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#81/33 VGP Salai, Saidapet, Chennai - 15, Tamilnadu, India.

Phone No - 92821 44444, 96000 26826

E-mail - princyavc@gmail.com, mail4avc@gmail.com

Website - www.annaivelankannis.com

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Organizes

INTERNATIONAL CONFERENCE ON APPLICATION OF



IN BUSINESS AND TECHNOLOGY

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**INTERNATIONAL CONFERENCE ON APPLICATION
OF AI IN BUSINESS AND TECHNOLOGY (ICAIBT)**

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PREFACE

The School of Commerce and Management Studies, Annai Veilankanni's College of Arts and Science initiated to organize this International Conference **ICAIBT-2025** on Application of AI in Business and Technology. This conference aims at providing a platform to Professionals Research Scholars, Faculties and Students to share their knowledge, ideas and experience among them.

We have received more than 250 papers from Professionals, Research Scholars, Faculty members and students of reputed institutions all over the world. Among them we have selected only 190 papers for publication. The selected papers included in this volume fall under the following categories:

1. AI-Powered Personalization and Digital Marketing
2. Inventory Optimization and Autonomous Logistics
3. Block chain Integration and Smart Warehousing
4. Startup Financing and Market Penetration
5. Ethical Implications of AI in HR and Corporate Governance

We express our sincere thanks and appreciation to all the authors for contributing the papers for this conference.

Editors



Chairman

"Our intelligence is what makes us human, and AI is an extension of that quality."

– Yann LeCun

Guided by this understanding, the International Conference on the Application of Artificial Intelligence in Business and Technology stands as a testament to humanity's ability to extend its intellectual capacity through innovation. The proceedings in this volume capture the essence of this vision; documenting insightful research, thought-provoking discussions, and pioneering innovations that together reflect the power of collective exploration.

Artificial Intelligence is not merely a tool; it is a profound technological force influencing every sector from commerce to communication, from healthcare to education. Its rapid advancement has created unprecedented opportunities to enhance efficiency, foster creativity, and solve problems on a global scale.

As these articles reveal, the ideas shared at this conference have the potential to shape policy, inform industry practice, and inspire continued academic inquiry. They represent a convergence of diverse expertise united by the belief that AI, when guided by human intelligence and values, can be a force for transformative and inclusive growth.

I extend my heartfelt appreciation to all presenters, participants, and contributors for enriching this dialogue, and to the organising committee for their dedication in bringing this event to fruition. *It is my hope that these proceedings will serve not only as a record of knowledge but also as a source of inspiration; encouraging future innovations that harness AI's capabilities for the betterment of business, technology, and society as a whole.*



Vice Chairman

"Education is the foundation upon which we build our future." – **Christine Gregoire**

In the same spirit, Artificial Intelligence represents one of the most significant building blocks of our modern world, reshaping the landscape of business and technology. By integrating into diverse sectors, AI not only accelerates innovation but also equips us with new tools to address complex challenges with efficiency, precision, and vision, laying the groundwork for a smarter and more sustainable future.

The International Conference on the Application of Artificial Intelligence in Business and Technology serves as a significant platform for presenting pioneering research, exchanging interdisciplinary ideas, and fostering collaborations that will shape the future of AI-driven solutions. The diversity of perspectives represented in these proceedings reflects the depth, scope, and relevance of ongoing work in this rapidly evolving domain.

I extend my deepest appreciation to our distinguished keynote speakers, paper presenters, and participants from across the globe for their valuable contributions. I also commend the organizing team for their dedication and meticulous planning, which have made this event possible.

It is my hope that these proceedings will not only serve as a record of insightful ideas and innovative approaches but also inspire future endeavours that harness AI for the betterment of business, technology, and humanity at large.

Wishing everyone a rewarding and enriching experience.



Secretary

"We are entering a world where we will learn to coexist with AI, not as its masters, but as its collaborators." – **Mark Zuckerberg**

This sentiment reflects a profound shift in our relationship with technology. Artificial Intelligence is no longer a distant concept locked within research laboratories; it is an active partner in shaping the world we live in. From the way we communicate to how we analyse data, streamline operations, and create solutions, AI is emerging as a true collaborator that enhances human ingenuity rather than replacing it. In the realms of business and technology, this collaboration has yielded remarkable progress. AI driven systems are helping organisations operate with greater efficiency, precision, and creativity. They are uncovering insights hidden within vast datasets, enabling faster and more informed decision making, and pushing the boundaries of what we once believed was possible.

The International Conference on the Application of Artificial Intelligence in Business and Technology has provided a vital platform for examining these developments. It has brought together diverse minds from academia, industry, and research institutions to share knowledge, challenge ideas, and explore practical implementations of AI that have the potential to transform economies and societies alike.

The proceedings before you represent more than a compilation of papers. They are a collective vision of the future, shaped by rigorous research, thoughtful dialogue, and real world application. They capture the essence of collaboration between human intellect and artificial intelligence, showcasing how this partnership can solve pressing challenges and create opportunities for sustainable growth.

I extend my sincere appreciation to the scholars, professionals, and School of Commerce and Management Studies, whose dedication and expertise have made this conference a success. I am confident that the insights documented here will inspire readers, whether academics, industry professionals, or policymakers, to think boldly, act innovatively, and embrace AI as an ally in shaping the future.



Joint Secretary

"AI will enhance the ways humans experience the world." – **Jeff Bezos**

This belief finds powerful expression in the way Artificial Intelligence is shaping the future; not as a distant promise, but as a transformative presence already redefining our interactions, industries, and possibilities. Yet, the true impact of AI depends not only on the technology itself, but on the diversity of minds and the openness of collaboration that drive its development.

The International Conference on the Application of Artificial Intelligence in Business and Technology has embodied this principle, bringing together the collective wisdom of academia, industry, and research institutions. It is within such forums that bold ideas are tested, refined, and elevated, enabling AI to move beyond technical capability toward enriching human life in meaningful ways.

The range of perspectives and expertise reflected in these proceedings is both inspiring and essential. Artificial Intelligence thrives at the intersection of disciplines, where technologists, entrepreneurs, researchers, and visionaries meet to share, challenge, and expand each other's understanding. This conference has provided precisely such a meeting ground, amplifying insights and fostering collaborations that will continue to grow long after the final session has concluded.

My sincere appreciation goes to the organisers for their dedication, to the contributors for their intellectual generosity, and to the participants for their active engagement. May the work documented here serve not only as a record of ideas exchanged, but as a catalyst for further dialogue, innovative solutions, and enduring partnerships that will continue to enhance the ways humans experience the world.



Principal

"AI is going to reshape every industry and every job." – Reid Hoffman

This truth underscores the profound significance of the work captured in these proceedings. It is with great delight that I present the volume of the International Conference on the Application of Artificial Intelligence in Business and Technology; a collection that reflects the innovative spirit, scholarly rigour, and forward-looking vision required to navigate AI's transformative role in contemporary business and technological landscapes.

The papers compiled here reveal a remarkable breadth of perspectives, methodologies, and applications. They illustrate the dynamic interplay between artificial intelligence and diverse sectors, showing how AI is not only redefining workflows and decision-making but also opening entirely new frontiers of possibility. Together, these contributions enrich academic discourse and offer insights that can shape real-world strategies, inform policy, and drive technological progress.

The successful organisation and publication of this conference proceeding stand as a testament to the dedication of the organising committee, the diligence of peer reviewers, and the commitment of contributing authors. Their efforts to uphold quality, relevance, and accessibility in research are essential to fostering meaningful advancements in this rapidly evolving field.

I trust that the findings and discussions documented in these pages will inspire continued research, encourage collaborative innovation, and support the sustainable growth of businesses and technologies worldwide. My sincere congratulations go to all authors and participants for their valuable contributions, and my gratitude to everyone who made this conference a vibrant and impactful platform for intellectual exchange.



Mr. Chozha Naachiar Rajasekar

President, The Tamil Chamber of Commerce

National Executive Committee Member, FICCI

Management Committee Member, ASSOCHAM

Executive Committee Member, ICC

"The best way to predict the future is to create it." – Peter Drucker

It gives me immense pleasure to convey my warm greetings and best wishes to the organisers, participants, and contributors of the *International Conference on the Application of AI in Business and Technology*.

Artificial Intelligence is rapidly transforming the global economic and industrial landscape. Its applications across diverse sectors are creating new opportunities, enhancing efficiency, and redefining the ways in which businesses operate and societies progress. At this crucial juncture, platforms such as this conference play a vital role in bringing together thought leaders, scholars, industry experts, and policymakers to share knowledge, ideas, and innovative solutions.

I firmly believe that the proceedings of this conference will serve as a valuable source of insight, not only for the academic and research community but also for industry and commerce. The exchange of perspectives documented here will inspire new collaborations and guide the responsible and impactful adoption of Artificial Intelligence in business and technology.



Dr. R. Ramanan, M.Sc., M.Phil., Ph.D., FSMS

“Tamil Nadu Scientist Awardee”

Joint Director (P&D) (Retd),

Directorate of Collegiate Education

Chennai, Tamilnadu

"Research is creating new knowledge." – **Neil Armstrong**

It gives me immense pleasure to extend my warm wishes to the organisers, participants, and contributors of the International Conference on the Application of AI in Business and Technology. Artificial Intelligence has emerged as one of the most powerful drivers of innovation in the 21st century. Its impact is being felt across every sphere of life; reshaping industries, redefining education, revolutionising research, and offering transformative solutions to challenges once considered insurmountable. In the domains of business and technology, AI holds the promise of greater efficiency, creativity, and sustainability, making this conference both timely and highly relevant. I am confident that the deliberations, research papers, and discussions compiled in these proceedings will serve as a valuable resource for academicians, researchers, industry professionals, and policymakers alike. The exchange of ideas and collaborative spirit reflected here will no doubt pave the way for further advancements and meaningful applications of AI for societal growth. I wholeheartedly congratulate the organisers for their vision and tireless efforts in bringing together such a distinguished gathering. I also commend the authors and participants for their invaluable contributions, which will continue to inspire innovation and inquiry in this exciting field. I extend my best wishes for the continued success of this conference and for the impactful journey of Artificial Intelligence in shaping the future of business, technology, and society.



Dr. MIM. Riyath
Senior Lecturer,
Department of Accountancy and Finance,
Faculty of Management and Commerce,
South Eastern University of Sri Lanka,
University Park, Oluvil,
Sri Lanka

Strategic Applications of Artificial Intelligence in Modern Business and Technology Environments

Distinguished guests, esteemed colleagues, and bright minds of the School of Commerce and Management Studies, Annai Veilankanni's College of Arts and Science.

It is my pleasure to address you at this important point when the world of business and the world of artificial intelligence converge. The theme 'Application of AI in Business and Technology' is not just a topical one; it is absolutely necessary in view of the paradigm shift that the technology is bringing, completely transforming the way businesses are run and changing economic landscapes. Artificial intelligence is no longer a science fiction idea anymore; it is the very construction of the modern trade with innovation, which questions the traditional principles of business in the world and creates new paradigms of the functioning of companies, marketing and structure.

According to Grand View Research, the global e-commerce market was valued at approximately \$25.93 trillion in 2023 and is projected to reach \$83.26 trillion by 2030, representing a compound annual growth rate (CAGR) of 18.9% from 2024 to 2030. The lightning-fast pace of machine learning, deep learning, and neural networks has revolutionized data processing by allowing companies to draw actionable information out of datasets reaching exabytes in scale at speeds that in the past would have been deemed as unachievable. The economic effects of AI are however far more than a more efficient rate of calculation; the disruptive potential poses an existential threat to the paradigm of whole industries. McKinsey estimates that AI could contribute up to \$13 trillion to global economic output by 2030. Indeed, adoption has developed not only into a luxury but also into a necessity since it is currently a precondition to the competitiveness of any business in the hypercompetitive global market. Organizations must thus understand both the technological mechanisms and the holistic implication that AI brings to the field of business, markets, and society in general.

In terms of finances, the best examples of such spaces include algorithmic trading and financial forecasting where AI leaves its mark. High-frequency trading algorithms execute trades in microseconds, with some systems achieving latencies as low as 50-100 nanoseconds. Real-time decision-making has been anchored in machine-learning models where firms are able to cope with billions of transactions daily. AI-powered fraud detection systems achieve accuracy rates of 99.5% while reducing false positives by 70%. The advantages of the financial institutions that implement the AI-driven algorithms are unique: JPMorgan's COIN platform reduces document review time from 360,000 hours to seconds, while AI trading systems generate 10-15% higher returns than traditional methods. AI is also significant in regulatory technology as automated compliance systems reduce regulatory reporting costs by 30-50% and processing time by 80%.

Not less significant is the impact of AI on supply chain management. Machine learning algorithms improve demand forecasting accuracy by 20-50%, with companies like Walmart reducing forecast errors by 25%. The precision of advanced demand-prediction procedures provides management with more accuracy than traditional methods, resulting in 10-20% reduction in inventory costs and 65% decrease in stockouts. Machine-learning algorithms also increase responsiveness because historical patterns are learned and processes are adjusted on the fly. Amazon's supply chain AI processes over 5 billion data points daily, enabling 30% faster delivery times and 15% cost reduction. Companies that have implemented the end-to-end supply-chain AI have reported significant savings in their logistics, with DHL achieving 30% improvement in route optimization and UPS saving \$400 million annually through AI-driven logistics.

Healthcare sector applications highlight AI's ability to transcend diagnostic capabilities. Google's DeepMind AI achieves 94% accuracy in eye disease diagnosis compared to 65-85% for human specialists. Whereas diagnostic algorithms make possible the detection of conditions like cancer, diabetes and cardiovascular diseases with mammography AI achieving 89% sensitivity versus 83% for human radiologists, the next frontier involves personalized treatment planning. IBM Watson for Oncology analyzes treatment options for cancer patients, with studies showing 96% concordance with oncologist recommendations in specific cancer types. Modern machine-learning models prescribe patient-specific regimens based on individual patient data, which has the potential to reduce medical errors significantly and enhance the overall quality of patient care. Clinical decision support systems reduce medication errors by 55% and improve diagnostic accuracy by 20%.

The technological landscape continues evolving with the capabilities of artificial intelligence exceeding previous limitations. Large language models like GPT-5 contain 52.5 trillion parameters and achieve human-level performance on standardized tests like the SAT (1410/1600) and the Bar Exam (90th percentile). Natural Language Processing has advanced to an extent that such models demonstrate sophisticated reasoning capabilities. Computer vision models like CLIP achieve 76.2% top-1 accuracy on ImageNet, whereas specialised medical imaging AI exceeds radiologist performance in specific tasks, achieving 94.5% accuracy for diabetic retinopathy detection. Edge AI deployment reduces latency from 100-200ms to 10-50ms while decreasing bandwidth usage by 90%, with organisations reporting substantial improvements in response times and bandwidth efficiency.

Despite these benefits, AI presents significant challenges requiring careful consideration. The proliferation of AI applications raises complex ethical and regulatory concerns, particularly regarding data privacy. Training large language models requires 10-100 petabytes of text data, raising significant privacy concerns. As AI systems require vast amounts of data to operate effectively, robust data protection measures become important.

Techniques like differential privacy add mathematical noise to datasets while maintaining utility, with Google's implementation achieving epsilon values of 0.5-2.0 for practical applications. Organizations must implement privacy-preserving technologies, such as differential privacy and federated learning, to safeguard individual rights while leveraging AI's power. Studies show that AI hiring tools exhibit 5-15% bias rates across demographic groups, as AI systems reflect the biases present in their training data, necessitating diverse development teams, rigorous testing, and ongoing monitoring to ensure equitable operation across demographic groups.

The EU AI Act, implemented in 2024, establishes the world's first comprehensive AI regulation framework, while the US is developing sector-specific guidelines. Regulatory compliance presents ongoing challenges as governments worldwide rapidly develop AI governance frameworks. The change in technology is often beyond the scope of legislation and creates precarious regulatory environments that businesses have to approach cautiously. To ensure compliance while fostering innovation, organizations must proactively develop robust governance structures and regulatory risk management systems. Adversarial attacks can reduce AI model accuracy by 10-90% depending on the attack sophistication, with cybersecurity threats co-evolving with AI capabilities. That is why thorough security procedures are necessary, including adversarial training that improves robustness by 20-40% and unique incident-response procedures.

Emerging technologies including neuromorphic computing, quantum machine learning, and multimodal AI systems that process text, images, and audio simultaneously suggest nearly inexhaustible future scope. Augmented intelligence is the purposeful combination of human ingenuity and computing capability; it is not a replacement of, but it is an augmentation of, good human judgment. Studies show human-AI collaboration improves performance by 85% compared to either humans or AI working alone. In the world of academic research, design, and strategic planning, this cooperation would be able to achieve breakthroughs we had barely dared to imagine. No-code and low-code AI platforms have grown by 750% since 2020, democratizing AI access and allowing smaller organizations to access more advanced capabilities without having specialized knowledge, thus, encouraging faster innovation and wider economic growth.

AI training consumes 0.5% of global electricity, with large models like GPT-3 requiring 1,287 MWh for training. The increased environmental awareness has resulted in the growing focus on sustainable development of AI. Energy-efficient algorithms and hardware optimizations can reduce AI computational energy consumption by 10-100x through techniques like model pruning and quantization. Green computing practices, and sustainable data infrastructure have also become the necessary elements in combating the environmental effects of AI technologies. By integrating sustainability into their AI plans, companies will be able to diminish their environmental impact and position themselves as good corporate citizens, improving brand image and building regulatory compliance at the same time.

Organizations report that 67% of AI projects fail to reach production, with data quality issues being the primary cause in 60% of failed projects. To any organization planning on the adoption of AI, a thought-out and well-organized strategy is important. Effective implementation typically starts with pilot projects, which test AI capabilities in well-understood use cases, to reduce the risk of failure whilst creating measurable stakeholder value. Companies with comprehensive AI strategies are 2.3 times more likely to achieve significant returns on AI investments. Development of the internal competencies (strategic hiring and specific training) ensures the effective management of the system, and collaboration of the academia helps to speed up the building of capabilities and provides access to the latest research. High-quality training data is essential, as models trained on clean datasets achieve 15-30% better performance than those using unprocessed data.

Development of holistic AI strategies, which are related to the overall business goals, is crucial in terms of ensuring that technology investments have been made in a way that leads to measurable value. Successful AI implementations require a 3-5 years average timeline and \$2-10 million investment for enterprise-scale deployments. These strategies must include specific use cases, success metrics, and implementation roadmaps supporting organizational goals. These plans must consider not just the technical, but the psychological and the cultural process of the adoption of the AI. Effective companies view implementation as a process of transformation in the organization, and not a technological deployment.

AI represents both transformative opportunity and complex challenge. When organizations adopt it strategically, rewards will be experienced in terms of increased efficiency, innovation and competitive advantage. Early AI adopters achieve 6.7% higher revenue growth and 11.5% higher profitability compared to non-adopters. Nevertheless, they do not come without their price: ethical practices related to AI, compliance with regulations and the creation of internal competencies are all valuable. The future of AI in business is not about technological advancement; it is about the responsible application of those capabilities to the generation of organizational and societal value.

Being the keepers of this technological revolution, we should not only use AI in productive ways, but also connect the development to the economic and social progress. The convergence of artificial intelligence with business innovation promises extraordinary opportunities for those prepared to embrace transformation with wisdom, purpose, and determination to leverage AI's capabilities for sustainable growth, enhanced human potential, and positive societal impact.



Mr.M.Farwis
Senior Lecturer,
Department of Accountancy and Finance,
Faculty of Management and Commerce,
South Eastern University of Sri Lanka,
University Park, Oluvil,
Sri Lanka

I thank the organizers for inviting me. I am grateful to the Chief Patrons, Patron, Principal, Dean, Organising Secretary, the Organising Committee, and all delegates for giving me this opportunity. I hope my thoughts today inspire you to explore the possibilities of next-generation AI in your businesses and careers.

Next-Gen AI Technologies Shaping Business

Good morning, Respected Chief Patrons, Patron, Principal, Dean, Organising Secretary, Members of the Organising Committee, distinguished delegates, and dear friends. It is a privilege and an honor to be here today to speak on a topic that is shaping the future of business across the globe Next-Generation Artificial Intelligence Technologies and their impact on business. We live in an era of unprecedented technological change. Artificial Intelligence, or AI, is no longer confined to laboratories or academic research. It is now deeply embedded in our daily lives, businesses, and industries. Across the world, from Silicon Valley to Tokyo, from London to Singapore, AI is driving transformation. In the global business landscape, organizations are adopting AI to improve efficiency, enhance customer experience, innovate products, and remain competitive. Today, I will explore next-generation AI technologies, their applications across industries, global trends, challenges, and how organizations worldwide can harness AI for sustainable growth.

What is Next-Generation AI?

AI has been evolving for decades. Early AI systems were rule-based, capable of performing repetitive tasks, and limited in scope. Today, next-generation AI is vastly more powerful. It can learn from data, adapt to new conditions, generate content, and support complex decision-making.

Some of the most notable next-generation AI technologies include:

1. **Generative AI** – AI capable of creating content such as text, images, music, and video. It is redefining marketing, entertainment, education, and product design globally.
2. **AI in IoT (AIoT)** – AI integrated with connected devices, enabling real-time decision-making. It is transforming industries like manufacturing, logistics, and energy.
3. **Autonomous Systems** – Robots, drones, and self-driving vehicles that operate independently. These systems are used in supply chains, agriculture, and urban mobility worldwide.
4. **AI-Enhanced Analytics** – Advanced AI systems that analyze large volumes of data, predict trends, and recommend strategic actions.
5. **Edge AI** – AI that runs on devices locally rather than relying on cloud computing, enabling faster decision-making and reducing latency.

These technologies are no longer theoretical. They are being implemented across the globe, helping businesses operate more efficiently, create innovative products, and offer better services.

