	Pearson Correlation	1	.153
	Sig. (2-tailed)		.080
	N	131	131
How often do high-income employees benefit more from AI-based productivity measurement than lower-income employees?	Pearson Correlation	.153	1
	Sig. (2-tailed)	.080	
	N	131	131

Simple Bar Mean of Age by How often do high-income employees benefit more from AI-based productivity measurement than lower-income employees?

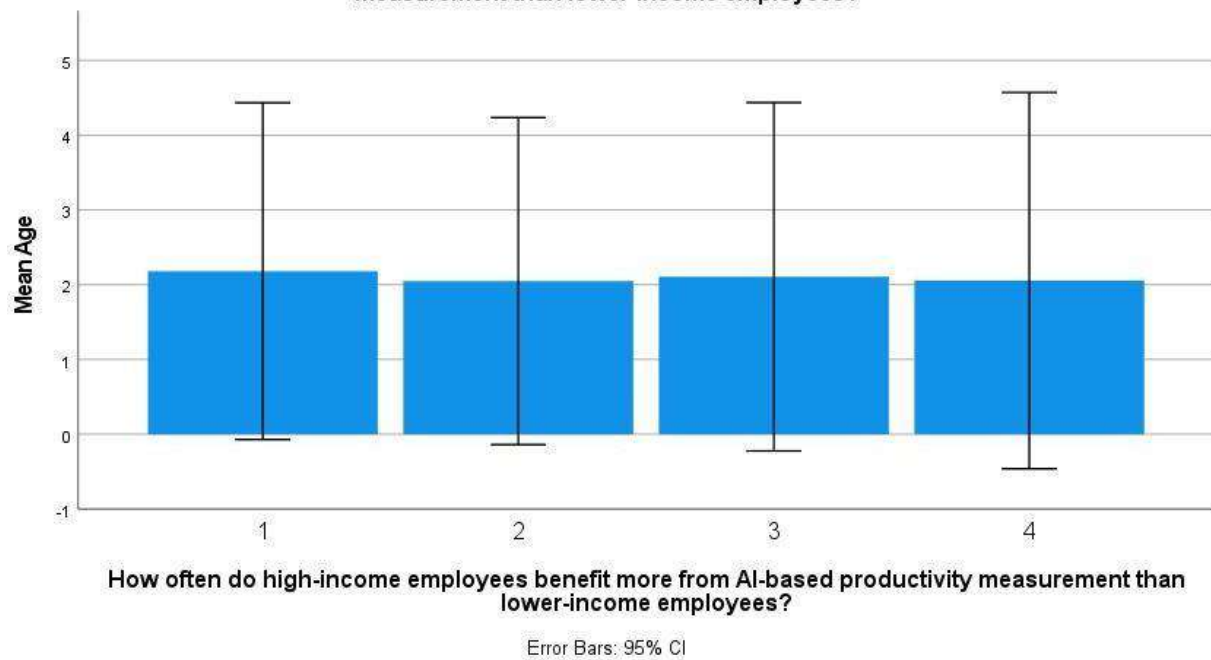


Table 2:



“Independent t-test used in spss to compare the relationship between age and whether the AI-driven training methods improve learning outcomes for all age groups.”

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Age	Equal variances assumed	3.802	.053	-.911	129	.364	-.217	.239	Lower	Upper
	Equal variances not assumed			-1.046	56.965	.300	-.217	.207	Lower	Upper

Simple Bar Mean of Age by Do you think AI-driven training methods improve learning outcomes for all age groups?