AI in Global Business Operations

Operations are at the heart of every business. AI is transforming how companies plan, produce, and deliver goods and services worldwide. In manufacturing, predictive maintenance is a major breakthrough. Sensors on machines collect real-time data, and AI predicts when failures are likely to occur. Companies such as Siemens in Germany, Toyota in Japan, and General Electric in the United States are using AI to reduce downtime, improve productivity, and optimize resources. Supply chain management has been revolutionized by AI. Global companies face challenges such as fluctuating demand, transportation disruptions, and rising costs. AI helps forecast demand accurately, optimize inventory, and plan logistics efficiently. For example, Amazon uses AI-driven algorithms to predict product demand, manage warehouses, and optimize delivery routes worldwide. Even quality control has become smarter with AI. Automated vision systems can detect defects in products with greater accuracy than human inspection, reducing errors and improving consistency.

AI in Marketing and Customer Experience

Marketing strategies across the world are being redefined by AI. Companies now have unprecedented access to data about customer preferences, behaviors, and trends. AI allows organizations to personalize marketing campaigns at scale. E-commerce giants like Alibaba, Amazon, and Shopify use AI to recommend products, tailor promotions, and predict customer buying patterns. Chatbots and virtual assistants are another global innovation. They provide instant support to customers 24/7, answer queries, and handle complaints. Multilingual AI systems enable businesses to cater to global audiences efficiently. Social media analytics powered by AI helps companies understand global trends, monitor sentiment, and create campaigns that resonate with customers in different regions. AI also enables predictive marketing, helping organizations anticipate customer needs and launch targeted campaigns.

AI in Finance and Accounting

Finance and accounting are among the most rapidly evolving sectors due to AI. In banking and finance, AI helps detect fraud in real time. Millions of transactions are monitored daily, and AI identifies suspicious patterns that could indicate fraud. AI also assists in credit scoring, loan approvals, and risk assessment, enabling financial institutions to make faster and more accurate decisions. Global financial institutions like JPMorgan Chase, HSBC, and DBS Bank are leveraging AI to optimize operations, reduce costs, and improve customer service. Fintech startups across Asia, Europe, and Africa use AI to provide accessible financial services to underserved populations, including small businesses and rural communities. In accounting, AI is automating routine tasks such as bookkeeping, invoice processing, and reconciliation. It can also analyze complex financial data to detect anomalies, improving accuracy and efficiency. Predictive AI helps companies forecast revenue, manage cash flow, and plan budgets effectively. Firms like Deloitte, PwC, and KPMG are incorporating AI into auditing and advisory services, allowing accountants to focus on strategic decision-making rather than repetitive tasks.

AI in Human Resources

AI is transforming human resource management on a global scale. Recruitment is faster and more objective with AI-powered platforms that screen resumes, match skills to job requirements, and rank candidates based on suitability. AI also identifies skill gaps within organizations and suggests personalized learning and development programs. Performance evaluations are increasingly data-driven, ensuring fairer and more consistent assessments. Global corporations, from Microsoft to Unilever, are using AI to manage talent efficiently and enhance employee engagement.

AI in Healthcare

Healthcare is one of the most impactful areas for AI globally. AI helps in disease diagnosis, drug discovery, patient monitoring, and personalized treatment planning. For instance, AI systems analyze medical images to detect cancers, heart diseases, or eye disorders at an early stage. Hospitals in the United States, Europe, and Asia are deploying AI for predictive patient care, reducing hospital stays, and improving treatment outcomes. AI-driven telemedicine platforms are expanding access to healthcare in remote areas. Patients in underserved regions can consult doctors virtually, with AI supporting diagnosis and treatment recommendations.

AI in Supply Chains and Logistics

Global supply chains have become more complex than ever. AI helps companies predict disruptions, optimize routes, and improve delivery efficiency. For example, DHL and FedEx use AI to optimize logistics operations, reducing fuel costs and delivery times. AI also helps companies anticipate demand spikes, manage inventory, and coordinate international shipments more effectively. Autonomous delivery drones and vehicles are being piloted in several countries, showing the potential for faster and more reliable delivery systems.

Challenges of AI Adoption Globally

Despite its benefits, AI adoption comes with challenges: first is Data Quality and Privacy: AI systems require accurate, high-quality data. Organizations must also ensure data privacy and comply with global regulations such as GDPR. Second is Infrastructure: AI often requires significant computing power and reliable internet connectivity, which may be limited in some regions. 3rd one is Skills and Talent: There is a global shortage of skilled AI professionals. Continuous training and collaboration with educational institutions are essential. 4th one is Ethical Concerns: AI systems can unintentionally perpetuate bias or make unfair decisions. Transparency, explainability, and fairness must be prioritized. The final is Cost of Implementation: AI adoption requires investment in technology, training, and process redesign. Companies must carefully assess ROI and strategic value. Addressing these challenges requires a collaborative effort between businesses, governments, and academia. Organizations must focus not only on technology but also on responsible and ethical implementation.

Future Trends in AI Worldwide

Looking ahead, AI will continue to transform global business:

- **Generative AI** will enable creative industries, product design, marketing, and education to innovate faster.
- **AI and IoT** will make cities smarter, optimize energy use, improve industrial efficiency, and enhance quality of life.

- **Edge AI** will provide faster decision-making in remote areas or devices with limited connectivity.
- **Multimodal AI** that understands text, images, and speech simultaneously will enable richer and more effective business solutions.
- **Quantum AI** has the potential to solve optimization problems that current systems cannot handle, benefiting industries such as logistics, finance, and healthcare.

In finance, accounting, and business strategy, AI will provide real-time insights, support risk management, and guide decision-making. In marketing, AI will anticipate customer needs and tailor campaigns globally. In healthcare, AI will improve diagnostics and accessibility worldwide.

How Global Businesses Can Prepare

Organizations worldwide can prepare for AI adoption by following strategic steps:

1. **Start Small:** Begin with pilot projects to test AI's impact on specific areas.
2. **Invest in Skills:** Train employees in AI, data analytics, and ethical practices.
3. **Collaborate:** Partner with technology providers, startups, and research institutions.
4. **Focus on Data:** Collect, clean, and manage data effectively for AI applications.
5. **Balance Humans and AI:** Use AI to augment human decision-making, not replace it. Collaboration is key to success.

By adopting these practices, organizations can maximize the benefits of AI while minimizing risks and challenges.

Conclusion

In conclusion, next-generation AI technologies are transforming business globally. They improve efficiency, enhance customer experience, and create new opportunities. From accounting and finance to marketing, operations, HR, healthcare, and logistics, AI is becoming a critical tool for organizations worldwide. However, responsible adoption is essential. Businesses must balance technology with ethics, skills, and strategy. Governments, academic institutions, and private organizations must collaborate to create a global AI ecosystem that is inclusive, transparent, and sustainable. I encourage businesses worldwide, large or small, to embrace AI wisely. The future belongs to those who innovate, adapt, and use technology to solve real-world challenges.

Thank you very much.



Vice Principal

"An investment in knowledge pays the best interest." – **Benjamin Franklin**

In keeping with this timeless truth, it is with immense pleasure that I present the proceedings of the International Conference on the Application of Artificial Intelligence in Business and Technology. This gathering reflects our shared commitment to advancing knowledge, fostering innovation, and encouraging collaboration in a field that is reshaping the very foundations of modern industry and society.

Artificial Intelligence has moved beyond being a specialised area of study. It is now a transformative catalyst for progress across business and technology domains. Through its integration into diverse sectors, AI creates unprecedented opportunities for efficiency, creativity, and informed decision-making. This conference has provided a dynamic platform for exchanging ground breaking ideas, presenting cutting-edge research, and exploring practical applications that address pressing real-world challenges. The diversity of minds and perspectives represented here has enriched discussions and broadened our understanding of AI's potential. The proceedings capture not only the academic rigour of the contributions but also the collaborative spirit that makes innovation possible. They stand as a testament to what can be achieved when imagination meets opportunity and when curiosity is channelled into purposeful action.

I extend my sincere appreciation to our distinguished speakers, presenters, participants, and the organising committee for their invaluable contributions and dedication in making this event a success. May the insights and ideas documented in these pages inspire continued exploration, bold thinking, and partnerships that harness AI for sustainable, inclusive, and impactful growth.

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1. THE IMPACT OF MACROECONOMIC FACTORS ON SRI LANKA SHARE PRICE: COLOMBO STOCK EXCHANGE EVIDENCE

Jelsa MAF, Sana JF and Riznee UF

Department of Accountancy and Finance, Faculty of Management and Commerce, South
Eastern University of Sri Lanka

Correspondence: mafjelsa1998@gmail.com

Abstract

This study examines the impact of macroeconomic factors on share prices in the Sri Lankan stock market, utilizing monthly data spanning the period from January 2011 to December 2020. The All Share Price Index was used as a proxy for the stock price, and the interest rate, inflation rate, and currency rate were the primary macroeconomic indicators. The dependent variable in this study is the All Share Price Index (ASPI), which gauges stock market performance. Macroeconomic variables such as interest rates (IR), inflation rates (INF), and exchange rates (ER) are examples of independent factors. The researcher has used both correlation analysis and multiple regression analysis. The conclusion demonstrated that the macroeconomic factors in Sri Lanka influenced the performance of the stock market.

Keywords:

All Share Price Index, Stock Market Return, and Macroeconomic Factors

Introduction

A country's economic situation can be determined in part by its stock market performance, which is measured in terms of increased profits to businesses rather than higher stock returns. The money supply, GDP, unemployment rate, interest rate, and inflation rate are macroeconomic variables that can be used to determine how stable a country's economy is. Share price fluctuations can typically be attributed to a variety of events, including shifts in the company's board of directors, monetary policy, inflation, interest rates, civil conflict, and politics. Each of these elements affects the returns from a given share in a different way. While many factors have a negative impact, others have a beneficial one on the volatility of stock returns.

This study emphasizes the significance of cautious management of external influences by demonstrating the relationship between macroeconomic variables and Sri Lankan stock prices. We specifically examine how the Sri Lankan stock market reacts over the long run to economic variables like industrial output (IP), interest rates (IR), exchange rates (ER), inflation (INF), and money supply (MS).

Objectives of the Study

Examining how macroeconomic factors affect stock market performance is the study's primary goal.

To determine the long-term correlation between Sri Lanka's macroeconomic factors and equities market volatility

To determine the immediate correlation between stock market performance and macroeconomic factors

- Interest rate,
- Inflation rate,
- Exchange rate on ASPI.

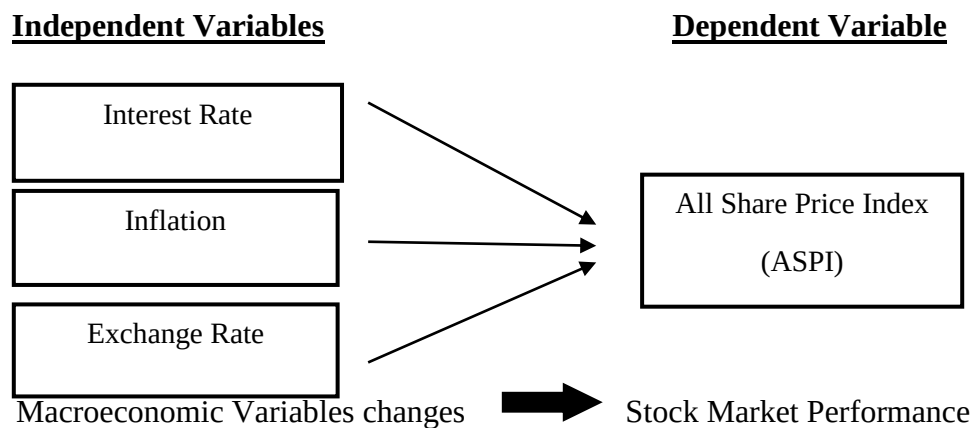
METHEDODOLOGY

From January 2008 to December 2017, 120 observations each month were made as part of this study's secondary data collection. The Colombo Stock Exchange's stock prices as well as the All Share Price Index are utilized. Statistics on inflation are derived from the Colombo Consumer Price Index, the Department of Census and Statistics, and the Central Bank of Sri Lanka. Interest rates are determined using the three-month main market Treasury bill yield rate, which is published in the Central Bank of Sri Lanka's Monthly Bulletin.

Conceptual Frame Work

The study examines the impact of macroeconomic variables on the stock market performance of the Colombo Stock Exchange. Data from central bank annual reports and the CSE data repository spanning ten years were used. The study looks at the effects of interest rates (IR), exchange rates (ER), and inflation rates (IR) as independent factors, with stock market performance serving as the dependent variable.

Figure 3.1 Conceptual Framework



Source: Researcher's construction

Hypotheses

The following hypotheses are constructed in order to accomplish the study's goal, which is to examine how macroeconomic factors affect stock market performance in the developing Sri Lankan stock market.

H1: The exchange rate and stock prices are significantly correlated.

H2: Interest rates and stock prices are significantly correlated.

H3: The rate of inflation and stock prices are significantly correlated.

Operationalization

Based on the above conceptual frame work the operationalization variables could be shown below.

Table 3.1: Operationalization

Concept	Variable	Indicator	Measurement
Stock market performance	Dependent variable	Stock Price	All Share Price Index used for the stock prices. (ASPI)
Macroeconomic variables	Independent Variable	Inflation	Changes in the Colombo Consumer Price Index (CCPI)
	Independent Variable	Exchange rate	Nominal Effective Exchange Rate (NEER)
	Independent Variable	Interest rate	The study uses three-month primary market Treasury Bill Yield Rate as a measure of nominal interest rate. (T bills)

Source: Researcher's Construction

Findings and Discussion

Table 4.1 : Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
ASPI	120	4571.63	7797.96	6224.0870	664.97355
Exchange Rate (USD)	120	109.50	187.39	145.9101	23.25070
Inflation Rate (CCPI)	120	.70	8.80	4.9758	1.98117
Interest Rate (T- Bills)	120	4.52	11.93	7.9567	1.59481
Valid N (listwise)	120				

Source: SPSS Analyzed Result from Secondary Data

Descriptive Analysis

Based on 120 observations, the descriptive statistics provide information about a number of variables. The stock price (ASPI) has a mean of 6224.0870 and a standard deviation of 664.97355, and it ranges from 4571.63 to 7797.96. The USD exchange rate has a mean of 145.9101 and a standard deviation of 23.25070, with a range of 109.50 to 187.39.

The CCPI, or inflation rate, has a mean of 4.9758 and a standard deviation of 23.25070, with a range of 0.7 to 8.80. The interest rate (T-Bills) has a mean of 7.9758 and a standard deviation of 1.59481, with a range of 4.52 to 11.93.

Pearson 's Correlation Coefficient Analysis

Tables 4.2: Pearson's coefficient of correlation matrix

		ASPI	Exchange Rate (USD)	Inflation Rate (CCPI)	Interest Rate (T-Bills)
ASPI	Pearson Correlation	1	-.416**	-.294**	-.424**
	Sig. (2-tailed)		.000	.001	.000
Exchange Rate (USD)	Pearson Correlation	-.416**	1	-.300**	-.102
	Sig. (2-tailed)	.000		.001	.269
Inflation Rate (CCPI)	Pearson Correlation	-.294**	-.300**	1	.328**
	Sig. (2-tailed)	.001	.001		.000
Interest Rate (T-Bills)	Pearson Correlation	-.424**	-.102	.328**	1
	Sig. (2-tailed)	.000	.269	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Analyzed Results from secondary Data

It reveals significant negative correlations between various economic factors and ASPI returns. The interest rate exhibits a strong negative association (-0.424) at a 1% significance level, suggesting a notable impact of TB 91 day's interest rate on ASPI returns. Similarly, inflation and exchange rate show weaker negative relationships (-0.294 and -0.416 respectively) with ASPI returns at the same significance level, indicating their influence on ASPI performance, albeit to a lesser extent.

Multiple Regression Analysis

The researcher conducted tests to assess the normality of their research data, utilizing the Kolmogorov-Smirnov test, normal probability plot, and histogram of standardized residuals. With a large sample size, the Kolmogorov-Smirnov test indicated a p-value of less than 0.001, suggesting non-normal distribution. Consequently, the data were transformed into logarithmic form for further analysis to evaluate normality.

Table 4.3 Summary Kolmogorov-Smirnov and Shapiro-Wilk test

	Kolmogorov-Smirnov ^a			Shapiro Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
ASPI Index	.046	120	.200 [*]	.988	120	.386
Exchange Rate (USD)	.164	120	.000	.922	120	.000
Inflation Rate (CCPI)	.071	120	.200 [*]	.971	120	.011
Interest Rate (91 Days Treasury Bill)	.062	120	.200 [*]	.985	120	.213

Lilliefors Significance

Correction

Source: SPSS Analyzed Results from secondary Data

It displays a P-P Plot of regression standardized residuals for a price model constructed using SPSS 20 statistical software with log-transformed data. While some regression models with normal data failed normality tests, this plot reveals that the points form a straight line, indicating the validity of the normality assumption. Furthermore, the bell-shaped nature of the histogram of standardized residuals confirms the normality of the research data.

Multiple Regression Analysis Results

Tables 4.4: The Results of Regression

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	Sig.
.698 ^a	.487	.474	482.35133	.351	36.722	.000 ^b

Source: SPSS Analyzed Results from secondary Data

In our study on the relationship between macroeconomic variables and stock prices in Sri Lanka, we found a multiple correlation coefficient (R) of 0.698, indicating a positive linear correlation. The coefficient of determination (R²) was 0.487, suggesting that 48.7% of the variation in stock prices can be explained by macroeconomic variables. Adjusted R Square, accounting for the number of variables and sample size, was 47.4%, with a Durbin-Watson value of 0.351 indicating no autocorrelation. ANOVA revealed a significant F-value of 36.722 ($p < 0.05$), confirming a strong relationship between macroeconomic variables and stock prices.

Tables 4.5: Coefficients.

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	10332.453	398.652		25.918	.000
Exchange Rate (USD)	-15.889	1.994	-.556	-7.970	.000
Inflation Rate (CCPI)	-114.149	24.642	-.340	-4.632	.000
Interest Rate (91 Days Treasury Bill)	-153.584	29.348	-.368	-5.233	.000

Predictors: (Constant), ER, T-Bills, CCPI

Dependent Variable: ASPI

Source: SPSS Analyzed Results from secondary Data

In the above table the Coefficients having p-values less than alpha are statistically significant. Thus, all of the P values for CCPI, TBILLS, and Exchange rate are less than 0.05; therefore, all of these are statistically significant.

CONCLUSIONS

The stock market is essential to economies because it makes it easier to raise money and allocate it to successful projects. This empirical study scrutinizes how changes in macroeconomic factors impact stock prices on the Sri Lankan Stock Exchange. Employing regression analysis, descriptive statistics, and correlation tests, the research explores these relationships.

The study looks at 120 monthly observations from January 2011 to December 2020, covering 296 companies from 20 different industries that are listed on the Colombo Stock Exchange. Multiple regression analysis, descriptive analysis, and Pearson's correlation coefficient analysis were used in the quantitative data analysis, which was carried out using SPSS 20.0.

2. THE STUDY ON IMPACT OF STOCK SPLITS ON FINANCIAL MARKETS

Andrea Merlyn Sam Joseph

Student ID: 24334669

Supervisor: **Prof. Chardin Wese Simen**

Abstract

This dissertation investigates the impact of stock splits on the Swiss stock market between 2014-2023, considering their influence on returns, liquidity and volatility. Utilizing event study analysis, abnormal returns were calculated for -30, +30 announcement days and +1 year post-effective event windows, which resulted in a comparatively moderate mean cumulative abnormal return (CAR) of 3.26% pre-announcement, with contribution made by just a few key firms. Liquidity measures, including bid-ask spreads, turnover rates and trading levels, suggest increased post-split market activity, with some of the effects being transitory. Volatility tests using conventional standard deviations and GARCH-based tests, similarly suggested post-split increased volatility, but without significant changes in volatility persistence, implying mostly transitory market reactions. Overall, evidence supports signalling as well as trading-range hypotheses but insists on substantial firm-specific heterogeneity. This research provides new insights into how stock splits operate in Switzerland, highlighting comparisons with more established and researched markets such as the US.

Introduction

“Why would a Swiss company deliberately cut its share price in half, losing not a franc of market value?” Stock splits are on the increase in Switzerland, reflecting a worldwide trend. In recent years, Swiss stock exchange-quoted companies have taken up forward stock splits as a way of enhancing market liquidity, attracting retail investors and signaling confidence in future growth opportunities. But how effective are such splits at capturing trading activity, volatility and investor sentiment in a market like Switzerland where there is less fractional trading and market structure is not as large as in big markets like the US?

1.1 Stock Splits

Stock splits have been making a significant comeback worldwide, especially in the technology and consumer discretionary sectors. A stock split refers to the corporate action when a company decides to increase the number of shares in the market and that value of every single share decreases proportionally. The overall market capitalization of the firm in the market is not changed in the event of stock splits but has implications on various aspects like trading volume, market coverage and investor sentiment. The two types of stock splits are forward stock splits and reverse stock splits (Brennan & Copeland, 1988).

A forward stock split increases the number of shares and thus lowers the price per share, but the total value of holdings remains unchanged. In a 2:1 stock split, for example each existing share is divided into two, which has the effect of doubling the number of shares owned by investors. Despite the increased quantity of shares, the total value of holdings remains unchanged. An example of this is

Apple Inc., which executed a 7:1 forward stock split in 2014 to mainly reduce its share price and attract retail investors (Apple Inc. Press Release, 2014).

In contrast, a reverse stock split reduces the number of shares by increasing the stock's price per share. In a reverse split of 2:1, if an investor originally holds two shares they will receive one new share. Citigroup is an example, it completed a reverse stock split of 1:10 in 2011 to restore investor confidence after the Great Recession (Citigroup Inc. (NYSE: C) May 9, 2011).

Forward stock splits mainly lower share prices to make stocks more accessible to retail investors and improve liquidity. This mostly applies to those regions where fractional trading is not practiced largely, however this way trading is not facilitated through official stock exchanges and is hence not widely available (Barber et al., 2021).

Stock splits may also reflect the signal of manager's optimistic expectations on future stock performance of the firm and can also attract new investors to enter in the stock market, leading to the short-term trading volume increase (Fama et al., 1969). On the other hand, reverse splits are often used by firms to remain in compliance with minimum listing price requirements or to improve the perceived valuation of the company.

In the context of this study, we consider only forward stock splits and concentrate on their impact on market liquidity, investor sentiment and trading volume patterns. We are interested in the Swiss stock exchange, offering insight into a phenomenon that has received relatively limited attention in the Swiss context compared to more extensively studied U.S. and Asian markets.

1.2 Role of Market Sentiment

There is a role of market sentiment for triggering the price behaviour after a stock split. Whenever a stock is split investors consider it a sign of impending good performance, thus triggering heavy trading which causes them to increase demand. The signalling theory implies that splits are a positive signal about the stocks and hence the company's financial health and growth potential. However, while sentiment can motivate short-term price movement, they are not always persistent and some investors may regard stock splits as cosmetic changes that do not alter intrinsic value.

Additionally, the Efficient Market Hypothesis (EMH) states that stock split would have no real effect on returns. However, empirical evidence shows that there are frequently short-term abnormal returns driven by investor sentiment and speculative trading. The paper seeks to find out if the Swiss market is under similar behavioural tendencies and if trading behaviour induced by sentiment leads to permanent price mispricing.

1.3 Motivation of the study

The motivation behind this dissertation arises from the growing practice of stock splits across the world and the question of whether corporate actions like these really contribute to making markets more efficient or merely generate short-term distortions in markets. Bloomberg (2023) has indicated that stock splits have gone into overdrive, particularly among technology giants. In Switzerland, although the overall market is smaller compared to the U.S., there have been more forward splits in

recent years. Bloomberg information suggests roughly 40% increase in Swiss stock splits within 2014 to 2023, though exact count differs yearly. This growing phenomenon makes it essential to explore if stock splits in Switzerland have similar impacts on returns, liquidity and volatility with what has been observed in other markets.

1.4 Research Gap

Despite a vast body of research on stock splits in the U.S. and Asian stock markets, there is little research on the Swiss market. Very few studies provide empirical evidence of how stock splits affect Swiss market efficiency, trading behaviour, and liquidity patterns. Furthermore, the emergence of fractional share trading opens questions about whether classic explanations for stock splits, such as improving affordability and liquidity, are as appropriate today. This study will address the void by putting forward evidence from Switzerland to throw light on whether stock splits reflect or lead to long-lasting changes in the market, and in doing so contribute new evidence to a topic which has had relatively little examination.

1.5 Research Aim and Objectives

The primary aim of this study is to analyze the impact of stock splits on capital markets, in particular on Swiss companies from 2014 to 2023. The objective of this research is to investigate whether stock splits cause significant stock price changes, volume changes, liquidity and volatility, ultimately assessing if splits are growth signals or merely mechanical responses with long-lasting effects.

Research objectives are:

- To carry out an in-depth event study of stock performance prior to and subsequent to stock split events.
- To analyze liquidity and volatility changes associated with stock splits.
- To distinguish short-run speculative movement from long-run fundamental change in market behaviour.

1.6 Methodology and Main Findings

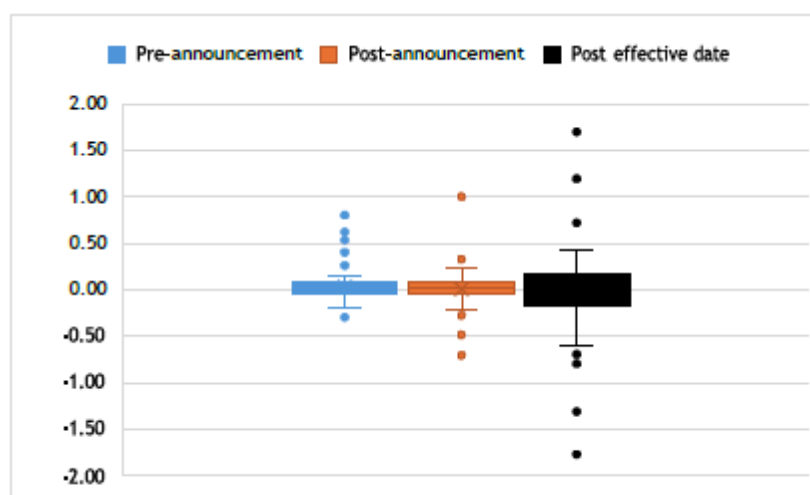
This study employs an event study model using daily stock returns to estimate abnormal returns, cumulative abnormal returns and volatility over a 30-day pre and post-announcement window and one-year post-effective window. Volatility is estimated using historical standard deviation and GARCH(1,1) modelling to capture time-varying behaviour and liquidity is captured in terms of trading volume, bid-ask spreads, and turnover ratios. Statistical significance is checked using t-tests with median-based robustness checks controlling for outliers. The 70 Swiss-listed companies show statistically significant positive CARs prior to split announcements, suggesting market anticipation or leakage of information, but post-announcement and post-effective periods yield mixed results, with most companies showing insignificant or negative CARs. Liquidity increases after splits through higher trading volumes and turnover, although some spikes are temporary and event-related. Volatility also increases significantly after a split but does not change long-run volatility patterns

significantly, such that Swiss stock splits are signals but produce firm-specific outcomes, as in mixed international evidence.

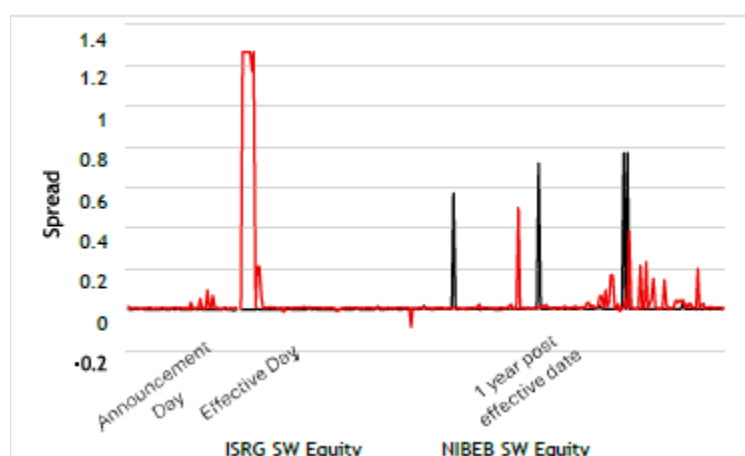
Average CAR and Standard Deviations Across Event Windows

Metrics	Mean CAR (%)	Standard Deviation (%)
Pre-announcement	3.264%	17.343%
Post-announcement	1.016%	20.695%
Post effective date	-1.244%	45.128%

Note: "CAR" represents the average cumulative abnormal return for Swiss stocks during pre-announcement, post-announcement, and post-effective dates. Standard deviations reflect dispersion around mean CAR.



Distribution of Cumulative Abnormal Returns (CAR) Across Event Windows



Data and Sample Selection

To analyze the stock split events that occurred in Switzerland between 2014 and 2023, this study investigates the impact of stock split on financial markets. The core data covers only splits with an adjustment factor greater than one, i.e., more than a single share was given per outstanding share.

This constraint eliminates splits considered to be non-material, i.e., corporate actions with a tiny adjustment (e.g., 1.01-for-1) and which are not likely to influence investor actions, trading activity, and stock price behavior in a material manner. And this threshold helps to filter out insignificant stock splits that do not lead to significant differences in market behaviour. In addition to maintain the validity of the results, firms that undertook merger, acquisition, or large restructuring during the event window were not included in the sample to prevent confounding effects. Of all 413 stock splits in Switzerland during this period, 151 has this criterion, out of which 70 stocks are used for analysis providing a rich cross-section of market sectors permitting a comparative analysis of industry-level effects (Appendix A).

2.1 Event Study Methodology

The event study method forms the backbone of this research, as it is a widely accepted empirical technique used to examine the reaction of financial markets to specific corporate events, in this case stock splits. This is particularly suitable as it allows measurement and isolation of AR, which is the difference between a stock's actual performance and the performance that would have existed if the split of the stock had not occurred. By examining these abnormal returns over a specific time period, the methodology measures investor reaction and examines for market efficiency.

2.2 Conclusion

The conclusion phase integrates two data sources to produce a solid dataset consistent with the study's analytical aims. The primary quantitative data source is the Bloomberg Terminal that offers extensive and reliable finance market data. All stock splits announced, adjustment factor effective data, historical price data for the stock, volumes, along with company-specific metadata are extracted using the equity screening and tracking functionalities of Bloomberg².

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3. THE IMPACTS OF ARTIFICIAL INTELLIGENCE (AI) ON BUSINESS CHALLENGES IN THE CURRENT SCENARIO

Dr. V. Rathika,

Principal, Annai Veilankanni's College of Arts And Science,
Saidapet, Chennai-600015

Abstract

In the current technological age, innovations and advances are happening at lightning speed, making this perhaps the most exciting time in human history. Artificial intelligence has become an integral part of our lives, impacting people, society, and the economy. Artificial Intelligence (AI) is the branch of computer science which deals with intelligence of machines where an intelligent agent is a system that takes actions which maximize its chances of success. It is the study of ideas which enable computers to do the things that make people seem intelligent. The central principles of AI include such as reasoning, knowledge, planning, learning, communication, perception and the ability to move and manipulate objects. It is the science and engineering of making intelligent machines, especially intelligent computer programs

The last few years have been remarkable for artificial intelligence, and today almost every company is reshaping their strategies and business models to incorporate AI into all business processes. However, companies are not yet aware of the consequences of this AI adoption, so its impact needs attention. In this paper, we aim to find out the impact of AI on enterprises by studying decision-makers and regular employees in enterprises.

Artificial intelligence (AI) is defined as "the capacity of a computer or computerized robotic system to process data and produce results that are similar to the thought process of humans in learning, decision-making, and problem-solving." Additionally, the aim of AI systems is to "solve challenging problems in ways that resemble human logic and reasoning." For the analysis, four different business parameters are considered, which help to find out the impact of AI on businesses. This Research paper mainly focus on usefulness of AI technology for Business Development Process in the current scenario. The results of the analysis show that AI offers numerous opportunities and the potential to transform the world of work, and it is now widely accepted. AI has been proven to positively impact all business operations by improving sustainability and market leadership.

KEYWORDS

Data Mining, Enterprises decision process, sustainability and market leadership.

INTRODUCTION

Rapid advances in the field of artificial intelligence have profound implications for the economy as well as society at large. These innovations have the potential to directly influence both the production and the characteristics of a wide range of products and services, with important implications for productivity, employment, and competition. But, as important as these effects are likely to be, artificial intelligence also has the potential to change the innovation process itself, with consequences that may be equally profound, and which may, over time, come to dominate the direct effect.

AI : E-commerce

AI's business applications seem to be of special value. We define the AI of e-commerce organisation as the capacity of firms to create, incorporate, and employ AI-based resources in connection with RBV. However, effective and efficient AI implementation in businesses necessitates substantial infrastructural resources, including funding, data hardware and software, and technical support. Since most ecommerce businesses operate online, they have an inherent advantage in obtaining data resources. Intangible resources should be used effectively as the organisation defines the fundamental tangible resources. It won't benefit businesses if they don't want to use AI for planning, coordination, control, and implementation. For employees utilize the AI in near future.

This branch of computer science is concerned with making computers behave like humans. Artificial intelligence includes game playing, expert systems, neural networks, natural language, and robotics. Currently, no computers exhibit full artificial intelligence. the greatest advances have occurred in the field of games playing. The best computer chess programs are now capable of beating humans. Today, the hottest area of artificial intelligence is neural networks, which are proving successful in a number of disciplines such as voice recognition and natural-language processing. There are several programming languages that are known as AI languages because they are used almost exclusively for AI applications.

Artificial intelligence refers to a type of programming that powers most of the "smart" technologies with which people tend to interact today. Standard computer programs are built around set rules, filters and exceptions that allow them to appear intelligent. But none of these programs rely on true intelligence; each of them is just following the rules.

In contrast, artificial intelligence enables computer systems to crunch large sets of data and gives them the ability to learn and change their own behavior based on past

experience. Because of its reliance on large sets of data, artificial intelligence is especially useful for pattern-recognition tasks like categorization and prediction.

OBJECTIVES OF THE STUDY

- To Analysis of Artificial intelligence computer system process for business.
- To evaluate the AI impact in Business Decision making system.
- To examine the AI usefulness in recruiting and human resources in business organization.

SCOPE OF THE STUDY

At the heart of artificial intelligence is the algorithm, which can be defined as a set of instructions that tell a computer what to do. A main difference between simple computational tasks (such as the kind performed in a spreadsheet) and artificial intelligence is that artificial intelligence algorithms can rewrite their own instructions. Instead of mindlessly crunching the same computations over and over again, an artificial intelligence algorithm can learn, and refine its predictive accuracy, by feeding exceptions to its predictions through a feedback loop. This research paper mainly focusses on how AI useful for meet the business challenges in current scenario of the business system.

STATEMENT OF THE PROBLEMS

AI is more useful for business Concerns meeting with their reporting managers once a year to review how the work is going and their performance are among the major ones that employees tend to express when it comes to employee engagement. Peakon, an AI-based programme that enables all employees to perform to their full potential, provides a solution to this issue.

Artificial intelligence's effects on recruiting and human resources Talent Acquisition Compared to any other industry, talent acquisition shows the highest impact of artificial intelligence on business. In the Talent acquisition superset, intelligent is used in a number of processes, such as candidate sourcing, resume screening, chatbot engagement, and face recognition AI-powered software to identify the candidate's emotions. This research paper mainly focusses on how the more useful of AI in Business development process in the Current Business scenario.

ADVANTAGES OF AI IN BUSINESS

- ❖ **Human Resource Management:** To assist HRs in the administration of administrative chores, a number of AI products are currently available on the market. Currently, human resources departments all over the world use chatbots to respond to

employee inquiries and big data to create employee schedules, which in turn aids businesses in forecasting demand and preparing efficient staff rotas to meet it.

- ❖ **Managing Your Career:** When discussing the use of AI in learning and development, several applications come to mind: career pathing, personalised training recommendations, coaching via chatbots, and manager development driven by in-the-moment team feedback.
- ❖ **Performance Administration:** It is much simpler to note all instances of good and poor performance because AI-driven assessments are instantaneous and real-time (with algorithms monitoring the quotas, targets, and how they are changing for each employee on a daily basis). This makes it easier to determine the proper measure of performance and provides an answer to the question of how AI will benefit businesses internally. Real-time access and monitoring can aid in highlighting flaws on a daily basis, allowing firms to take corrective action before a problem gets worse.
- ❖ **Customer Service:** Chatbots are the most popular response to the question of how artificial intelligence is applied in a corporate setting. Businesses can access the layers of data from the neural networks, such as consumer data and information, which have been accumulated over time, thanks to deep learning-powered AI chatbots. When equipped with real-time access to client preferences and purchase history, chatbots have an advantage over their human counterparts.
- ❖ **Creation of Content:** Every content marketer who is tired of creating the monthly content using spreadsheets can use a chatbot. A programme called Wordsmith is renowned for successfully transforming a number of structured data elements in textual documents. There are a few firms that have employed systems like Wordsmith, however AI in content production is only used for publications that have a strict framework.
- ❖ **Greater User Experience:** The reason artificial intelligence is beneficial to business can be summed up in one sentence: consumers today are much more demanding than they ever have been. They require a vast array of goods, data, and services in one location, all delivered in real-time and at breakneck speeds. Additionally, using AI allows you to provide all of the services in a single location and in real time, ultimately improving the user experience.
- ❖ **Impact of Artificial Intelligence on Finance Accounts Payable:** Due to the use of digital workflows, there are a variety of AI-based invoice management systems that greatly streamline the processing of invoices. In order to do this, the machine learning

algorithms are created in a way that they can learn accounting codes that are suitable for managing and creating invoices. 3.1 Procurement Organizations' purchase and procurement processes typically include a tonne of paperwork and the use of numerous files and systems that are frequently incompatible with one another. The procurement process will become significantly more paperless and require fewer human efforts if APIs and AI are used to combine and process unstructured data through mobile apps that are driven by AI.

- ❖ **Management of Expenses:** Any accounting team must spend a lot of time reviewing and approving expenses to ensure that they are in accordance with the organization's policies. People can use AI to programme machines to read receipts, audit expenses, and notify the finance team if there are any discrepancies. 4. AI's effects on operations management Analysis of logs The largest application for AI-powered Operations is log analysis. Operating system, server, hardware, and application layers all leave behind data streams that can be collected, saved, processed, and then analysed by machine learning algorithms. The data is then used to conduct an event's root cause analysis. By utilising AI's power in log analysis.
- ❖ **Capacity Management:** The resource requirements of the apps are carefully planned by IT architects, multi-tier, sophisticated application might be very difficult for them. Every application's physical layer needs to be matched with the appropriate number of CPU cores, storage space, ROM, and network bandwidth. Artificial intelligence is helpful in this situation of proper hardware specifications or choosing the appropriate instance type in the public cloud.
- ❖ **Scaling Infrastructure:** The Both proactive and reactive auto scaling configurations are available. The monitoring infrastructure will be able to track events in the reactive mode. 4.3 Construction Maintenance The assistance it provides with building upkeep is the final benefit on our list of how AI may improve corporate operations.

INTELLIGENCE. MARKETING STRATEGIES

The majority of the potential uses of AI in marketing in the future are only limited by the imagination. The concept of who we are and how marketers interact with humans and their technological extensions may change as a result of advances in artificial intelligence. Marketing strategies must not only comprehend the consumer but also the software that person uses to make decisions. Artificial intelligence is not going anywhere, and its capabilities will keep expanding. Future sales applications of AI. Currently, artificial intelligence handles a variety of sales tasks, including customer retention and sales

forecasting. "Mining of customer actions, sales transactions, regional sales distribution, sales executive involvement. Although AI can already complete the aforementioned tasks, it cannot take the place of the human interaction between the salesperson and the client. The link between men Today.

Research methodology

In this paper the Researcher used the convenient sampling method for data collection from various business Enterprises. The business perceptions on the importance and anticipated impact of AI across sectors and our daily lives. A wide range of sectors such as financial services, technology, and manufacturing via an online survey to explore attitudes toward AI and its current and future implications on society. The survey was conducted among adults employed in fulltime/part-time or self-service roles in organizations under consideration. To visit in some of the houses in the locality and relative for their views and thought about the AI in different field of the day-to-day activities. That is called personal open on about any things from user and how they comfort for this. Last one liker process in we survey on the basis on like and different person perception on the Ai use in every sector of the Businesses and other activities of life.

- ❖ **AI in Astronomy:** Artificial Intelligence can be very useful to solve complex universe problems. AI technology can be helpful for understanding the universe such as how it works, origin, etc.
- ❖ **Generative AI tools:** These tools use machine learning algorithms like natural language processing/generation (NLP/NLG) to create new content such as text, images, or music based on input from a user. Generative AI is applicable in many industries for content creation, product development and design, and personalized marketing.
- ❖ **AI in Healthcare:** In the last, five to ten years, AI becoming more advantageous for the healthcare industry and going to have a significant impact on this industry. Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnoses and can inform when patients are worsening so that medical help can reach to the patient before hospitalization.
- ❖ **AI in Gaming:** AI can be used for gaming purpose. The AI machines can play strategic games like chess, where the machine needs to think of a large number of possible places.
- ❖ **Business intelligence (BI) platforms:** BI tools leverage AI to analyze large volumes of data and provide actionable insights. These platforms help businesses make data-

informed decisions by identifying trends, forecasting future outcomes, and optimizing operations through advanced data analytics.

- ❖ **Development tools, such as automatic code generators:** These AI-powered tools assist developers by automatically generating code snippets, suggesting optimizations, and even creating entire applications based on predefined parameters. They enhance productivity and reduce development time.
- ❖ **Analytics platforms:** AI-driven analytics platforms process vast amounts of data to uncover patterns and insights that would be impossible to detect manually. They support predictive analytics, customer behavior analysis, and performance tracking.
- ❖ **Cybersecurity augmentation:** AI enhances cybersecurity by identifying potential threats, monitoring network activity, and responding to security breaches in real-time. Machine learning algorithms can detect anomalies or vulnerabilities and predict attacks before they occur.
- ❖ **AI in Finance:** AI and finance industries are the best matches for each other. The finance industry is implementing automation, chatbot, adaptive intelligence, algorithm trading, and machine learning into financial processes.
- ❖ **Market research and target audience segmentation:** AI tools analyze consumer data to provide deep insights into market trends and customer preferences and behaviors. They help businesses segment their target audience more effectively, enabling personalized marketing strategies and improving customer engagement.



Findings and Suggestions:

AI-enabled decision-making is faster and smarter because it can deliver the data business leaders need in real-time. If a marketer wants to know whether to continue a

campaign, for example, AI can quickly show how the campaign has performed so far. However, AI may also indicate current market fluctuations and other factors that could impact campaign success. Marketing leaders can access these insights fast and make snap decisions with confidence — based on accurate data. This AI Maximum used for Education institutions and small and medium and large-scale business Enterprises.

Table – 1.1 Artificial Intelligence in benefits in various field

Particulars	Satisfaction level
Customers Experience	60.65
Cost Reduction	70.2
Risk Management	68.4
AI in Entertainment	80.4
AI in Agriculture	76.2
AI in E-commerce	90.5
AI in education	82.4

Chart – 1.1 Artificial Intelligence in benefits in various field



Future of AI for Businesses

- ❖ **Increasingly human-like language generation:** AI models will produce text virtually indistinguishable from human-written content, potentially enhancing customer service interactions, content creation, and report generation.
- ❖ **Enhanced personalization:** AI will drive increasingly sophisticated personalization for business marketing, tailoring content and campaigns to individual preferences and behaviors to improve customer experiences and conversion rates.
- ❖ **Microtargeting via granular audience segmentation:** AI-powered tools will empower marketers to create highly specific audience segments, enabling precise microtargeting and maximizing marketing ROI.

- ❖ **Highly accurate and longer-range predictive analytics:** AI will power more accurate predictive analytics, empowering businesses to forecast long-term trends, optimize supply chain logistics, manage inventories better, and improve overall financial planning.
- ❖ **More roles that require AI-powered tools for increased efficiency:** As AI becomes an essential aspect of business, more roles will require proficiency in these technologies, necessitating ongoing training and upskilling for effective utilization.