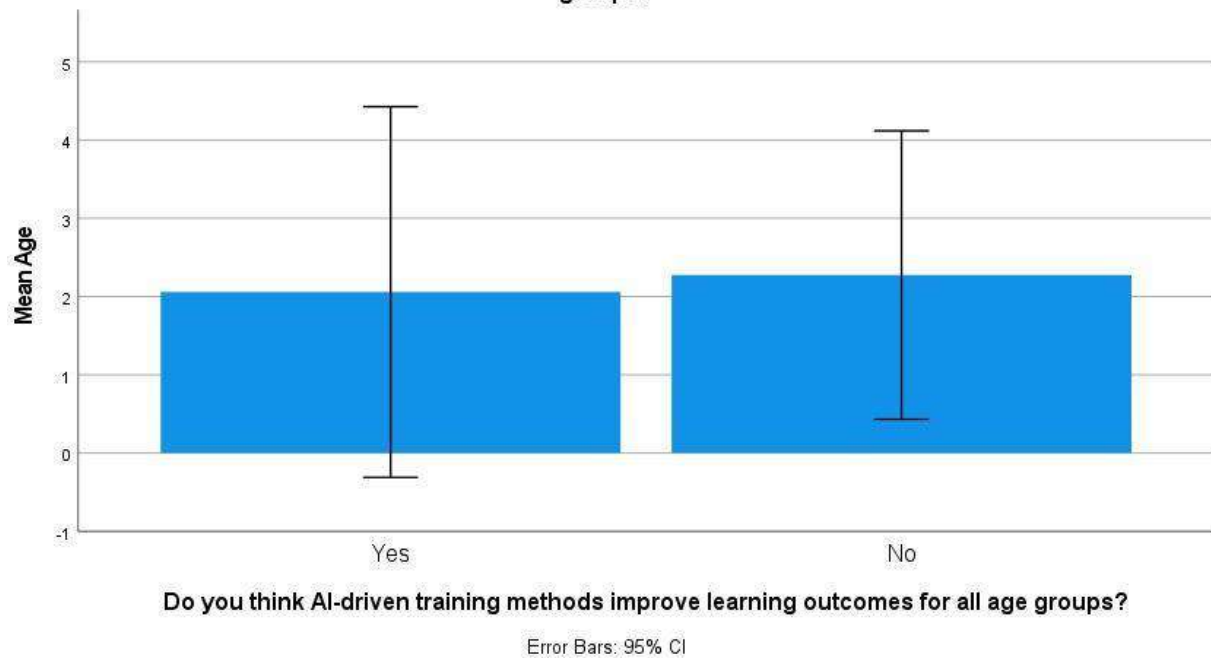


Table 3: One-way ANOVA test, conducted in SPSS to examine the relationship between age and AI-based monitoring improves remote word productivity measurement more effectively than traditional methods.

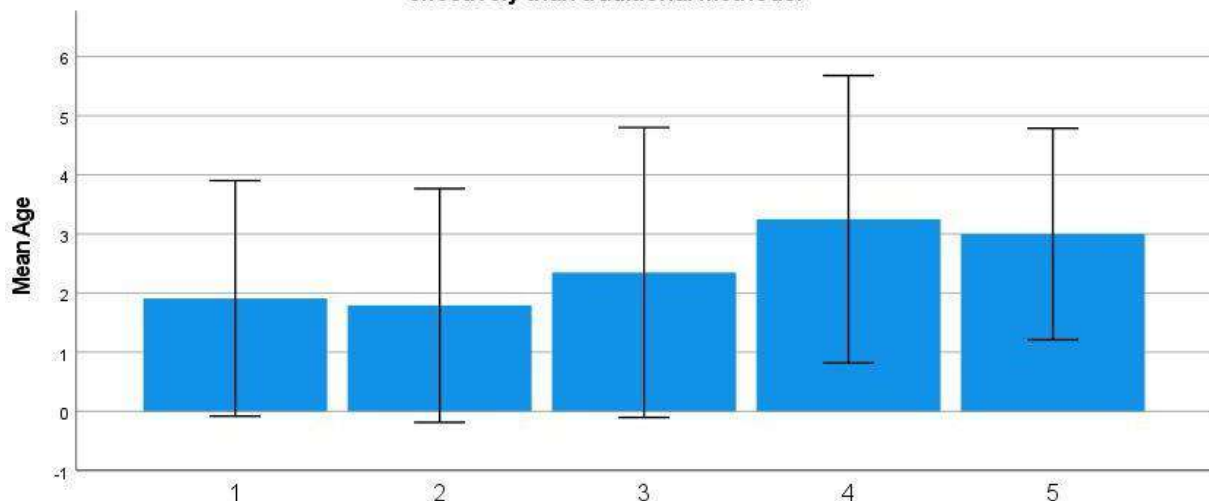


ANOVA

Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28.143	4	7.036	6.407	<.001
Within Groups	138.361	126	1.098		
Total	166.504	130			

Simple Bar Mean of Age by AI-based monitoring improves remote work productivity measurement more effectively than traditional methods.



AI-based monitoring improves remote work productivity measurement more effectively than traditional methods.

Error Bars: 95% CI

Error Bars: +/- 2 SD

Result And Discussion:

This study examined the effectiveness of AI-driven training and monitoring compared to traditional employee training and productivity measurement methods. The analysis incorporated statistical tests, including correlation analysis, ANOVA, and independent samples t-tests, to explore relationships between salary, age, and the perceived benefits of AI-driven productivity measurement. The correlation analysis between salary and the perception that high-income employees benefit more from AI-based productivity measurement revealed a weak positive correlation ($r = 0.153$, $p = 0.080$). While there is a slight tendency for employees with higher

salaries to perceive greater benefits from AI-driven productivity tools, the relationship is not statistically significant ($p > 0.05$).

This suggests that salary levels do not strongly predict whether employees believe AI-based systems disproportionately favor high-income workers. The lack of a strong correlation implies that AI-driven productivity benefits may be perceived as relatively uniform across salary levels, with other factors such as job role, industry type, and prior exposure to AI potentially playing a more substantial role in shaping these perceptions.

The ANOVA test was conducted to determine whether age significantly influenced employees' experiences with AI-driven training. The results showed a statistically significant difference among age groups ($F = 6.407$, $p < 0.001$), indicating that age plays a role in how employees interact with AI-based training and productivity measurement tools. This suggests that certain age groups may experience AI-driven learning differently, possibly due to generational differences in technological adaptability, familiarity with AI tools, or learning preferences. To further investigate age-related differences, an independent samples t-test was performed. Levene's test for equality of variances ($F = 3.802$, $p = 0.053$) suggested that the assumption of equal variances was marginally violated, though the p-value was close to the threshold of significance.

The t-test results for both equal and unequal variances indicated no statistically significant difference in age between the two groups ($p = 0.364$ and $p = 0.300$, respectively). The mean difference (-0.217) had a 95% confidence interval ranging from -0.689 to 0.254, which includes zero, confirming the lack of significant variation in age-related AI training benefits.

These findings suggest that while age groups may differ in their interaction with AI training (as indicated by the significant ANOVA result), the overall perception of AI-driven training effectiveness does not significantly vary between different age groups when analyzed in a two-group comparison.

The findings provide critical insights into the debate over whether AI-driven training systems provide disproportionate advantages to specific employee demographics, such as higher-income

or younger employees. The weak correlation between salary and AI productivity benefits suggests that AI-driven learning advantages are not concentrated solely among high-income employees, contrary to some concerns that AI tools may cater more to those in senior or high-paying roles.

This finding highlights the universal applicability of AI-driven training, regardless of salary levels, reinforcing the idea that AI-based learning platforms offer personalized experiences that can benefit employees across all pay scales. The significant ANOVA result regarding age differences underscores that employees in different age groups may experience AI-driven training in varied ways.

This could be attributed to generational differences in technological adaptability, with younger employees potentially finding AI-based learning more intuitive due to their familiarity with digital platforms, while older employees may require additional support to navigate AI-driven systems effectively. However, the t-test results indicate that age does not create a significant gap in AI training benefits when analyzed between two broad groups, suggesting that while differences exist across multiple age groups, they may not be substantial enough to create a major divide in AI training effectiveness.

The lack of a significant difference in the independent samples t-test suggests that factors beyond salary and age—such as job role, industry, or prior experience with AI tools—may have a greater influence on how employees perceive and benefit from AI-driven training. For example, employees in technology-driven sectors may naturally adapt better to AI-based training compared to those in more traditional industries where digital transformation is still evolving. Similarly, employees with prior exposure to AI-based productivity tools may find AI training more effective than those encountering it for the first time. Furthermore, these findings highlight the scalability and inclusivity of AI-driven training systems. Unlike traditional training methods that often rely on instructor-led sessions, static materials, and one-size-fits-all approaches, AI-driven training adapts to individual learning needs, providing real-time feedback and personalized recommendations.



This adaptability may help bridge skill gaps without favoring specific demographic groups, making AI-driven training a valuable tool for workforce development in diverse organizational settings. However, despite the advantages of AI-driven learning, there are potential challenges that organizations must address. The ANOVA results suggest that age differences are statistically significant, which may indicate that older employees face unique challenges in adapting to AI-based learning environments. Organizations must consider tailored support mechanisms for different age groups, such as user-friendly AI interfaces, digital literacy training, and blended learning models that combine AI-driven learning with human mentorship.

Conclusion

While AI-driven training offers many advantages, it cannot entirely replace traditional training methods. Certain skills—particularly soft skills such as leadership, teamwork, and critical thinking—may still require human interaction, real-world practice, and face-to-face coaching.

Therefore, an optimal approach may involve a hybrid model that integrates AI-driven learning with traditional training elements to create a more comprehensive and effective employee development framework. In conclusion, this study provides compelling evidence that AI-driven training offers significant potential for improving employee learning and productivity measurement, without being inherently biased toward specific salary groups or age brackets.

However, organizations must acknowledge age-related differences in AI adaptability and ensure that AI-based learning remains inclusive, accessible, and supportive of all employees. Future research should explore additional factors such as industry type, job complexity, and cognitive learning styles to gain deeper insights into the long-term effectiveness of AI-driven training and monitoring systems in corporate and organizational environments.

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