CONCLUSION

Machine Vision Machines can capture visual information and then analyse it. Here cameras are used to capture the visual information, the analogue to digital conversion is used to convert the image to digital data, and digital signal processing is employed to process the data. Then the resulting data is fed to a computer. In machine vision, two vital aspects are sensitivity, which is the ability of the machine to perceive impulses that are weak and resolution, the range to which the machine can distinguish the objects. Knowledge-Based Systems. A KBS can be defined as a computer system capable of giving advice in a particular domain, utilizing knowledge provided by a human expert. A distinguishing feature of KBS lies in the separation behind the knowledge, which can be represented in a number of ways such as rules, frames, or cases, and the inference engine or algorithm which uses the knowledge base to arrive at a conclusion. The ultimate goal of institutions and scientists working on AI is to solve majority of the problems or to achieve the tasks which we humans directly can't accomplish. It is for sure that development in this field of computer science will change the complete scenario of the world Now it is the responsibility of creamy layer of engineers to develop this field

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4. ASSESSMENT OF FINANCIAL ECONOMIC AND TECHNOLOGICAL INTEGRATION IN HOTELS WITH SPECIAL REFERENCE TO VARANASI DISTRICT

Dr. Rakhi Gupta

Assistant Professor, Faculty of Commerce, Banaras Hindu University Varanasi UP

Dr. Divya Chowdhry

Director, Jagran Institute of Management Kanpur UP

Uma Barman

Research Scholar, Faculty of Commerce, Banaras Hindu University Varanasi UP

Abstract

Artificial Intelligence plays the most persistent role in every sector now a days. The purpose of this study is to investigate the integration of personnel, informational and technological advancement towards financial management in hotels. The main objective is to find out the collective impact of three components on financial performance in hotels. The financial performance of any organization shows its condition whether it is strong or not. While discussing Financial performance, it is very important to highlight other variables such as technological advancement, personnel and informational analytical. As this report is based on hospitality industry so here all these components are covered. The research addresses a multi theoretical approach, combining the TAM (Technology Acceptance Model) to assess the employees' behavior towards technology with the framework of TOE (Technology-Organization-Environment) and the RBV (Resource-Based view). Through this integrative model the study aims to reach the financial productivity with the support of personnel or human, informational analytical and technological alignment. A preliminary research was conducted using a questionnaire survey by taking 30 respondents. For data analysis, SPSS statistical tool was used to find out the result. The findings offer both theoretical and practical implications in AI driven hotels.

1. Introduction

In counting of total population now India is the prime leader or we can say the highest population country is India (143.81 crores) according to **(Sources include: World Bank, United States Census Bureau)**. By the growth of population in India it also shows the growth in Industrial sector including Hotel Industry. The hotel industry is an emerging industry in the increasingly competitive business world. The technology revolution directly impacts on hotel industry which is also influenced by employee behavior and loyalty **(Babu, B. H., Verma, B., & Tyagi, A. 2025)**. In the increasingly competitive hospitality industry, the effectiveness of financial management and the degree of technological integration play a

vital role in a hotel's operational success and long-term sustainability. With rising customer expectations, cost pressures, and digital transformations, hotels are compelled to adopt modern financial strategies and embrace technological tools that ensure optimal resource utilization, improved service delivery, and profitability. The awareness of stakeholders in CSR practice is also shed light on Indian Hospitality sector positively **(Aparna, K., Amilan, S., & Raj L, V. 2024)**. carbon emission intensity (CEI) and revenue per available room (RevPAR) were the factors that most affected hotel chains. In Asiatic Country there are more energy efficient hotels are there which help to generate sufficient revenue for hotel industry **(Arenhart, R. S., & Souza, A. M. 2025)**. To ensure economic stability in hotels, financial management and budget planning are the key drivers which influenced by the factors like employee safety, changes in customer needs, a decrease in tourist flow, economic instability. In crises time it is very substantial to manage the financial planning of hotels. Financial and budget strategies only can help to recover the crises time and can face challengefull situations **(Nedzvedskyi, Y., Banyeva, I., Kushniruk, V., Velychko, O., & Cherven, I. 2024)**. Accounting practice is a part of Financial planning which emphasizes the significance of transparency of accounting books of hotels. The investors are always wants low risk and high return. So in this case accounting practices helps to increase the investors' confidence and managing the risk in a better way **(Avdylaj, A., & Asllanaj, R. 2024)**. In financial economic terms the audit report also plays another influential role to determine the budget in hotels. The effect of audit committee, internal auditor and audit quality increase the value of the firm or hotel industry **(Ikhsan, A., Rosari, D., Pambudi, J. E., Lubis, P. K. D., & Fadillah, T. D. 2024)**. In finance, the importance of funds and its applications plays the crucial role but in the same way the transparent report by the audit committee also meanwhile very essential. Because a hotel within its boundry needs various types of cautiousness in financial planning and other aspect of management. So it is very significant to prepare a good system of finance in this industry where conflicts of interest can be minimized. No doubt the technology changes the industrial and commercial uses of product and services in a rapid speed. We can see the impact of smart technology on hotel industry also. From generating the revenue to collecting customers for hotels all these things are done by technology itself. No one can deny the reality of changing the system of recording footfall of customers in hotels by the help of online hotel bookings and other facilities. Technology increases the efficiency and productivity in hotels. Now the hoteliers can analyse the guest experiences of hotels easily so that they provide better facilities to the guests. Symbiotic relationship between hotels and technology advancement increases the innovation, efficiency

gain and enhanced customer satisfaction(Ponduri, S. B., Ahmad, S. S., Ravisankar, P., Thakur, D. J., Chawla, K., Chary, D. T., & Sharma, S. 2024). Digital technology not only improves the internal system of hotels it also changes the external process of attracting consumers for hotel industry . It encourages hotel industry to boom and sustainable development (Kolobkova, V. A., Romanov, A. A., & Frolova, E. A. 2021). So, here we can clarify two research questions RQ 1: What is the current state of hotels and its financial activities in Varanasi? RQ 2: What is the impact of technologies on financial performance of hotels in Varanasi? These two questions are playing main role in this research study.

1.1 Research Objectives

1. **To evaluate the current state of hotel and financial activities**
2. To evaluate the relationship between digital technologies and financial economic performance in hotels.

1.8 Research Hypotheses

Null Hypothesis (H01): There is no significant relationship between the current financial economic practices and the overall financial performance of hotels.

Alternative Hypothesis (H11): There is significant relationship between the current financial economic practices and the overall financial performance of hotels.

Null Hypothesis (H02): The adoption of digital technologies has no significant relation with financial economic in hotels.

Alternative Hypothesis(H12) : The adoption of digital technologies has significant relation with financial economic in hotels.

2. Literature Review and Hypothesis

Dryglas, D., Lis, A., & Suder, M. (2024), This study reveals the practical scenario of facing problems in pandemic crises , therefore in hotel industry researchers shifted attention to how hotels can become more adaptable and better equipped to recover from adversities. **Zhubi, M., Zhubi, D., Kovaçi, I., & Tahiri, A. (2024),** According to this study 100 hotels are taken as sample to identify the importance of performance evaluation. It is not just only to tick the blank boxes but to detect the errors in Human resource management system where it is very important to analyse those factors which are responsible for influencing the hotel's financial performance. **Lopez-Gamero, M.D., Molina-Azorin, J.F., Tari, J.J., & Pertusa – Ortega, E.M.(2023),** According to the study the hotel's sustainability practices have direct relation with the financial performance. The study continued by taking 365 hotels where it found that hotel's financial performance affected by social sustainability, economic sustainability positively. **Xi, W., Baymuminova, N., Zhang, Y. W., & Xu, S. N. (2022),**

This study addressed how hotel CEOs manage differently when faced with cognitive dissonance and group norms. It is very common that clash and conflict can raise at any moment in organization from top to bottom. The study was done in Seoul by taking the 5 star hotels as respondent. Findings reveal that even when individuals hold differing personal views, they're more prone to validate if they're compensated for doing so. This compliance positively influences both financial and non-financial management outcomes. **García-López et al., (2025)**, Andalusian hotels and their readiness for shifting towards digital transition to analyze the prevailing situation in hotels. The study reported out the speed up rate of digitalization in hotels based on respondents collected as a sample of 183 hotels. **Begum, N., Faisal, M. N., Sobh, R., Nunkoo, R., & Rana, N. P. (2025)**, The research study was based on Meta analysis specially. This study tries to introduce the robot service in hotels. As service robots become more common in hotels now a days , researchers have been trying to understand what underlying factors responsible for customers to embrace and use them. Interestingly, effort expectancy, how easy the robots are to use, while only weakly linked to acceptance, still shows promise as a predictor. The study reveals that while we understand a lot about the functional and customer-related aspects, there's still much to learn about the features of the robots themselves. By consolidating what we know, the research offers both theoretical insights and practical guidance. For hotel managers, this means focusing not only on how well the robots work but also on shaping positive customer attitudes to ensure smoother adoption. **Shukla, A., & Mishra, A. (2023)**, This study uses the Stimulus-Organism-Response (S-O-R) framework to explore how online reviews affect people's intent to book hotels online. Data was gathered through an online questionnaire and analyzed using advanced statistical methods (PLS-SEM). The findings reveal that the tone of a review whether it's positive or negative plays a big role in how credible the review is perceived to be. Surprisingly, the *length* of the review doesn't have much effect. The study also discussed the electronic word of mouth in hotel booking decision. **Sarfraz, M., Khawaja, K. F., Han, H., Ariza-Montes, A., & Arjona-Fuentes, J. M. (2023)**, This paper explored to the emerging technology such as blockchain technology and its impact on sustainable strategies of hotels in large competitive market. This study centered around how hotels and resorts can gain a lasting competitive edge by adopting sustainable supply chain strategies and how technology plays a key role in that process. The study concludes that it's not enough for firms to simply be sustainable they must also embrace emerging technologies and adapt to digital change. These insights are desirable for both researchers and hotel industry leaders who want to stay competitive in a fast-changing market. **Mehmood, K., Zia, A., Alkatheeri, H. B., Jabeen,**

F., & Zhang, H. (2023), The role of top management in service innovation, service improvement is very important in hotel industry. To strengthen the management structure of hotels it is very important to educate the management in all levels with the proper knowledge of information technology. The study explores 448 hotels in UAE , the study applied sophisticated statistical analysis to test its framework. The results show a clear link: hotels with strong IT capabilities tend to perform better, but this isn't just a direct connection .

Binesh, F., & Baloglu, S. (2023), This study explores the adoption of robots in hotels as it is related to social and emotional factors that influence the real world because robots replaced human being . Therefore to know the feelings of customer in this kind of service is very influential . Technology plays these days a very crucial role in every aspect but to provide food services by a robot is somehow influence the social and emotional aspect of human being. The study also finds that when people feel safe and comfortable using robots, they're more likely to adopt them. Overall, this research offers a more complete view of how and why guests embrace new tech, and gives hotel managers valuable insight into designing better, more appealing tech experiences that go beyond just novelty.

Yanan, L. I. (2023), The study seeks to understand the threat side of employees in hotels after adopting Artificial Intelligence. As artificial intelligence (AI) becomes more integrated into the workplace, many employees especially in luxury hotels are starting to feel that their professional knowledge is being replaced.

Bahri-Ammari, N., & Nusair, K. (2015), Researchers surveyed 406 CRM users across 15 four- and five-star hotels in Tunisia, using structural equation modeling to analyze the data. The findings show that having a well-structured, customer-focused management system helps hotels make better use of CRM technology.

Sirirak, S., & Islam, N. (2010, July), The study was done in Phuket , Thailand where it explored the hospitality sector very deeply and it found that tourism industry is now in rapid growth in Thailand as well as hotel industries. In increasing competition many hotel owners are showing interest on ICT (Information and Communication technologies). ICT simply covers that how many technological tools are available and their integration with how intensely they are used. The findings show that ICT can indeed improve productivity—but the impact varies by hotel type.

Prakash, S., Sharma, V. P., Singh, R., & Vijayvargy, L. (2023), This study explores how the hotel industry can better adopt green and sustainable practices by identifying and prioritizing the most critical performance indicators (CPIs). As environmental concerns grow, hotels are under increasing pressure to reduce their carbon footprint and operate more sustainably.

Jitto, P., & Nakbanpote, W. (2023), The study found that as the hotel industry is growing rapidly but side by side the problem of wastage is also growing rapidly. The study

was done in Thailand. Food waste is a growing challenge in Thailand, making up 40% to 70% of municipal solid waste depending on the region, food habits, and local lifestyles. To tackle this, Thailand has set a national goal: reuse or recycle 50% of its organic waste by 2026, following the 3Rs strategy—Reduce, Reuse, Recycle. **Adel, A. M., Dai, X., Roshdy, R. S., & Yan, C. (2021)**, The study explores the problems of muslim travelers while they travels to non muslim countries. This study finds that the muslim travelers are more reliable on personal contact rather than online information of websites. **He, W., Tian, X., Tao, R., Zhang, W., Yan, G., & Akula, V. (2017)**, In today's competitive market, a strong reputation can set a company apart especially online, where customers freely share their experiences. For hotels, social networks play a growing role in shaping that reputation. With reviews and opinions pouring in from users every day, hotels now have access to a wealth of valuable feedback. But to make sense of it all, they need smart tools. **Modi (2024)** studied the tourism industry of India which generates not only employment opportunities but also income for the nation which has created a positive impact on countries GDP. **Prakash (2020)** in his study it explains that in recent years India has attracted Foreign Tourists from the UK, the US, and Bangladesh. The finding of the study suggests that foreign exchange earnings (FEE) from foreign tourists are significant for the Gross Domestic Product of India. **Godara (2018)** studied economic growth and tourism in India. In this study, the results represent a positive relation between economic growth and tourism but this relationship is very weak this means that the effect of the growth of foreign tourism on the growth rate is less or we can also say there is no strong relationship among these two variables. **Ali (2018)** described a relationship between foreign tourist arrival (FTA) and foreign exchange earnings (FEE) by taking the data from 2000 to 2016, showing the percentage change over the previous years. In this study, the researcher shows that foreign exchange earnings contributed to GDP 6.7% of total GDP, and employment generated 3.66 crores of people in 2014. Eja (2017), in this research paper, identified the seasonal patterns for foreign tourist arrival in Nigeria and showed foreign tourist arrival increases the growth of Hotel industries but it is also observed that many challenges faced by the Hotel industries such as high taxation, inadequate electricity supply, inadequate and obsolete facilities and insecurity. Prediction models for tourist arrivals by many researchers in their studies. **Adeyefa, A., Adedipe, A., Adebayo, I., & Adesuyan, A. (2023)**, This study investigated employee retention in the hotel sector by analyzing the impact of green HRM (GHRM) practices using Structural Equation Modeling (SEM) and Relative Importance Index (RII). **Naung, M. N. N. M. S., & Aung, M. T. (2022)**, This study examines the impact of HRM practices on job satisfaction and employee retention in hotels. Using a

sample of 160 responses from employees in 3-star, 4-star, and 5-star hotels, the research identifies five key HR practices: recruitment and selection, training and development, performance appraisal, compensation and reward, and employee participation. The results reveal a positive correlation between HRM practices and job satisfaction, with training and development. **Martorell Cunill,(2024)**, in this study the researcher tries to show the different performance of equity strategy (own hotels) and non equity strategies(hotels under rental, franchise, and management contract) where it found that equity strategy hotels performed better than non equity strategies hotels. In this study, they found the negative performance of food and beverages services or we can say negative synergy. **Dubé, J., Lapointe, A., Martel, V., Placide, M. B., & Torres Ospino, I. V. (2024)**, the study found that a sea view can add 0-20% to room prices, with more stable prices, especially in summer. **Singh, V., Sharma (2023)** In this study the researcher found that technology infrastructure, compatibility, relative advantage, top management support, and social influence are important determinants in the adoption of hotel pricing. Here the researcher used regression analysis. **Asshofi, I. U. A., Putri, M. A., Saputra, R. D., & Wijayanti, A. (2023)**, the study found that customers' views on fairness in pricing are mainly shaped by how familiar they are with the pricing practices. **Satpute, P., & Venkatraman, D. P. (2021)** in this research researcher studied the duration or length of time when a guest stays in hotels. Here "duration control" (a method of managing the length of guest stays) helps hotels reach their break-even point more efficiently, ultimately boosting profitability. **Sharma, H., & Aggarwal, A. G. (2021)** this study finds that user-generated content (UGC), like guest reviews and ratings, significantly influences hotel sales along with financial factors. **Kim, J., Jang, S., Kang, S., & Kim, S. J. (2020)**, this study examines how room prices relate to hotel attributes like size, age, service quality, and location (proximity to airports, highways, and tourist spots). **Gumaste, R. R., Shende, K. M., & Shah, G. D. (2019)**, this study on 5-star hotel guests reveals that men and women prioritize different in-room facilities. Both genders value proper ventilation and air quality. **Phillips, P., Barnes, S., Zigan, K., & Schegg, R. (2017)**, in this study the researchers found various determinants that help to decide the room rate of hotels where the main attributes are services provided by hotels, location of rooms, and the food services. **Ben Aissa, S., & Goaid, M. (2016)**, this paper highlights four main findings on hotel efficiency. First, broader factors like international appeal and competition directly impact hotel performance. Second, efficiency varies based on specific hotel traits, including its age, type, management style, and location. Third, management characteristics, such as the general manager's tenure, board members' education, and the number of managers, also play a role. Lastly, higher

tourism wages are linked to improved corporate hotel efficiency scores. **Taylor, W. J., & Kimes, S. E. (2010)**, this study analyzed room prices from hotels along the St. Lawrence River in Quebec (Canada) during peak winter and summer seasons. Using matched data and hedonic pricing models, it measured how much having a sea view increases room prices.

While several studies have explored financial management and digital transformation in the hotel industry separately, there remains a lack of integrated research that examines how both these elements interact and impact overall hotel performance. For instance, **López-Gamero et al. (2023)** highlighted the positive link between sustainability practices and hotel financial performance, but did not go into depth about how technological tools contribute to that performance. Similarly, **García-López et al. (2025)** examined the speed and readiness of digital adoption in Andalusian hotels, yet didn't assess how these digital tools are affecting cost control, financial planning, or economic decision-making within hotels. Additionally, studies like **Marinakou et al. (n.d.)** have looked at AI in talent acquisition, suggesting the need for alignment with strategic and financial goals. But , they did not explore how well hotel staff are adapting to these changes or how digital skills among employees are impacting financial efficiency on the ground. This study tries to carry a holistic study including financial economic, technological, personnel and informational component.

3. Methodology

3.1 Research Design:

This research adopts a mixed-method approach combining both quantitative and qualitative methods. A descriptive research design is followed to assess various components of financial and technological management in hotels.

3.2 Sample size:

The study will target hotel owners, managers, and finance professionals across urban, suburban, rural, and tourist-centric regions. A structured questionnaire was distributed among a sample of 30 respondents in Varanasi district, selected using stratified random sampling to ensure a balanced representation of hotel sizes and locations. In this research the questionnaire was adopted from previous research work of **Румик, І., Лакіза, В., Курило, О., Антошкова, Н., & Тараненко, Г. (2024)** which is a modified version of original questionnaire **Kuznetsov, V., & Strijov, V. (2014)** . Data was collected for the period of February,2025 to June, 2025.

3.3 Data Collection Tool:

Primary data is collected using a detailed, bilingual (English and Hindi) questionnaire covering four major components:

- Personnel
- Information-Analytical
- Technical-Technological
- Financial-Economic

Each component will be evaluated on a 5-point Likert scale to measure agreement levels. The questionnaire also includes demographic profiling. The existing questionnaire of this research is adopted .

3.4 Data Analysis Techniques:

A descriptive study is done in this research including mean, standard deviation, frequency and percentage with diagram and charts. In data analysis Excel and SPSS is used.

3.5 Sampling method

A purposive sampling method was used to select 30 hotel managers in Varanasi. For the time constraints for this dissertation work the data collected from February month of 2025 to June, 2025. Only 5 months data was recorded for this research study.

3.6 Theoretical overview

The research addresses a multi theoretical approach, combining the TAM (Technology Acceptance Model) to assess the employees' behavior towards technology with the framework of TOE (Technology-Organization-Environment) and the RBV (Resource-Based view). Through this integrative model the study aims to reach the financial productivity with the support of personnel or human, informational analytical and technological alignment. Based on these theories this research paper tried to make a relationship among four variables such as personnel, informational, technological and financial economic.

3.7 Statistical Analysis

To fulfill the research hypotheses, the research paper conducted a descriptive analysis. The analysis was done by Excel and SPSS. There are four constructs in this research paper from which the first one is Personnel component and its indicators are showing, Purposefulness of the financial management, digital technologies has significant relation with financial economic in hotels, Effectiveness management hierarchy at the enterprise where the highest mean value of “strongly agree of likert scale” shows 17.67 and S.D. 2.5166 (medium). The Second construct Informational analytical has three indicators Validity of management decision regarding costs, the ability to recognize factors affecting costs, A system for obtaining and evaluating data and information about expenses where the likert scale “agree” shows highest mean value of 16.000 and S.D. 3.60555 (medium). The third construct

technological component comprises of active use of digital technologies for cost management, updating the material and technical base for management activities, technologies for controlling financial costs. In this construct the highest average score falls under the “strongly agree” category with mean value of 25.333 and S.D. .57735. The last construct the financial economic construct comprises of Level of financial and economic security, effectiveness of financial management subjects at the enterprise, motivation of subjects of financial management where the mean score highest for “strongly agree” category with mean value 23.67 and highest S.D. 3.21455.

The current state of hotel which was the first hypothesis is fulfilled because the mean value supports and shows highest in every components. The second hypothesis was also confirmed by correlation analysis of financial economic and technological adoption in hotels. Analysing the following table, the correlation analysis between the data of Technological components and Financial components. The result suggests that there is some positive relationship between technology adoption and financial performance, but the results are not statistically significant. Therefore, technology may influence financial performance, but a larger sample size and more focused variables are required to confirm this integration effectively.

Correlation Analysis of Financial and Technological Components:

		Correlations					
		Active use of digital technologies for cost management	Updating the materialk	Technologies for controlling	Level of financial and economic security	Effectiveness of FM	Motivation of subjects of FM
Active use of digital technologies for cost management	Pearson Correlation	1	.288	.351	.349	-.044	.010
	Sig. (2-tailed)		.122	.057	.058	.831	.960
	N	30	30	30	30	26	26
Updating the materialk	Pearson Correlation	.288	1	.072	.149	.019	.114
	Sig. (2-tailed)	.122		.705	.432	.925	.580
	N	30	30	30	30	26	26
Technologies for controlling	Pearson Correlation	.351	.072	1	.070	.088	.180
	Sig. (2-tailed)	.057	.705		.714	.669	.380
	N	30	30	30	30	26	26
Level of financial and economic security	Pearson Correlation	.349	.149	.070	1	-.013	-.074
	Sig. (2-tailed)	.058	.432	.714		.951	.718
	N	30	30	30	30	26	26
Effectiveness of FM	Pearson Correlation	-.044	.019	.088	-.013	1	.525**
	Sig. (2-tailed)	.831	.925	.669	.951		.006
	N	26	26	26	26	26	26
Motivation of subjects of FM	Pearson Correlation	.010	.114	.180	-.074	.525**	1
	Sig. (2-tailed)	.960	.580	.380	.718	.006	
	N	26	26	26	26	26	26

** . Correlation is significant at the 0.01 level (2-tailed).

4. Findings and Conclusion

The study investigated four core components — the Financial-Economic Component, Technical-Technological Component, Personnel Component, and Information Analytical Component each assessed through five-point Likert scale rankings ranging from “Strongly Agree” (5) to “Strongly Disagree” (1). By summing up all together these findings described that the present state or current state of financial management is strong and progressive with technology transformation advancement which satisfied the first hypothesis of this research study. However, the role of human resource is also plays central in this study report. **The study concluded the importance of technology integration in hotels and how the process of managing finance is changed. Here the role of staff is very much prominent because the increasing technology advancement increases the demand of well equipped manageable staffs recruitment** Hotels are clearly moving toward digital integration in financial processes. The correlation analysis showed a positive relation between technological and financial performance of hotels but not so much strongly. So the second hypothesis is not fully satisfied. However, the relatively modest scores in the information–analytical component suggest that while data is being collected, its potential is not being fully harnessed for strategic and predictive financial decision-making.

5. Suggestion

From the findings, it is suggested that while hotels continue to grow their existing strengths in financial stability, technological advancement, and professionally competent personnel, there should be a fruitful effort to enhance their information analytical capabilities also. The results indicate that while the respondents agreed that financial decisions are mostly relied on data and that systems. So it is suggested that some strong agreement points including in other components can clarify the result in a better way. In particular, there is a need to transition from descriptive or routine data analysis toward more advanced, predictive, and real-time analytics. Hotels should explore how financial data can not only be used to assess past performance but also to project future trends, anticipate cost pressures, and support long-term strategic planning. This would require upgrading the existing systems for financial information management, investing in business intelligence platforms, and training staff to use these tools not just for reporting, but for strategic interpretation.

6. Recommendation

Based on the above conclusion and suggestions, it is recommended that hotel enterprises address a strategic roadmap aimed at strengthening their data-driven financial decision-making ecosystem. This can be start with the integration of more advanced

transformational and analytical tools and techniques into existing financial systems in hotel industry. The adoption of modern enterprise resource planning (ERP) systems, real-time data dashboards, and business intelligence platforms would allow hotels to collect, monitor, and interpret financial information with greater speed and accuracy. In addition to these, hotels should incorporate structured training and development programs focused on financial analytics, forecasting, budgeting techniques, and cost modeling.

7. Practical Implications

The research study is mainly based on Hospitality sector of hotels. The study is helpful for hotel owners and managers. Academically the study can help the researcher in this field. Some other business purpose stakeholders can be benefitted by this research study. These are the practical implications of this research.

8. Research Limitations

This study does not aim to evaluate customer satisfaction, marketing strategies, or purely technical aspects of software development. Instead, it focuses on how technology is used as a tool to enhance financial and strategic hotel performance. The sample size used in this study is only 30 so it can be a problem of generalizing the result in broad which is a limitation of this research. By clearly defining its scope, this study aims to produce focused, actionable insights that reflect real-world practices and challenges, especially in under-researched hotel environments with resource constraints and evolving digital capacities.

5. EXPLORING AI-DRIVEN HR PRACTICES AND THEIR IMPACT ON WORK-LIFE BALANCE OF HEALTHCARE WORKERS IN GOVERNMENT HOSPITALS

R. Sowmya (Research Scholar, Full-Time)

Dr. P. James Mary (Research Guide)

PG and Research Department of Commerce

St. Joseph's College of Arts and Science (Autonomous), Cuddalore-1

Abstract

Artificial Intelligence (AI) is transforming human resource (HR) processes throughout various industries, among them healthcare. In government hospitals, the incorporation of AI into HR functions like scheduling, performance management, and employee support systems has the potential to enhance work-life balance (WLB) among healthcare professionals. This paper examines the current and future effects of AI-driven HR methods on the work-life balance of healthcare employees in public healthcare organizations. The paper uses a conceptual framework to integrate literature from HRM, healthcare management, and AI to point out essential facilitators and obstacles. The paper's objective is to provide particularly relevant as public health systems increasingly seek digital transformation without compromising employee well-being.

Keywords

AI in HR, Work-Life Balance, Government Hospitals, Healthcare Workers, HR Tech, Public Sector.

1. Introduction

“AI transformation is a strategic initiative, not just a technological upgrade”. Artificial Intelligence is especially useful in Human Resource Management (HRM) for enhancing efficient and improving decisions and employee experiences. From automating routine HR tasks to enabling data-driven workforce planning, AI technologies are increasingly integrated into organizational HR functions. In the healthcare sector—especially within government hospitals where the complex situation happens HR plays a vital role in maintaining operational continuity, employee satisfaction, and service quality. But healthcare workers often deal with work pressure, irregular shifts, and emotional exhaustion, which affects their work-life balance (WLB). Maintaining a healthy WLB is essential not only for individual well-being but also for ensuring patient care quality, staff retention. A good WLB is important for personal health, patient care, keeping staff, and the strength of the organization. The convergence of AI and HR practices together presents a promising solution

to address WLB challenges. AI-driven tools can assist in schedule planning, real-time feedback systems, stress detection, and personalized employee support, among others. Yet, the public healthcare sector in India, particularly government hospitals, is still in the early stages of adopting such strategies. The Indian government is also recognizing the value of **healthcare technology**. Initiatives like the **National Digital Health Mission (NDHM)** aims to create a digital ecosystem that integrates AI solutions, from electronic health records to teleconsultations such as e-sanjeevani and HRMIS.

2. Literature Review:

2.1 Artificial Intelligence in Human Resource Management (AI in HR)

AI in HRM involves the use of intelligent technologies to automate, augment, and optimize HR functions. Key applications include AI-powered recruitment, predictive workforce analytics, Chatbot-enabled employee support, sentiment analysis, and intelligent scheduling. According to Upadhyay & Khandelwal (2018), AI is reshaping HR practices by enhancing personalization, reducing human bias, and improving operational efficiency. However, its adoption in the public sector, particularly in healthcare, remains limited due to infrastructure, awareness, and policy challenges.

2.2 HR Practices in Healthcare Institutions

In healthcare, HR practices are critical to managing workforce deployment, training, retention, and motivation. Government hospitals in India face chronic understaffing, administrative delays, and a lack of digital integration, all of which burden HR departments and frontline workers alike (Saini et al., 2021). Traditional HR approaches often fail to address the dynamic and emotionally demanding nature of healthcare work, especially during pandemics and resource shortages.

2.3 Theoretical Link Between AI and WLB

Emerging studies can suggest that AI can support WLB through smart scheduling, workload prediction, fatigue monitoring, and responsive HR systems. For example, AI tools can allocate shifts based on employee preferences, identify burnout risks through behavioral data. While such innovations are being explored in private hospitals and global contexts, their applicability in Indian government settings is Still Under-Researched.

2.4 Gaps in the Literature: Existing research is characterized by significant gaps in:

- ❖ Limited research exists on the actual implementation of AI in human resources practices within public health.
- ❖ Under-representation of **nurses, lab staff, PHC workers**, etc., in studies.

- ❖ There is currently a lack of established conceptual frameworks connecting AI-HR functions to work-life balance in public sector healthcare environments.

3. Methodology:

This paper follows a **conceptual research design**, the aim of which is to combining and using the current knowledge produced across several disciplines to generate a theory on how HR practices with AI can shape the work-life balance of workers in government hospitals. Instead of collecting primary data, the paper generates a groundwork for analysis and further empirical research by discussing the insights from academic journals, government reports.

3.1 Research Approach

The research does not rely on primary data collection but rather synthesizes existing scholarly and institutional knowledge.

3.2 Data Sources:

As this is a **conceptual and non-empirical** research paper, data sources are exclusively **secondary** and include a wide range of literature and institutional documents.

Data Sources Secondary sources are used:

Academic publications from peer-reviewed journals in the fields of human resource management, Government documents on healthcare HR policy and Reports from international bodies like WHO and ILO on healthcare workforce management (Various articles and Websites).

4. Discussion

This section discusses how various AI-driven HR functions can support the WLB landscape in public healthcare and proposes a conceptual framework for understanding these relationships.

4.1 Conceptual Framework:

This paper proposes a conceptual framework to explain how AI enabled HR practices-Better HR Operation-Reduced stress- Enhanced **work-life balance (WLB)** and overall **Well-Being** of healthcare workers in government hospitals. The framework identifies three key components: (1) AI-driven HR functions, (2) mediating organizational factors, and (3) employee-centered outcomes.

1. AI-Driven HR Functions: *The following core functions identified:*

- ❖ Use AI algorithms to optimize shift rotations, reduce overwork, and provide fair time-off allocations.
- ❖ Leverages historical data to forecast staffing needs, ensuring that human resources align with patient volume and seasonal trends.
- ❖ Automate routine HR interactions such as leave approvals, policy queries, and real-time feedback collection through chatbots and virtual assistants.
- ❖ Analyze employee metrics to support fair, data-driven appraisal and development strategies.
- ❖ Use sentiment analysis and behavioral data to identify early signs of emotional fatigue or stress.

2. Mediating Organizational Factors: *For AI to be effectively in HR practices, certain mediating factors within the organization must support its adoption and acceptance.*

- *A workplace culture that emphasizes well-being, transparency, and innovation boosts the positive impacts of AI.*
- Employees' digital literacy and openness to technology determine how effectively AI tools are utilized. Well-defined HR policies and institutional support structures are necessary to guide AI use.

3. Expected Outcomes: *When AI-driven HR functions and mediating factors are expected to produce several favorable outcomes:*

- **Improved Work-Life Balance and Reduced burnout through flexible scheduling.**
- Due to faster HR services, fair assessments, and responsive feedback systems can improve job satisfaction.
- With data-backed performance support and reduced workplace stressors.
- As a effect of reduced administrative friction and greater work-life harmony.

5. Conclusion and Suggestions

Growing demands on healthcare staff, particularly in public hospitals, necessitate forward-thinking HR strategies that balance workplace productivity and staff welfare. The integration of AI into HR practices offers a promising pathway to improve the work-life balance (WLB) of healthcare workers, particularly in overburdened government hospitals. This conceptual paper examined how AI can be strategically integrated into human resource practices to improve work-life balance for healthcare professionals.

Overall, AI presents a opportunity to revitalise human resource policies in the public healthcare sector. Thoughtfully designed AI systems can not only boost organisational spperformance but also help achieve a crucial balance between healthcare professionals' personal and professional lives.

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6. THE ROLE OF ARTIFICIAL INTELLIGENCE IN MSME GROWTH AND DECISION-MAKING IN MICRO ENTERPRISES

V. R. Govindan,
Ph.D. Scholar

Dr. S. Subramanian, M.B.A., M.Phil., Ph.D.,
Professor & Director,
Head of the Department,
Department of Management Studies,
Tamil Nadu Open University (TNOU), Chennai – 600 015.

Abstract

Artificial Intelligence (AI) has emerged as a transformative force for Micro, Small, and Medium Enterprises (MSMEs), especially micro enterprises that often struggle with limited resources and data-driven decision-making capabilities. This study examines the role of AI in enhancing the growth and strategic decision-making of microenterprises in India. By integrating AI-based tools, micro enterprises can streamline operations, forecast trends, and personalize offerings to remain competitive. This study employs a descriptive and analytical research approach to investigate the impact of AI on decision-making and growth within microenterprises. A convenience sample strategy was utilized to gather data from 120 micro firms in Tamil Nadu. This is to examine the impact of AI tools on operational efficiency, marketing decisions, and customer relationship management. The findings reveal a significant relationship between AI adoption and improved decision-making and growth among micro enterprises. Therefore, promoting AI integration and upskilling among micro enterprises can play a vital role in achieving sustainable and competitive MSME development.

Keywords

Artificial Intelligence (AI), Micro Enterprises, MSME Growth, Decision Making, Technology Adoption.

1. Introduction

Artificial intelligence (AI) is transforming Micro, Small, and Medium Enterprises (MSMEs) by enhancing efficiency, improving decision-making processes, and driving business growth. AI-powered tools automate tasks, analyze data for insights, and provide personalized customer experiences, ultimately boosting productivity, reducing costs, and enabling data-driven strategies. Micro, Small, and Medium Enterprises (MSMEs) play a vital role in economic development, contributing significantly to employment and GDP. In India, micro enterprises constitute over 94% of the total MSME sector. However, these businesses

often face challenges in scaling due to limited access to technology and data analytics. AI presents a unique opportunity to overcome these challenges by enabling predictive analytics, automating routine tasks, and enhancing customer insights. This study examines the use of AI tools in decision-making processes and their contribution to the overall growth of micro enterprises.

2. Theoretical Background

In the digital era, ICT offers numerous advantages that are especially impactful for MSMEs, as noted by Mariam et al. (2021) and Amirudin (2024). Enhanced technology, particularly AI, helps streamline operations, increase productivity, and support data-driven decisions. According to ADB (2023), MSMEs contribute significantly to GDP and inclusive growth, but face limitations like access to finance, markets, and infrastructure. AI integration can address these challenges by reducing waste, improving efficiency, and fostering innovation aligned with sustainability goals. However, barriers such as high costs and weak tech infrastructure hinder adoption (Qazi et al., 2019; Rachmawati, 2022). ESG-based governance and policy support are crucial to encourage sustainable AI usage (Sklavos et al., 2024). The literature review highlights AI's role in improving operational performance, environmental outcomes, and informed management within MSMEs. This study seeks to bridge research gaps and offer insights for leveraging AI to ensure sustainable MSME development.

2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), created by Davis in 1989, elucidates the process by which consumers adopt and utilize technology. It emphasizes two major factors: perceived utility and perceived simplicity of usage. Perceived usefulness refers to the conviction that technology will enhance job performance, whereas ease of use pertains to its simplicity.

In smaller firms, these elements are essential for the adoption of AI. Entrepreneurs are more likely to use AI if it is perceived as advantageous and straightforward to apply. AI systems that streamline operations and facilitate decision-making enhance adoption rates. Consequently, the Technology Acceptance Model elucidates how micro enterprises adopt AI technology.

2.2 Resource-Based View (RBV)

The Resource-Based View (RBV) paradigm posits that a firm's enduring competitive advantage arises from resources that are valued, uncommon, unique, and non-substitutable. When effectively applied, AI technologies might be considered strategic resources. AI

provides tiny firms with data analysis, automation, and customer interaction capabilities that competitors may find difficult to imitate. These AI-driven benefits enhance efficiency and foster creativity. Through the use of AI, micro firms can overcome obstacles associated with their size. The distinctiveness and functionality of AI render it a significant internal resource. Consequently, the deployment of AI is consistent with the ideas of the Resource-Based View (RBV) for sustained competitiveness.

2.3 Diffusion of Innovation Theory

According to Rogers (2003), the Diffusion of Innovation Theory explains how new technologies spread through a social system over time. The adoption process is categorized into five stages: innovators, early adopters, early majority, late majority, and laggards. Early adopters are crucial because they serve as opinion leaders, influencing the adoption behavior of others. Micro enterprises that begin using AI often fall into the early adopter category. Their willingness to embrace innovation sets a precedent for similar businesses. By showcasing the benefits of AI, they encourage broader acceptance across the sector. This ripple effect accelerates digital transformation within the MSME ecosystem.

3. Review of Literature

Fajri et al. (2025). This study examines the impact of early AI adoption on the growth and competitiveness of key firms in Indonesia. It highlights AI's role in enhancing marketing, customer service, inventory, and financial planning. The research discusses the barriers faced by micro and ultra-micro enterprises, including low digital skills and infrastructure gaps. Benefits like data-driven decisions and personalized services are emphasized. The authors recommend tailored AI strategies, policy support, and capacity-building initiatives to address these challenges.

Kumar et al. (2024). This research proposes a framework linking AI-driven workforce management with revenue enhancement in MSMEs. It explores three key areas: workforce risk, business/marketing, and information sharing. Using SEM, six hypotheses were validated with data from 307 employees. The findings confirm AI's positive impact on economic growth via intelligent workforce and business strategies. It stresses the necessity for AI-based knowledge systems in MSMEs. Shakya et al.(2023). The study examines the adoption of Industry 4.0 in MSMEs, with a focus on robotics and automation technologies. Robots are shown to enhance manufacturing quality and efficiency through the use of AI. Human-robot collaboration is gaining traction in the MSME sector. Challenges in AI adoption are addressed along with solutions. The paper concludes that AI-integrated robotics continues to have a positive impact on MSMEs.

Lemos et al. (2022). This work develops a multi-criteria decision-support system using cognitive mapping and the DEMATEL method within a neuromorphic framework. It aims to overcome the limitations of previous models by incorporating uncertainty into decision-making. AI experts and industry professionals helped validate the approach. The system supports structured evaluation of adaptation efforts in technology adoption. The model's utility was demonstrated in a real-world corporate innovation setting. Vásquez et al. (2021). This study develops a sustainability maturity assessment model tailored for MSMEs. It includes environmental knowledge, strategies, and systems within a four-tier framework. Machine learning algorithms help classify firms based on their sustainability maturity. Results from Colombian MSMEs showed varied maturity levels, with 18% being highly sustainable. The model supports MSMEs in advancing their environmental and production practices.

4. Scope of the Study

This research is limited to micro firms in Tamil Nadu, India. These are enterprises with less than 10 workers and an annual revenue of less than ₹5 crore. The emphasis is on examining the integration of Artificial Intelligence (AI) capabilities inside their operations. The research investigates explicitly AI applications in marketing, finance, and routine business operations. It assesses the impact of these technologies on organizational expansion and strategic decision-making.

The scope encompasses evaluating both possibilities and difficulties associated with AI deployment. The findings intend to facilitate digital transformation within the microenterprise sector.

5. Objectives of the Study

1. To analyze the extent of AI tool adoption among micro enterprises.
2. To examine the relationship between AI usage and growth indicators in micro enterprises.
3. To identify barriers to adopting AI technologies.
4. To assess the effectiveness of AI tools in improving decision-making.

6. Hypotheses of the Study

H₁: There is a significant association between AI awareness and perceived business growth among micro enterprises.

H₂: There is a significant difference in decision-making efficiency across different levels of AI adoption in micro enterprises.

H₃: AI applications in marketing, finance, and customer service have a significant positive impact on the business growth of micro enterprises.

H₄: AI in Finance is the most influential factor in predicting business growth among the three AI application areas.

7. Methodology

This study employs a descriptive and analytical research approach to investigate the impact of AI on decision-making and growth within microenterprises. A convenience sample strategy was utilized to gather data from 120 micro firms in Tamil Nadu. Primary data were collected using structured questionnaires, while secondary data were obtained from MSME reports, published studies, and relevant journals. The study examines the awareness, uptake, and effects of AI technologies. The study used Chi-square tests, ANOVA, and Multiple Regression Analysis to evaluate the hypotheses and elucidate the connections among variables. These statistical instruments facilitated the identification of noteworthy patterns and connections.

8. Results Analysis and Interpretation

The results indicate an increasing trend in AI adoption among MSMEs, particularly for enhancing operational efficiency, labor management, and informed strategic decision-making. Research indicates that AI substantially enhances productivity, market adaptability, and sustainable growth. Nonetheless, obstacles such as digital illiteracy, budgetary limitations, and infrastructural deficiencies remain. The results highlight the necessity of customized AI frameworks and policy assistance to optimize advantages for micro and small businesses.

Table No.1: Demographic Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Age	Below 30 years	25	20.83%
	31–40 years	35	29.17%
	41–50 years	30	25.00%
	Above 50 years	30	25.00%
Gender	Male	70	58.33%
	Female	50	41.67%
Educational	Below HSC	10	8.33%

Qualification	Undergraduate (UG)	50	41.67%
	Postgraduate (PG)	40	33.33%
	Professional Degree	20	16.67%
Years in Business	Less than 5 years	30	25.00%
	5–10 years	50	41.67%
	More than 10 years	40	33.33%

*** **Source:** Primary data

The study analyzed the demographic background of 120 respondents from various microenterprises, focusing on age, gender, income, education, and years in business. A total of 20.83% were under 30, 29.17% were between 31 and 40, and 50% were above 40, reflecting a healthy mix of youth and experience. Gender-wise, 58.33% were male and 41.67% female, indicating encouraging female participation. Educationally, 41.67% were undergraduates, 33.33% postgraduates, 16.67% held professional degrees, and 8.33% had education below higher secondary. In terms of business tenure, 25% had less than 5 years of experience, 41.67% had 5–10 years, and 33.33% had over 10 years. This mix illustrates both entrepreneurial maturity and openness to innovation. Though income data wasn't captured in the table, it is presumed to influence AI affordability and adoption. Overall, the demographic spread suggests microenterprise owners are well-positioned to evaluate and adopt AI technologies for growth and improved decision-making

Chi-square Test

Null Hypothesis (H₀): There is no association between AI awareness and perceived business growth.

Alternative Hypothesis (H₁): There is a significant association between AI awareness and perceived business growth.

Table No.2: Chi-square Test Result Summary

Test	Chi-square Value (χ^2)	df	p-value	Result
AI Awareness & Business Growth	14.76	3	0.002	Significant

The p-value (0.002) is below the significance threshold of 0.05; hence, the null hypothesis (H_0) is rejected. This outcome demonstrates a statistically significant correlation between AI knowledge and participants' perceived company development among microenterprises. Individuals familiar with AI tools are more inclined to indicate elevated levels of corporate growth. This discovery highlights the importance of technical understanding in fostering firm growth.

It suggests that enhanced understanding and exposure to AI can have a significant impact on corporate performance. Awareness serves as a crucial facilitator for the adoption of novel tools. Consequently, augmenting digital literacy may be essential for the development of MSMEs.

ANOVA

Table No.3 ANOVA – Effect of AI Adoption Level on Decision-Making Efficiency

Source of Variation	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-value	p-value
Between Groups	102.4	2	51.2	4.89	0.009
Within Groups	980.3	117 (120-3)	8.38		
Total	1082.7	119			

The null hypothesis (H_0) assumes that there is no significant difference in decision-making efficiency among different AI adoption levels (i.e., low, medium, and high). The F-value is 4.89, and the p-value is 0.009, which is less than the standard significance level of 0.05. Hence, the null hypothesis is rejected, indicating that there is a statistically significant difference in decision-making efficiency across different levels of AI adoption. This implies that enterprises with higher levels of AI adoption demonstrate improved decision-making capabilities compared to those with lower levels.

Multiple Regression Analysis

Table No.4: Multiple Regression Analysis – Predicting Growth Based on AI Applications

Independent Variables	Unstandardized Coefficient(β)	t-value	p-value	Significance
AI in Marketing (X_1)	0.34	2.89	0.005	Significant ($p < 0.05$)
AI in Finance (X_2)	0.42	3.45	0.001	Highly Significant

				(p < 0.01)
AI in Customer Service (X₃)	0.29	2.15	0.034	Significant (p < 0.05)
Constant (Intercept)	2.1	—	—	—

$$\text{Business Growth (Y)} = 2.1 + 0.34X_1 + 0.42X_2 + 0.29X_3$$

$$\text{Business Growth (Y)} = 2.1 + 0.34X_1 + 0.42X_2 + 0.29X_3$$

Table No.5: Model Summary

Model Summary Statistics	Value
R (Multiple Correlation Coefficient)	0.684
R ² (Coefficient of Determination)	0.468
Adjusted R ²	0.451
Standard Error of Estimate	0.512
F-Statistic	15.76
Significance (p-value)	0.000

The regression analysis indicates that all three independent variables—AI in Marketing, AI in Finance, and AI in Customer Service—have a positive and statistically significant impact on the dependent variable, Business Growth. The p-values for all predictors are less than 0.05, confirming the significance of the relationships. Among them, AI in Finance has the highest beta coefficient ($\beta = 0.42$), suggesting it is the most influential predictor of growth. The model's R² value of 0.468 indicates that approximately 46.8% of the variance in business growth can be explained by the combined influence of the three AI variables.

9. Findings

The study emphasized a well-distributed array of participants in terms of age, gender, education, and experience. This mix guarantees perspectives from both youthful innovators and experienced entrepreneurs on AI implementation. Chi-square study indicated a robust correlation between AI awareness and business development (p = 0.002).

Entrepreneurs proficient in AI technologies demonstrated enhanced performance, indicating that digital literacy is essential. ANOVA results (F = 4.89, p = 0.009) indicated that organizations employing AI made more rapid and strategic judgments. This affirms AI's contribution to enhancing corporate insight and agility. Regression analysis indicated that AI

in Finance ($\beta = 0.42$) exerted the most significant influence on growth. The implementation of AI in marketing and customer service has notably enhanced company performance. The predictive capability of AI tools is demonstrated by an R^2 of 0.468, indicating that these applications account for 46.8% of the variance in corporate growth. This indicates that AI techniques have a significant predictive impact on the advancement of MSMEs.

The research revealed that organizations deficient in AI competencies exhibited inferior performance relative to their technology-savvy counterparts. This underscores the pressing necessity for digital literacy and specialized AI training initiatives.

10. Conclusion

This study concludes that Artificial Intelligence (AI) serves as a crucial enabler for growth and effective decision-making among micro enterprises within the MSME sector. The analysis revealed that respondents' awareness and adoption of AI tools significantly enhance business outcomes, particularly in areas such as finance, marketing, and customer service. The research objectives were successfully met, establishing a positive relationship between AI usage and enterprise performance, while also identifying key barriers, such as a lack of digital literacy and inadequate infrastructure. Statistical findings from the analysis test confirmed the influence of AI on operational efficiency and strategic choices. Among the AI domains, finance emerged as the most influential in driving growth. However, the study also emphasizes the need for focused training and policy-level interventions to overcome adoption gaps. The demographic diversity among respondents further reinforces the applicability of AI across age groups, educational backgrounds, and business experiences.

Therefore, promoting AI integration and upskilling among micro enterprises can play a vital role in achieving sustainable and competitive MSME development.

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7. AI- POWERED PERSONALIZATION AND E- MARKETING

D.S. Annapoorna

Assistant Professor

Quaid-E-Millath Govt College for Women

ABSTRACT

This paper presents the study on consumer behaviour towards online shopping in Indian context. Online marketing becomes the key to open the lock of success for companies and online presence of the organization becoming inevitable. Information technology has transformed the way of people work. Electronic commerce has unleashed yet another revolution which is changing the way businesses buy and sell products and services. The internet gave another boost to e-commerce. Internet marketing or online marketing refers to advertising and marketing efforts that use the Web and e-mail to drive direct sales via electronic commerce, With many technical revolutions like affordable internet 3G connection, Data Modems, Smartphone's with internet connectivity, the number of customer buying products online is increased. The average time spending and connectivity with internet increased many folds. Hence the study examines the consumer behaviour attribute and relation among them in E-marketing perspective. Attempt has been made to study the acceptance rate of e-marketing among the Chennai consumers and its impact on their purchase decision.

INTRODUCTION

E-marketing can be defined as marketing of products and services on electronic media. E-marketing is one of the latest and emerging tools in the marketing world. It include the creative use of internet technology including use of various multimedia, graphics, text etc with different languages to create catchy advertisements, forms and e-shop where product can be viewed, promoted and sold. E- Marketing does not simply entail building or promoting a website, nor does it mean placing a banner ad on another website. It includes advertisement (flash, text, graphics, audio or video), product display, product navigation, 3-D products view, basket selection, checkout and payment. E-marketing & internet marketing terms are used in the same sense. This form of marketing is equally applicable in most of the business models:

- E-commerce — Direct sales of goods to the mass customer/consumer or the business customers.
- Publishing Services — where advertisement are sold.

- Lead-based websites — like policy bazaar, sulekha where sales leads are generated are sold to either third party or used in-house to convert them into sales through appropriate channel.
- Affiliate marketing — a referral marketing strategy where reward is given for referring product, company, or website to other friends, relative or in nutshell other potential customer or target segment.

Think of a situation where each time marketer has to do media planning and repeated telecast of same advertisement to reach the different customer as and when they can be targeted and very less option of customization per segment is available but E- marketing is a very cost effective tool where customization is very easy and affordable along with very less criticality of managing the marketing efforts. As respondent hit can be stored easily with the monitoring and statistical software's it become inexpensive, fast, reliable to perform data analytics and majorly all the aspects of an e- campaign can be traced, stored, analysed, and tested.

The advertisers can use a variety of methods: pay per impression, pay per click, pay per play, or pay per action. Therefore, marketers can determine which messages or offerings are more appealing to the audience. E-marketing is convenient than the traditional marketing for both customer and the marketer.

It offers large number of variety for the particular product relatively with lower prices and in less time. But use of E-commerce requires customer's familiarity with the latest innovation both in digital technology as well financial and legal domain. In this way it appeal is limited due to requirement of High speed Internet connections, overly-complicated websites, from the buyer's perspective, the inability of customer to touch, taste or to smell or to have the trail before making them purchase online , and among them biggest is the concern of security with online payments etc.

OBJECTIVES OF THE STUDY

Research study on consumer behaviour towards e-marketing is based on certain objectives:

- To study awareness of e-marketing among the people in Chennai city.
- To study the acceptance of e-marketing among consumers.
- To study the impact of e-marketing on purchase decision of consumers.

METHODOLOGY

Research Design: The research design chosen for the study is conclusive. Our research is mainly based on a survey conducted by distribution of questionnaire.

Data Collection: Basically Primary ways of data collection has been carried out through a questionnaire with Likert Type of scale used. The variables used for this study was Gender and Occupation. The occupational natures of respondents were like Students, Businessmen, Service Retired & Housewives.

Sampling: Random sampling method was used and the sample size taken for the study was 100.

Technique of Analysis: Quantitative techniques like Chi –square test and t-test were used for the Data Analysis.

MAJOR HYPOTHESIS

- ❖ Age group between 18-30 years surf internet most.
- ❖ There is high degree correlation between income of the respondents and their purchase decision.
- ❖ Respondents find e-shopping more convenient because it is time saving, availability of alternatives to choose from and possibly less expensive products and services.
- ❖ Respondents' reaction was mixed regarding price & quality of the products/services offered online
- ❖ Most of the respondents are hesitant to purchase items over internet because of security concerns.
- ❖ Usage of newer technology in online trading has made process more complicated, affect buying behaviour of respondents. Most of the respondents prefer traditional buying because they do not prefer changes.

DATA ANALYSIS & INTERPRETATION

Since data collected is non-parametric in nature therefore data analysis is done using CHI SQUARE test at 5% significance level ($\alpha=0.05$). Null hypothesis is rejected where $\alpha \leq 0.05$ & it is accepted when $\alpha > 0.05$.

	Variable	Percentage
Gender	Male	52
Age	Less than 18 years	5
	18- 30 years	58
	30 -45 years	28
	45 – 60 years	5
	More than 60 years	4
Monthly	less than Rs.10,000	7

Income		
	Rs.10,000-Rs. 20,000	9
	Rs. 20,000-Rs. 30,000	21
	Rs. 30,000-Rs. 50,000	11
	More than Rs. 50,000	12
	Not Applicable	40

The above table exhibits that Majority of the Male respondents in the age group between 18-30 years surf internet most. Maximum numbers of the respondents are in the income group between 20,000 to 30,000.

Hypothesis 1: Age group between 18-30 years surf internet most.

In order to prove above hypothesis Chi -square test is conducted.

	Age	Internet surfing
Chi –square	80.40	30.973
DOF	4	3
Sig level	.000	.000

Test statistics showed that Chi-Square calculated at 12 degree of freedom is 111.373 at 0.00% significance level. Hence null hypothesis is rejected at $\alpha=0.00$ & alternate hypothesis is accepted that there is a strong relation between age of the respondents and Internet surfing.

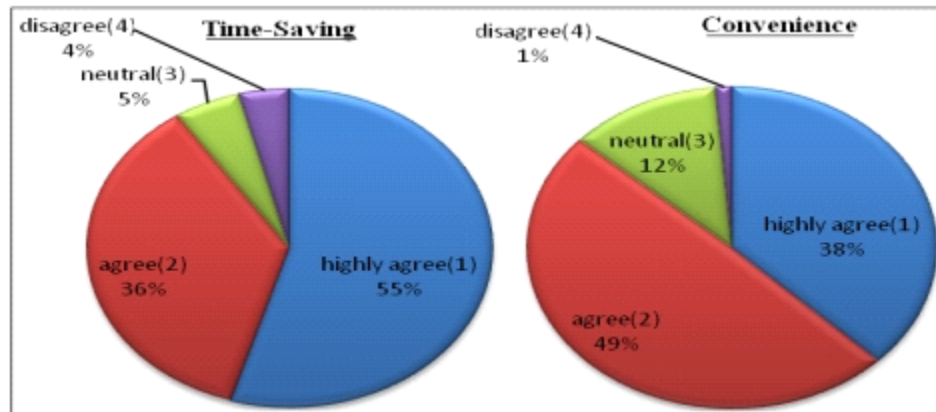
Hypothesis 2: There is high degree correlation between income of the respondents and their purchase decision. Chi-square test is conducted between income of the respondents & their purchase decision affected by e-marketing.

	Monthly Income	Purchase decision
Chi –square	35	22.653
DOF	5	3
Sig level	.000	.000

The above Table shows that chi square value comes out to be 57.653 at 15 degree of freedom and the calculated value is significant at 0.0%. Hence it can be concluded that null hypothesis is rejected & alternate hypothesis is accepted that there is significant difference of a strong relation between income of the respondents and purchase decision.

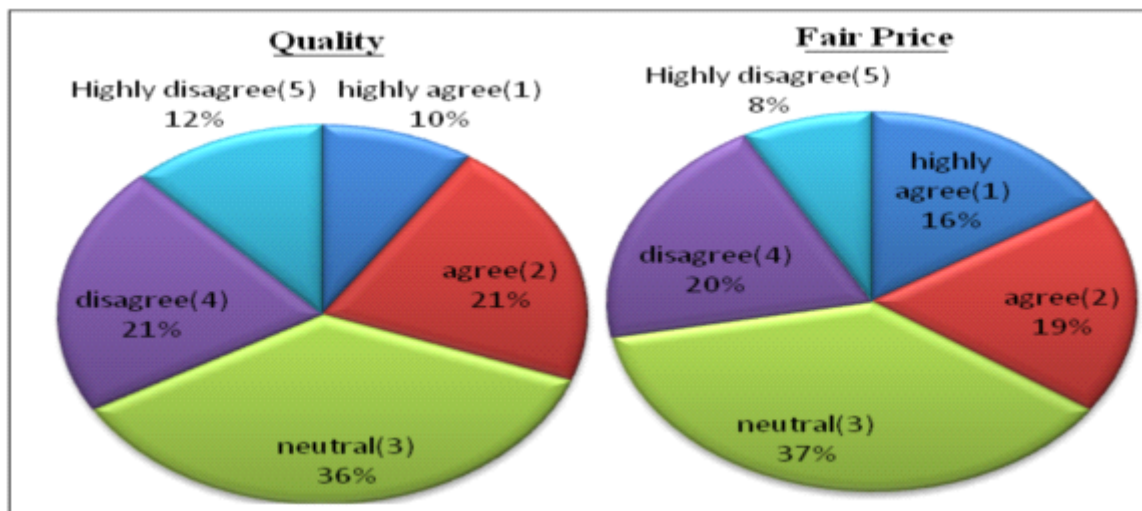
Hypothesis 3: Respondents find e-shopping more convenient because it is time saving, availability of alternatives to choose from & possibly less expensive products and services. . It was found that 65% were highly agreed on easy accessibility of online

products. Further, most of the respondents found online shopping more convenient & time saving than brick & mortar system. Pie chart depicting the same is shown below.



Hypothesis 4: Respondents' reaction was mixed regarding price & quality of the products/services offered online.

It was found that 35% of the respondents agreed regarding fair price & 31% on quality of products/services offered, while 28% disagreed on the former & 33% on the later. 37% & 36% of the respondents had a neutral view on the two attributes respectively.



Hypothesis 5: Most of the respondents are hesitant to purchase items over internet because of security concerns.

In order to prove the above hypothesis the researcher used the Henry Garret Ranking Technique. The Respondents were asked to rank the drawbacks of the online shopping such ranking has been converted into score value.

It was observed that according to the Henry Garret score the respondents claimed security concern regarding disclosure of personal information as first rank, lack of physical approach on products/services offered as second, followed by Quality & authenticity of

products/services offered as third and fourth rank was assigned for delay in delivery of products and services.

Hypothesis 6: Usage of newer technology in online trading has made process more complicated, affect buying behaviour of respondents.

Consumers were asked if product/service of their requirements is being offered online at reasonable price, then will they prefer to buy that product/service online or purchase the same from brick & mortar system. It was found that 68% of the respondents claimed product/service of their requirement through traditional shop, while 32% favoured online purchases.

Mode of Payment: Respondents were asked to select the mode of payments while shopping online. 52% preferred credit card payment, while 28% opted for debit card payments, 12% preferred payments through cheques and 8% preferred for demand draft or pay order services.

Major Findings of the study

- ❖ Age group of 18-30 years surf internet most. Main possible reason behind this may be that younger people are more technology oriented & also they may be working in organizations where they need to work upon computer and internet.
- ❖ A strong relation exists between monthly income and purchase decision of the respondents. People with higher income group usually have little time to go and purchase products/services from tradition shops because of their busy schedule. Hence in order to save time they trade online.
- ❖ Most of the respondents are hesitant to trade online because of security reasons. Besides this lack of physical approach, time required to deliver products & authenticity of the product merchandised are other factors. Consumers do not have faith in most of the online trading sites. Also usage of newer technology has made online trading more complicated & people resist changing, that is why consumers prefer traditional shopping as compared to online trading.
- ❖ Most of the respondents find e-shopping more convenient & time saving. A wide range of products/services with variety are available and also it facilitates them to choose from the different alternatives. There has been a mixed reaction in response to quality & authenticity of the products offered.
- ❖ Most of the respondents prefer credit cards as the most suitable option of payment followed by debit cards. This is probably due to the fact that with credit cards we can

purchase products/services on credit and also now days they can be easily obtained from different banks.

CONCLUSION:

E-marketing is rapidly changing the way people do business all over the world. In the business-to-consumer segment, sales through the web have been increasing dramatically over the last few years. Customers, not only those from well-developed countries but also those from developing countries, are getting used to the new shopping channel. Understanding the factors that affect intention, adoption and repurchase are important for researchers and practitioners alike.

E-marketing is gaining popularity among people specially the younger generation but in today scenario to become equally popular among all age groups e- marketing will have to cover a longer distance. People have hesitations in using e-services due to security concerns, lack of physical approach towards product offered, delays in product delivery along with price & quality concerns. More-over people are more resistant to change & not easily adaptable to newer technology. **68%** of respondent found shopping from shop easier, convenient & preferable over online purchasing. Above finding clearly supports our conclusion that people are tradition bound & have doubt in mindset as far as issue of online shopping/purchase of product is concerned. People have dubious attitude towards e-marketing of product & services mainly due to security concern related to privacy of personal information.

Personal information privacy should be given preference by the companies involved in online marketing of product & services. The other major concern among people includes authenticity of product & services offered online. Companies involved in online trading should focus on building their brand awareness among people so that trust-worthy relationship can be developed between producers & consumers. On-time delivery of products purchased through online shopping will prove to be quite beneficial in a long run. Significant price-cuts should be offered to customers as there are relatively no/lesser intermediaries involved as far as e-marketing is concerned.

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8. CHALLENGES FACED BY YOUNG ENTREPRENEURS WITH SPECIAL REFERENCE TO TAMIL NADU

Dr. R. Kamaraj

Associate Professor

School of Commerce

Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology

Chennai – 600 062, Tamil Nadu, India.

E- mail id: kamaraj019@gmail.com

Abstract

Young entrepreneurs often face a huge challenge due to a lack of knowledge and understanding in their chosen industry. Starting a business requires a deep understanding of the market, competitors, and consumer needs. Nevertheless, the absence of prior expertise can provide a significant obstacle. Another challenge faced by young entrepreneurs is the lack of established networks and relationships. Starting a business often requires collaboration, partnerships, and access to resources, which can be difficult for individuals in the initial phases of their enterprise who do not have a wide professional network. Starting a firm often requires financial resources, and potential entrepreneurs may face financial constraints due to inadequate personal savings or limited access to finance choices. Limited financial resources can provide difficulties when it comes to investing in necessary equipment, developing marketing initiatives, and recruiting workers. Successful entrepreneurs recognise that challenges are an integral part of the process. They actively interact with them in a positive and productive manner, placing a higher emphasis on finding solutions rather than dwelling on problems. They break down complex tasks into smaller, more achievable goals, so increasing their motivation and productivity. In this study, the researcher investigates the difficulties encountered by young entrepreneurs, specifically focusing on Tamil Nadu.

Keywords

Young Entrepreneurs, Networks, Financial Resources, Marketing Strategies and Challenges.

Introduction

An aspiring entrepreneur in the fashion industry may face difficulties in finding suppliers, manufacturers, or distributors if they don't have the right networking contacts. Under the current circumstances, it is crucial to actively engage in networking, attend industry events, and make connections with influential individuals in the sector. Utilising online platforms like LinkedIn and joining relevant industry associations can also help broaden one's network and open up opportunities for new prospects. Furthermore, they

dedicate time to self-reflection on their progress and adjust their strategies accordingly. By maintaining adaptability, individuals can swiftly adapt to changing circumstances while staying focused on their long-term objectives. Essentially, successful entrepreneurs view challenges as opportunities for growth and improvement in order to attain success.

REVIEW OF LITERATURE

A literature review is a distinct type of review article. A literature review is a scholarly publication that presents a comprehensive summary of the current knowledge on a certain topic, encompassing important discoveries, theoretical progressions, and methodological contributions. Literature reviews are classified as secondary sources since they do not contain novel or original experimental findings. These reviews are frequently encountered in scholarly publications and are specifically focused on academic literature. It is crucial to avoid confusing them with book reviews, which may also appear in the same newspaper.

In his study, **Kamaraj (2023)** suggested that the government should extend financial assistance to start-up enterprises and female entrepreneurs by offering loans and subsidies. The agriculture and related sectors serve as the primary sources of employment for the bulk of the Indian populace. Consequently, a significant proportion of individuals were unable to sustain their companies and agricultural activities due to insufficient financial resources.

Umakanth and Avinash Raj David (2023) proposed that young entrepreneurs are individuals who actively engage in extracurricular activities, such as promoting awareness or serving the community, and are more likely to develop the skills and qualities that increase their likelihood of achieving success. Engaging in well acknowledged extracurricular activities, such as sports or volunteer work, is very likely to foster the acquisition of skills and attributes that are essential for the success of young entrepreneurs.

In their study, **Suresh Babu and Yuan Zhou (2023)** observed that policymakers in India's agricultural and rural development sectors acknowledge the significant role of youth entrepreneurship in driving the transformation of these sectors. The economic boom witnessed in India over the past two decades has created the necessary conditions for the emergence of youth entrepreneurship. However, there are still obstacles that need to be overcome in order for young people to access economic opportunities in agriculture. Various structural limitations exist in terms of technology accessibility, financial resources, institutional backing, market entry, and business guidance.

In their study, **Paramasivan and Kumaresan (2017)** highlighted that entrepreneurship plays a crucial role in driving socio-economic development in a country.

They emphasised that entrepreneurship is an emerging feature and a significant tool for developing nations. Tamil Nadu is at the forefront of promoting entrepreneurship by providing financial assistance through the District Industries Centre (DIC) and various schemes, particularly the NEEDS scheme. This scheme is divided into two categories, with one specifically targeting the youth. The main objective of this scheme is to encourage young individuals to become self-reliant and enable them to access local resources to establish new businesses and foster a conducive entrepreneurial environment.

Paramasivan and Kumaresan (2017) noted that youth entrepreneurship is a growing area of focus that aims to contribute to the overall socio-economic growth of the country. Youth entrepreneurship has a positive and beneficial effect on the development of India. Youth entrepreneurship stimulates the formation of initial capital, creates a significant number of jobs, enhances the standard of living for the population, promotes the creation of wealth and the equitable distribution of economic resources, increases the Gross National Product (GNP) and per capita income, and facilitates overall development by promoting the country's exports.

Research Gap

The youth in the country lack understanding and implementation of entrepreneurial skills. The current educational and societal framework is deficient in fostering entrepreneurial abilities, which is a pressing need. Our country's social system has no impact on our policies concerning youth entrepreneurship. This research study focuses on analysing the endeavours and competence of young entrepreneurs in Tamil Nadu. Furthermore, it clarifies the elements that contribute to the impact of entrepreneurship on economic growth and the effectiveness of young entrepreneurs.

OBJECTIVE OF THE RESEARCH

1. To know the overview of young entrepreneurs in India.
2. To identify the Challenges Faced by Young Entrepreneurs with Special Reference to Tamil Nadu.

RESEARCH METHODOLOGY

This research study is characterised by its descriptive style and incorporates both primary and secondary data. The primary data was collected using a structured interview schedule, whereas the secondary data was obtained from several public and unpublished sources, including DIC, TIIC, and TAHDCO. The study area is restricted to the districts of Chennai, Trichy, Coimbatore, and Madurai in the state of Tamil Nadu. The researchers employed a stratified random sampling strategy to pick the participants for the study. The

data underwent analysis utilising sophisticated statistical methodologies, notably Factor Analysis, Regression, and Structural Equation Modelling. An first inquiry was carried out among a group of 50 participants using a pre-planned interview schedule. After evaluating the reliability and validity, the interview schedule was revised and finalised.

Area of study

The study covers the geographical area of Chennai, Trichy, Coimbatore, and Madurai Districts in the state of Tamil Nadu. Four districts have been designated as the "Universe" for the specific purpose of gathering and evaluating data.

Sampling Techniques

Methods of selecting, a subset of individuals or items from a larger population for the purpose of conducting research or analysis. The participant for the study was chosen through the utilisation of stratified random selection methods. The population for this research study comprises the cohort of young entrepreneurs affiliated with DIC, TIIC, and TAHDCO. A grand total of 240 participants were discovered, with an equal distribution of 60 respondents taken from each district.

Sample Size

A sampling size calculator was used to establish the sample size for the research investigation.

Table Number 1.1

S. No	Name of the District	Sample Size			No. of. Respondents Selected (3x20=60)
		Financial Institutions			
		DIC	TIIC	THADCO	
1.	Chennai	20	20	20	60
2.	Trichy	20	20	20	60
3.	Coimbatore	20	20	20	60
4.	Madurai	20	20	20	60
Grand Total		80	80	80	240

Source: *Primary Data*

Statistical Tools for Analysis

The researcher utilised a range of proficient statistical tools, including descriptive statistics for percentage analysis, trend percentages, t-tests, multiple regression analysis, factor analysis, to analyse the data.

PERSONAL PROFILE OF YOUNG ENTREPRENEURS

The responder's personal profile is crucial in any research because it directly influences the subject matter of the study. The primary data collected from the participants in this study includes various demographic characteristics such as age, gender, marital status, family structure, place of residence, educational attainment, educational background, type of educational institution, and the business profile of young entrepreneurs. Demographic variables undergo Percentage Analysis and Descriptive Statistics analysis, and the results are displayed in tables.

Table Number 1.1
Demographic Profile of the Respondents

Demographic Profile (N = 240)	Description	Frequency	Percentage
Gender	Male	167	69.58
	Female	73	30.42
Age	20-25 years	23	9.58
	26-30 years	63	26.25
	31-35 years	154	64.17
Education	School Level	40	16.67
	College Level	74	30.83
	Professionals	126	52.50
Marital Status	Married	177	73.75
	Un Married	63	26.25
Income (Year)	Below -3,00,000	13	5.42
	3,00,001-5,00,000	49	20.42
	5,00,001-7,00,000	101	42.08
	Above- 7,00,001	77	32.08
Location of Unit	Rural	37	15.42
	Semi -Urban	104	43.33
	Urban	99	41.25
Initial Investment	Less than 1 lakh	12	5.00
	1-5 lakhs	112	46.67
	6-10 lakhs	65	27.08
	Above 10 lakhs	51	21.25

Source: Primary Data

Table 1.1 displays the demographic attributes of the participants based on the geographical area of Tamil Nadu. Approximately 64.17% of the respondents belong to the age group of 31-35 years. Moreover, a significant majority (62.5%) of the participants are in a state of matrimony. Moreover, a majority (52.50%) of the participants have received a professional education, while a majority (42.08%) have an annual salary between 5,00,001-7,00,000. Furthermore, a significant proportion (43.33%) of the participant's lives in rural areas, and a majority (46.67%) of them has made an initial investment between 1-5 lakhs.

DESCRIPTIVE STATISTICS

Descriptive statistics are used to clarify and illustrate the factors related to the challenges faced by young entrepreneurs. Young entrepreneurs have two main hurdles, specifically the Risk Factor (IF) and the Knowledge Factor (CF). The challenges encountered by young individuals include the necessity for continuous learning, the impact of technology, the desire for constant engagement, the pursuit of long-term achievements, and the involvement in a time-consuming registration process. The risk factors include various aspects, specifically financial resources, marketing unpredictability, societal perception, and governmental regulations. The table below displays the descriptive statistics for all factors associated with the Challenges Faced by Young Entrepreneurs.

Table Number- 1.2

Descriptive Statistics of Challenges Faced By Young Entrepreneurs

Variables Relating to CYE	Mean	SD
Updating knowledge	4.606	0.523
Technology based	4.539	0.619
Restless efforts	4.402	0.645
Long term progress	4.539	0.591
Lengthy registration process	3.896	1.009
Adequate financial facilities	4.311	0.729
Uncertainty of marketing	4.295	0.707
Social approach about youth	4.295	0.665
High Risk	4.004	0.772
Government policies	4.058	0.859

The results shown in Table 1.2 demonstrate a notably higher average value for the Challenges Faced by Young Entrepreneurs when it comes to making employment decisions. These data indicate a significant degree of uniformity in the Risk Factors. The factor with the highest average value among the knowledge factors is Updating knowledge, with a mean value of 4.606. The factor with the lowest standard deviation value is Updating knowledge, with a value of S.D=0.523. The other factors, in descending order of mean value, are technology based (M=4.539, SD=0.619), Restless efforts (M=4.402, SD=0.645), Long term progress (M=4.539, SD=0.591), Lengthy registration process (M=3.896, SD=1.009), Adequate financial facilities (M=4.311, SD=0.729), Uncertainty of marketing (M=4.295,

SD=0.707), Social approach about youth (M=4.295, SD=0.665), High Risk (M=4.004, SD=0.772), and Government policies (M=4.058, SD=0.859).

The reliability of the Challenges Faced by Young Entrepreneurs scale was evaluated by employing Cronbach's Alpha as the first step in doing factor analysis. The results are displayed in the table provided.

Table Number – 1.3

Reliability Analysis of Challenges Faced By Youth Entrepreneur

CYF FACTORS	ALPHA VALUE	NO OF VARIABLES
Risk Factor (RF)	812	6
Knowledge Factor (KF)	706	4
CYF	0.822	10

The reliability of the ten-item scale was evaluated using Cronbach's alpha reliability test, as indicated in Table 1.3. The table displays the Cronbach's Alpha values for the variables in the Risk Factor (RF) and Knowledge Factor (KF), which are 812 and 706, respectively. The Cronbach Alpha coefficient for all criteria pertaining to the obstacles encountered by young entrepreneurs is 0.822. Since the result is more than 0.800, it may be inferred that the construct scale used to measure the challenges encountered by young entrepreneurs demonstrates a high degree of dependability. In order to evaluate the appropriateness of the data for factor analysis, the researchers performed the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test. The results are outlined in the subsequent section.

Table Number – 1.4

KMO and Bartlett's Test of Challenges Faced by Youth Entrepreneur

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.833
Bartlett's Test of Sphericity	Approx. Chi-Square	782.058
	Df	45
	P value	0.000

Table 1.4 reports that the KMO measure of sample adequacy is recorded as 0.833, which above the threshold value of 0.600. Therefore, the KMO score of 0.833 indicates that factor analysis is the most suitable approach for studying the 10 Challenges Faced by Young Entrepreneurs variables. The Kaiser-Meyer-Olkin (KMO) value is a reliable indicator of the suitability of the sampling method used for the present dataset.

Similarly, the adequacy of the data for factor analysis was evaluated by utilising Bartlett's test of sphericity. The data in the table shows that the test value of 782.058 is

statistically significant ($P < 0.000$). Hence, the data is highly suitable for factorising the variables associated with the Ten Challenges Encountered by Young Entrepreneurs. Therefore, the indications listed above jointly demonstrate that the dataset is very suitable for factor analysis.

The technique of principal component analysis is employed to condense a significant quantity of data into separate components. To assess the suitability of factorising the variables associated with Challenges Faced by Young Entrepreneurs, we computed communalities and measures of Sampling Adequacy. The results are presented in Table 1.4. The study has discovered two underlying dominant factors that explain 54.980% of the overall variation in the nine variables related to Challenges Faced by Young Entrepreneurs. The two hidden dominant elements are Factor one and Factor two. The factors have been redefined as Risk Factor (RF) and Knowledge Factor (CF), as shown in the tables provided below.

Table Number- 1.5
Descriptive Statistics of Challenges Faced By Youth Entrepreneur

Variables Relating to CYE	MSA	Communalities
Updating knowledge	0.742	0.661
Technology based	0.680	0.707
Restless efforts	0.757	0.420
Long term progress	0.830	0.447
Lengthy registration process	0.882	0.401
Adequate financial facilities	0.862	0.592
Uncertainty of marketing	0.866	0.566
Social approach about youth	0.866	0.554
High risk	0.882	0.671
Government policies	0.876	0.557

Table 1.5 displays the communalities, which offer insights into the degree to which each variable contributes to the total variance of the factors that influence the obstacles faced by young entrepreneurs. An acceptable factor analysis is achieved when both the communality and MSA value above 0.500. The MSA value ranges from 0.876 to 0.680, while the communalities values range from 0.707 to 0.401. The MSA and Communalities variables above the predetermined threshold limits, suggesting that factor analysis can be

utilised to investigate the 10 issues faced by young entrepreneurs. The following data presents the total variance explained:

Table Number- 1.6
Total Variance Explained In Challenges Faced By Youth Entrepreneur

Component	Rotation Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %
1	3.303	33.026	33.026
2	2.195	21.954	54.980

Table 1.6 presents the total variance explained by each component in the factors associated with challenges faced by young entrepreneurs. Factor analysis is used to condense the ten variables into two separate factors, which together account for 54.980% of the total variation. The first principal component explains the majority of the total variance. The second component accounts for 21.954% of the variance in challenges faced by young entrepreneurs, contributing to a total variance of 33.026%. The selection of principal components is based on their Eigen value exceeding 1. The table above demonstrates that both factors responsible for the challenges faced by young entrepreneurs have a higher Eigen value and contribute significantly to the overall variation. In order to enhance the understanding of the two components, a Varimax rotation was performed. The results are displayed in the subsequent section:

Table Number – 1.7
Factor Loading Of Risk Factor (RF)

SL.NO	RF relating to CYF Variables	Factor Loading	Eigen Value	Variance Explained
RF01	High risk	0.800	3.303	33.026
RF02	Adequate financial facilities	0.769		
RF03	Government policies	0.745		
RF04	Uncertainty of marketing	0.718		
RF05	Social approach about youth	0.713		
RF06	Lengthy registration process	0.477		

Table 1.7 presents the Risk Factor (RF) as the primary and most significant factor affecting the challenges faced by young entrepreneurs. This factor is measured through six statements, each with a corresponding factor loading. These statements include High risk (0.800), Adequate financial facilities (0.769), Government policies (0.745), Uncertainty of

marketing (0.718), Social approach about youth (0.713), and Lengthy registration process (0.477). These six variables collectively account for 33.026% of the variance in the obstacles experienced by young entrepreneurs, with an Eigen value of 3.303. Based on the information provided, it can be deduced that out of the six RF factors, "High risk" holds the highest level of significance.

Table Number- 1.8
Factor Loading Of Knowledge Factor (KF)

SL.NO	KF relating to CYF Variables	Factor Loading	Eigen Value	Variance Explained
KF01	Technology based	0.841	2.195	21.954
KF02	Updating knowledge	0.803		
KF03	Restless efforts	0.599		
KF04	Long term progress	0.508		

Table Number 1.8 presents the dominant and most significant factor, Risk Factor (RF), in the challenges faced by young entrepreneurs. This factor is composed of six statements with corresponding factor loadings: Technology based (0.841), Updating knowledge (0.803), Restless efforts (0.599), and Long term progress (0.508). Based on the information provided, it can be deduced that out of the four key performance variables (KF), the variable labelled "Technology based" holds the highest level of significance.

Table Number- 1.9
Descriptive Statistics and Test of Normality (CYE)

CYE	Mean	SD	Variance	Skewness	Kurtosis	Kolmogorov-Smirnova		Shapiro-Wilk	
						Statistic (df = 241)	Sig.	Statisti (df = 241)	Sig.
RF	24.858	3.438	11.821	-0.767	0.553	0.123	0.000	0.948	0.000
KF	18.087	1.738	3.021	-0.432	-0.974	0.184	0.000	0.880	0.000
Lilliefors Significance Correction									

Table 1.9 provides an assessment of how effective descriptive statistics are in the field of employment decision-making research. A higher average value and lower standard deviations suggest a normal distribution of data. The data's normality is confirmed by the outcomes of the Shapiro-Wilk and Kolmogorov-Smirnova normality tests, suggesting that they are appropriate for higher-order multivariate analysis. The employment decision-making distribution displays a mean, standard deviation, variance, skewness, and kurtosis that are within the anticipated range.

Table Number 1.10**Model Summary Table for Influence of CYE and EIYE**

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.826	0.492	0.382	1.719

Table Number 1.10.1**ANOVA for CYE and EIYE Forecasting**

	Sum of Squares	Df	Mean Square	F	P value
Regression	450.931	4	112.732	38.122	0.000
Residual	697.881	236	2.957		
Total	1148.813	240	-		

Table Number 1.11**Youth Entrepreneurs Satisfaction in the Multiple Regression Analysis**

	Unstandardized Coefficients		Standardized Coefficients	t	P value
	B	Std. Error	Beta		
(Constant)	24.210	1.361	-	3.093009	0.002
EF	2.064	0.043	-0.077	21.476	0.141
SF	1.298	0.102	0.162	2.900	0.004
RF	2.282	0.036	0.444	7.658	0.000
KF	1.185	0.074	0.147	2.499	0.013
Multiple R- value	0.826				
R square value	0.492				
F- value	38.122				
p- value	0.000				

Note: ** Denotes significant at 1 % level. * Denotes significant at 5 % level.

The R-squared coefficient of determination

The coefficient of determination, or R-Square, measures the extent to which the estimated regression accurately captures the variability in the dependent variables. The statement refers to the process of determining the amount of variation that can be accounted for by the regression equation that has been fitted to the sample data.

The coefficient of determination (R square) is 0.826. The estimated SRP, which incorporates the independent variables of Economic Factor (X1), Social Factor (X2), Risk Factor (X3), and Knowledge Factor (X4), accounts for approximately 82% of the variability in satisfaction among young entrepreneurs. The R-square value is statistically significant at a significance level of 1%. The F-value is 38.122 and the p-value is 0.01.

The equation that represents multiple regression is as follows: The equation is $Y = 24.210 + 2.064 \text{ times } X1 + 1.298 \text{ times } X2 + 2.282 \text{ times } X3 + 1.185 \text{ times } X4$. The

coefficient of X1 is documented as 2.064, signifying the partial effect of the Economic Factor while accounting for the impact of other independent variables. If a positive sign is estimated, it suggests that the observed effect is positive. More precisely, the study indicates that the satisfaction level of young entrepreneurs would increase by 2.064 units for every unit of growth in the Economic Factor. Moreover, this value coefficient exhibits statistical significance at the 1% level.

The study identified four independent factors (Economic Factor (X1), Social Factor (X2), Risk Factor (X3), Knowledge Factor (X4)) and found that the Economic Factor had the strongest predictive relationship with young entrepreneurs' satisfaction. This relationship was highly significant ($t = 21.476$; $p < 0.01$).

Table Number – 1.12
Descriptive Statistics and Test of Normality (YESEEE)

CYE	Mean	SD	Variance	Skewness	Kurtosis	Kolmogorov-Smirnova		Shapiro-Wilk	
						Statistic (df = 241)	Sig.	Statistic (df = 241)	Sig.
AF	31.199	3.158	9.976	-1.164	2.351	0.144	0.000	0.904	0.000
TF	24.896	3.321	11.035	-0.399	-0.468	0.107	0.000	0.965	0.000
PF	22.423	2.238	5.011	-1.210	1.818	0.166	0.000	0.888	0.000
MF	12.514	2.131	-0.867	-0.867	0.284	0.167	0.000	0.905	0.000
OF	17.589	2.000	4.001	-0.930	1.720	0.142	0.000	0.909	0.000
Lilliefors Significance Correction									

The elevated mean and reduced standard deviation values presented in Table No. 1.5, supported by strong descriptive statistics, indicate that the data related to Youth Entrepreneurship on Social and Economic Empowerment in the study area follow a normal distribution. This normality is further validated by the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests. Additionally, the normal distribution and reliability of the variables concerning Youth Entrepreneurship, Social Empowerment, and Economic Empowerment are substantiated through an analysis of their mean, standard deviation, variance, skewness, and kurtosis, confirming the suitability of the data for higher-order multivariate analyses.

Figure Number - 1.1

Impact of Young Entrepreneur on Social Empowerment and Economic Empowerment

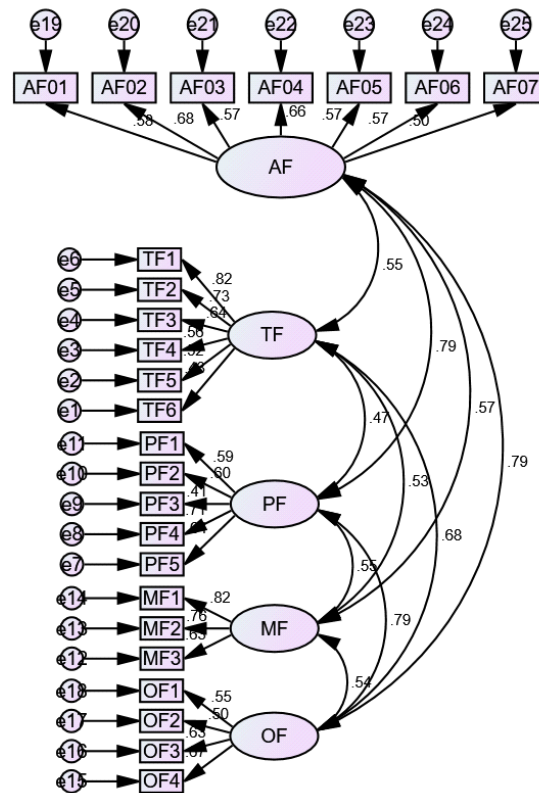


Fig. 1.1 CFA Model for Impact of Young Entrepreneur on Social Empowerment and Economic Empowerment

Figure 1.1 illustrates the functional values comprising two distinct sub-dimensions: the Social Factor (SF) and the Economic Factor (EF). The Social Factor encompasses five components, while the Economic Factor consists of four. The data reveal that Financial Factor 1 exerts a significant influence on the Social Factor (SF), with a standardized coefficient of 0.72. Similarly, Economic Factor 3 demonstrates the strongest impact on the Economic Factor (EF), with a coefficient of 0.78. Model fit statistics presented in Table 1.1, based on the Confirmatory Factor Analysis (CFA) assessing the influence of young entrepreneurs on social and economic empowerment, indicate an overall acceptable model fit. Key indices—GFI (0.981), CFI (0.979), TLI (0.972), NFI (0.900), and RMSEA (0.059)—are all within recommended thresholds and statistically significant at the 1% level. Although the Chi-square statistic ($\chi^2 = 68.612$, $DF = 25$, $p < 0.000$) does not meet ideal expectations, the Relative Chi-square value ($\chi^2/DF = 3.764$) remains below the acceptable cut-off of 5, suggesting reasonable fit.

Overall, with the exception of the chi-square value, all fit indices confirm the adequacy of the model. Therefore, the CFA model incorporating latent constructs effectively represents the empirical data regarding the role of young entrepreneurs in promoting social and economic empowerment.

Table Number: 1.13

The variables used in the Structural Equation Modeling

S. No	Structural Equation Model
I.	Observed, Endogenous Variables
	1. Impact of Young Entrepreneur on Social Empowerment and Economic Empowerment
	2. Social empowerment
	3. Economic empowerment
II.	Observed, Exogenous Variables
	1. Financial Empowerment
	2. Marketing Empowerment
	3. Operational Empowerment
	4. Investment Empowerment
III.	Unobserved, Exogenous Variables
	1. e1: Error term for Impact of Young Entrepreneurs Social Empowerment and Economic Empowerment
	2. e2: Error term for Social Empowerment
	3. e3: Error term for Economic Empowerment

Figure No. 1.2

Structural Equation Modeling on Impact of Young Entrepreneurs Social and Economic Empowerment

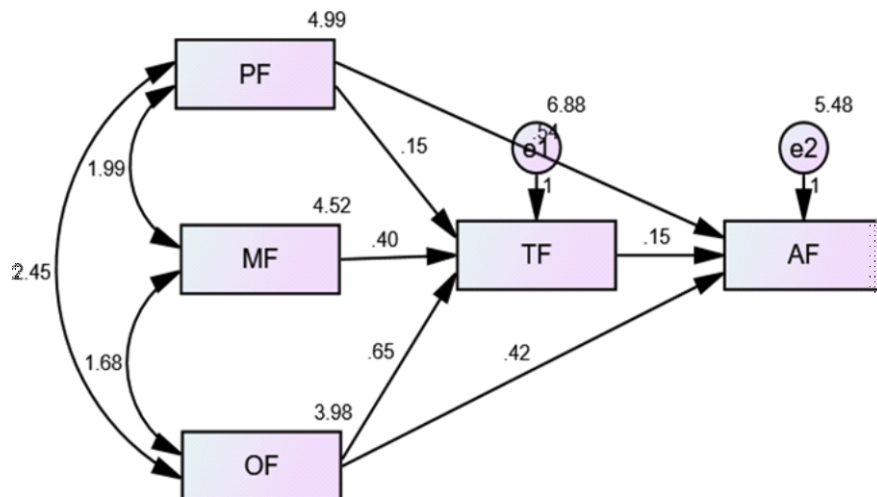


Table No: 1.14**Variables in the Structural Equation Model Analysis**

Measured Variables		Latent Variable	SW	USW	S.E.	C.R.	P
TF	<---	PF	0.104	0.155	0.094	1.646	.100
TF	<---	MF	0.257	0.400	0.090	4.456	***
TF	<---	OF	0.389	0.646	0.104	6.214	***
AF	<---	PF	0.380	0.536	0.082	6.520	***
AF	<---	OF	0.263	0.415	0.100	4.170	***
AF	<---	TF	0.162	0.154	0.055	2.787	0.005

Note: ** Denotes significant at 1% level. * Denotes significant at 5% level

The unstandardized coefficient of 0.389 represents the partial effect of technological factors on young entrepreneurs, while controlling for financial empowerment, marketing empowerment, operational empowerment, and investment empowerment. This positive coefficient indicates a favorable influence, suggesting that for each one-unit increase in technological factors, there is an associated 0.389-unit increase in social and economic empowerment. Furthermore, the coefficient is statistically significant at the 1% level, reinforcing the strength and reliability of this relationship.

RECOMMENDATIONS

Significant financial assistance should be provided to young entrepreneurs in the state of Tamil Nadu by banks and other financial institutions. This is mostly due to the perception among young entrepreneurs that the assistance they receive from institutions is insufficient to fulfil their financial requirements. Financial institutions such as DIC, TIIC, and TAHDCO are prioritising the provision of secure and asset-backed loans instead of high-risk or venture-based loans in order to appeal to young entrepreneurs. There exist numerous initiatives and incentives for aspiring young entrepreneurs, but, they are predominantly conceptual and lack practical implementation. Substantial financial assistance should be provided to young entrepreneurs to ensure the continuity of their firms.

CONCLUSION

A notable number of the participants initiated their entrepreneurial pursuits by leveraging their prior experiences, while a lesser subset of respondents expressed that self-employment serves as a motivating factor for their engagement in entrepreneurial endeavours. Currently, the majority of the younger generation focuses primarily on obtaining employment, while only a small portion considers the possibility of starting their own

business. It is necessary to change the cognitive framework of the younger generation. Therefore, it is crucial for young people to have a thorough understanding of the fundamental goals of entrepreneurship. This will allow them to actively contribute to society or the country by generating income, creating job opportunities, and achieving economic independence. A significant proportion of the participants demonstrated expertise in financial management, as evidenced by their financial performance, which was influenced by their past experience. Young entrepreneurs in the research region bear a significant obligation to secure money for capital investment concurrently.

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9. A STUDY ON IMPLEMENTATION OF AI TOOLS IN TELECOMMUNICATION COMPANIES WITH SPECIAL REFERENCE TO CHENNAI CITY

N. Vikram

Assistant Professor

Post Graduate of Commerce

Dwaraka Doss Goverdhan Doss Vaishnav College (Autonomous) (DDGDVC)

ABSTRACT

This paper aims to investigate the impact of Artificial Intelligence (AI) applications on the growth of digital marketing in Indian telecommunication companies. The research explores their role in enhancing digital marketing strategies and performance by focusing on crucial AI technologies — Expert Systems, Evolutionary Computation, and Neural Networks. A sample size of 240 employees from various Indian telecommunication companies using Stratified Random Sampling. Statistical analysis including Percentage Analysis, Frequency tests, Chi-square tests, ANOVA, Correlation Analysis, and Multiple Regression Analysis were used to assess the relationship between AI applications and digital marketing growth. The findings highlight the significant effects of AI on digital marketing, offering insights into the potential of these technologies to drive the sector forward.

Keywords

Artificial Intelligence, Digital Marketing, Indian Telecommunications, Expert Systems, Evolutionary Computation, Neural Networks, Statistical Analysis.

INTRODUCTION

The rapid advancement of technology has revolutionized various industries, with artificial intelligence (AI) emerging as a critical driver of innovation and growth. In digital marketing, AI applications transform traditional practices, enabling companies to enhance customer experiences, optimize campaigns, and achieve better results. Integrating AI into digital marketing strategies has become increasingly important in India, where the telecommunication sector is expanding rapidly. This study examines the effect of AI applications on the growth of digital marketing within Indian telecommunication companies.

THEORETICAL BACKGROUND

The use of AI in digital marketing has changed how Indian telecom businesses function. The literature emphasizes on how AI applications improve client engagement, customization, and efficiency in digital marketing efforts. Neural networks, expert systems,

and evolutionary computing have been intensively explored for their capacity to analyze massive volumes of data, enabling better decision-making and targeted marketing.

The literature shows that AI technologies have transformed Indian telecom businesses' digital marketing. AI will improve customer targeting, campaign efficiency, and marketing effectiveness, preparing these organizations for sustainable development in a competitive market.

REVIEW OF LITERATURE

Chowdhury, S., Basu, S., Ashoka, N., & Singh, P. K. (2024) infers that the key aspects determining the impact of AI-driven Digital Marketing on Consumer Purchase Intention are Personalized Recommendations, Behavioural Targeting, Chatbots and Virtual Assistants, and Predictive Analytics.

Eni, L. N., Chaudhary, K., Raparathi, M., & Reddy, R. (2023) opines that results and suggestions of this research were positioned to provide information to stakeholders, industry professionals, and policymakers directing their efforts in navigating the revolutionary process of Indian banks marketing driven by AI and big data analytics.

Chintalapati, S., and Pandey, S. K. (2022) suggested a future research agenda to investigate the ongoing changes brought about by the rapid use of AI in marketing.

Kumar, V., Ramachandran, D., & Kumar, B. (2021) examined the role of four emerging technologies - the Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), and Blockchain (BC) - in marketing. The research emphasized critical issues that need management attention in the implementation of these modern technologies.

SCOPE OF THE STUDY

The scope of the study encompasses the role of AI applications in digital marketing within the Indian telecommunications industry. The research focuses on three key AI technologies — expert systems, evolutionary computation and neural networks — and their influence on marketing performance. The study is confined to telecommunication companies in India and seeks to provide insights that can be generalized across the sector. By understanding the relationship between AI and digital marketing, the study aims to contribute to the development of more effective marketing strategies in this industry.

OBJECTIVES OF THE STUDY

1. To study the demographic profile of the respondents.
2. To study how Expert Systems influence the growth of digital marketing in Indian telecommunication companies.

3. To analyze the effect of evolutionary computation on the growth of digital marketing in Indian telecommunication companies.
4. To explore the impact of neural networks on the growth of digital marketing in Indian telecommunication companies.

HYPOTHESES OF THE STUDY

H1: There is a significant influence of expert systems on the growth of digital marketing in Indian telecommunication companies.

H2: There is a significant effect of evolutionary computation on the growth of digital marketing in Indian telecommunication companies.

H3: There is a significant impact of neural networks on the growth of digital marketing in Indian telecommunication companies.

RESEARCH METHODOLOGY

The study adopts a quantitative research design, employing a sample size of 240 employees from various Indian telecommunication companies. The sampling method used is stratified random sampling to ensure a representative sample across different company levels and functions. Data were collected through a structured questionnaire that measured respondents' perceptions of AI applications and their impact on digital marketing growth.

DATA ANALYSIS AND INTERPRETATION

The research study sets the stage for the entire investigation, providing a clear and concise overview of the Statistical analysis including Percentage Analysis, Frequency tests, Chi-square tests, ANOVA, Correlation Analysis, and Multiple Regression Analysis which assess the relationship between AI applications and digital marketing growth.

Table 1: Demographic Profile of the Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Age	21-30 years	80	33.33
	31-40 years	100	41.67
	41-50 years	45	18.75
	Above 50 years	15	6.25
Gender	Male	150	62.50
	Female	90	37.50
Education	Undergraduate	60	25.00
	Postgraduate	130	54.17
	Professional Degree	50	20.83
	Total	240	100

*** Source: Primary data

The demographic profile indicates that the majority of the respondents are aged between 31-40 years (41.67%) and predominantly Male (62.50%). Most participants have attained Postgraduate education (54.17%).

**Table 2: Chi-Square Test for Relationship Between All Three AI Applications
(Expert et al.) And Digital Marketing Growth**

Variable	Chi-Square Value	df	p-value	Significance
Expert Systems vs. Digital Marketing Growth	8.452	3	0.037	Significant
Evolutionary Computation vs. Digital Marketing Growth	9.671	3	0.022	Significant
Neural Networks vs. Digital Marketing Growth	10.789	3	0.013	Significant

The Chi-square test results show a significant relationship between all three AI applications (expert systems, evolutionary computation, and neural networks) and digital marketing growth, with p-values less than 0.05.

**Table 3: ANOVA for All AI Applications Significantly Influence
Digital Marketing Growth**

Source of Variation	The sum of Squares (SS)	df	Mean Square (MS)	F-Value	p-value	Significance
Expert Systems	230.5	2	115.25	4.32	0.015	Significant
Evolutionary Computation	254.7	2	127.35	5.01	0.009	Significant
Neural Networks	279.8	2	139.9	5.67	0.005	Significant
Error	587.4	237	2.48			
Total	1352.4	239				

ANOVA results reveal that all AI applications significantly influence digital marketing growth, as indicated by F-values greater than the critical value and p-values less than 0.05.

**Table 4: Correlation Analysis for the Relationship between each AI application and
Digital Marketing growth**

Variable	Correlation Coefficient (r)	p-value	Significance
Expert Systems vs. Digital Marketing Growth	0.625	0.001	Significant
Evolutionary Computation vs. Digital Marketing Growth	0.642	0.001	Significant
Neural Networks vs. Digital Marketing Growth	0.689	0.001	Significant

The correlation analysis shows a strong positive relationship between each AI application and digital marketing growth, with all correlations being significant ($p < 0.05$).

Table 5: Multiple Regression Analysis for the strongest impact on digital marketing growth followed by Evolutionary Computation, Expert Systems and Neural Networks.

Predictor Variables	B	Standard Error	Beta	t-value	p-value	Significance
Expert Systems	0.345	0.072	0.321	4.79	0.001	Significant
Evolutionary Computation	0.367	0.065	0.338	5.65	0.001	Significant
Neural Networks	0.405	0.058	0.398	6.98	0.001	Significant

The multiple regression analysis indicates that neural networks have the strongest impact on digital marketing growth, followed by evolutionary computation and expert systems. All predictor variables are significant contributors ($p < 0.05$).

FINDINGS, SUGGESTIONS & RECOMMENDATIONS AND CONCLUSION

The study reveals that AI applications — expert systems, evolutionary computation, and neural networks— significantly contribute to the growth of digital marketing in Indian telecommunication companies. Neural network, in particular, demonstrates the strongest influence, highlighting their potential to drive marketing innovation. The findings suggest that telecommunication companies can prioritize the integration of AI technologies into their marketing strategies to enhance performance and competitiveness. This could lead to new avenues of research or suggest limitations in the current study.

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10. A STUDY ON DIGITAL BANKING A SPECIAL FOCUS ON TRENDS, OPPORTUNITIES AND CHALLENGES

Dr. N. A. Arshiya Afrin

Assistant professor

Madhubala R & Sriranjane T,

Student of B.com (Accounts and Finance) Third year,

Department of Commerce,

B.S. Abdur Rahman Crescent Institute Of Science And Technology

ABSTRACT

Digital banking represents the transformation of traditional banking services into digitized formats, enabling customers to access financial services without the constraints of physical bank branches. This research explores the evolution of digital banking, highlighting its impact on accessibility, efficiency, and customer experience in the financial sector.

Data for this study were collected through a mixed-methods approach, encompassing both quantitative surveys to gauge customer satisfaction and usability, as well as qualitative information from books and reference material to gain insights into operational challenges and technological advancements.

The findings reveal that digital banking enhances user convenience through features such as online account management, mobile banking applications, and a suite of payment services including UPI, NEFT, RTGS, and IMPS. Notably, the transition to digital platforms has led to significant reductions in transaction costs and increased security through advanced encryption measures. However, challenges remain, including cybersecurity risks, the digital divide affecting certain populations, and a reliance on stable internet connectivity.

This research underlines the critical role that digital banking plays in promoting financial inclusion and fostering economic growth in an increasingly digital world.

Keywords:

Digital Banking, financial services, customer experience, technological advancements in digital banking.

INTRODUCTION

Digital banking refers to the automation of traditional banking services through digital technologies. It enables customers to access financial products and services via electronic platforms such as mobile apps, websites, and ATMs, eliminating the need to visit a physical bank branch.

According to Tavaga, digital banking means "digitizing all banking operations and replacing the bank's physical presence with a continuous online presence."

India has emerged as a global leader in digital transactions, with over 48.6 billion real-time payment transactions in 2021, surpassing China. Initiatives like Digital India, Jan Dhan Yojana, and the Unified Payments Interface (UPI) have significantly accelerated the adoption of digital banking.

Major banks such as SBI, ICICI, and HDFC, along with fintech platforms like Razorpay and PhonePe, are at the forefront of innovation in this sector.

Types Of Digital Banking

Type	Description
Internet Banking	Accessing banking services via a bank's website.
Mobile Banking	Using smartphone apps for transactions, account management, and payments.
UPI (Unified Payments Interface)	Real-time money transfers using mobile apps and virtual addresses.
Digital Wallets	Apps like Google Pay, PhonePe, and Paytm for fast payments and transfers.
Digital-Only Banks	Banks that operate entirely online, with no physical branches.

Advantages of Digital Banking

1. **Convenience:** Digital banking offers 24/7 access to financial services from any location with internet connectivity, eliminating the need for in-person branch visits.
2. **Speed and Efficiency:** Transactions such as money transfers and bill payments are processed quickly, and loan approvals can be expedited through online platforms.
3. **Cost Savings:** Reduced operational costs for financial institutions often result in lower fees for customers. Additionally, the shift to paperless transactions leads to savings in time and resources.
4. **Enhanced Features:** Digital banking platforms provide valuable tools such as real-time notifications and budgeting resources, as well as integration with mobile wallets and third-party financial applications.
5. **Environmental Benefits:** By minimizing the use of paper and reducing the reliance on physical infrastructure, digital banking contributes to a lower carbon footprint.

Disadvantages of Digital Banking

1. **Security Risks** Digital banking systems are susceptible to cyber threats, including phishing and data breaches. Users must maintain strong security practices and remain vigilant against online risks.
2. **Limited Personal Interaction:** The absence of face-to-face assistance may pose challenges when addressing complex issues. Automated systems may not fully satisfy user concerns.

3. **Digital Divide:** Access to digital banking may be limited for individuals without internet access or necessary digital skills, particularly affecting older adults and residents of rural areas.
4. **Technical Glitches:** Users may experience disruptions due to application crashes, server downtime, or transaction failures, highlighting the dependence on technology.
5. **Privacy Concerns:** The collection and tracking of user data can raise privacy issues. It is imperative that banks handle sensitive information with the utmost responsibility and care.

REVIEW OF LITERATURE

1. **Martins, C., Oliveira, T., & Popovič, A. (2014).** "Understanding the Internet Banking Adoption: A Unified Theory of Acceptance and Use of Technology and Perceived Risk Application." *International Journal of Information Management*, 34(1), 1-13. Utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT), this research investigates internet banking adoption. It reveals that performance expectancy, effort expectancy, and social influence significantly impact users' intentions. Perceived risk is identified as a moderating factor.
2. **Shaikh, A. A., & Karjaluoto, H. (2015).** "**Mobile Banking Adoption:** A Literature Review." *Telematics and Informatics*, 32(1), 129-142. This comprehensive literature review explores factors influencing mobile banking adoption. It identifies perceived usefulness, ease of use, trust, and personal innovativeness as key determinants. The review concludes that demographic variables such as age and education also play significant roles in adoption rates.
3. **Alalwan, A. A., Dwivedi, Y. K., & Williams, M. D. (2016).** "Customers' Intention and Adoption of Telebanking in Jordan." *Information Systems Management*, 33(2), 154-178. This study focuses on telebanking adoption in Jordan, emphasizing the role of trust, perceived usefulness, and ease of use. The results demonstrate that cultural context and trust in technology providers are crucial elements for successful digital banking adoption.

OBJECTIVE

1. Understand the trends in digital banking.
2. Explore the opportunities presented by digital banking.
3. Identify the challenges faced by digital banking.

DATA ANALYSIS AND INTERPRETATION

I. TRENDS OF THE DIGITAL BANKING

Age Group	Q1:Growth Online Banking	Q2: UPI/Wallet changed payments	Q3: Use of QR/Voice/Online cards	Q4: Chatbots Help Banking	Q5: Online to Replace Branch
Young (18-25)	4.8	4.5	3.5	3.4	3.2
Middle (26-40)	4.5	4.1	3.9	3.7	3.5
Older (41+)	4.4	3.0	3.2	2.8	2.7

Young adults (18-25) are eager adopters of digital banking, while those in their 26-40s are selective users, and individuals over 41 prefer traditional banking methods.

II. OPPORTUNITIES OF THE DIGITAL BANKING

Age Group	Q6: Anytime Anywhere	Q7: Better Money/Investment Understanding	Q8: App Suggests Personalized Services	Q9: Saves Time vs. Branch	Q10: Helps Rural/Remote
Young (18-25)	4.4	4.0	3.4	4.2	3.7
Middle (26-40)	4.3	4.2	3.7	4.1	3.6
Older (41+)	4.1	2.7	2.9	4.0	3.3

Young adults prioritize flexibility, middle-aged users value convenience and personalization, while older adults appreciate convenience with less emphasis on outreach.

III. CHALLENGES FACED IN DIGITAL BANKING

Age Group	Q11: Faced App/Transaction Issues	Q12: Worry About Security	Q13: Some People Struggle Due to Low Knowledge	Q14: Harder in Villages	Q15: Hard to Get Help
Young (18-25)	4.0	3.6	4.8	4.4	4.2
Middle (26-40)	3.7	3.8	4.4	4.3	4.0
Older (41+)	3.8	4.2	4.1	4.1	3.7

Young users see tech gaps, middle-aged focus on fraud concerns, while older users prioritize safety and acknowledge rural access issues.

III. EXPERIENCE IN DIGITAL BANKING

Age Group	Q16: Helpful	Q17: Comfortable	Q18: Make Better	Q19: Tech Will Solve	Q20: Happy
Young (18-25)	3.86	4.05	4.36	3.77	3.77
Middle (26-40)	3.45	3.36	3.73	3.45	3.91
Older (41+)	3.67	4.00	3.17	3.50	2.50

Young adults highly desire online banking improvements; middle-aged users are moderate, while older adults are least satisfied and skeptical.

FINDINGS

1. Young users embrace online banking and UPI enthusiastically, middle-aged users adopt QR, voice tech, and chatbots more readily, while older users recognize digital growth but adopt new tools slowly.
2. Younger users valued digital banking for access and savings; older users focused more on convenience than investment advice and personalization.
3. Younger users valued digital banking for access and time savings, while older users prioritized convenience over investment understanding and personalization.
4. Young users are optimistic about digital banking improvements; middle-aged users are less comfortable but slightly happier than others.

SUGGESTIONS

1. Enhance User Experience: Simplify interfaces for all ages, with intuitive navigation and accessible design features.
2. Promote Digital Literacy: Provide targeted education and support, especially for older users, to boost confidence in digital tools.
3. Offer Hybrid Models: Combine digital and physical banking options to accommodate preferences for in-person service alongside digital convenience.
4. Boost Security and Trust: Emphasize strong security measures and transparent communication to alleviate concerns, especially in older demographics
5. Facilitate Seamless Payments: Support multiple payment options like UPI, wallets, QR codes, and cards, making transactions fast and versatile.

CONCLUSION

Digital banking in India has revolutionized financial services by offering unparalleled convenience, speed, cost efficiency, and accessibility, driven by technological innovation and government initiatives. The study reveals that younger users are the most enthusiastic

adopters, middle-aged individuals balance convenience with security, while older users adopt cautiously with a focus on trust and ease of use. However, challenges such as cybersecurity risks, the digital divide, and limited personal interaction remain. The future of banking lies in blending digital advancements with human touchpoints, enhancing digital literacy, and strengthening security to ensure inclusive growth, foster financial inclusion, and create a secure, customer-centric banking ecosystem.

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11. FOSTERING A POSITIVE WORKPLACE CULTURE: THE IMPACT OF AI-POWERED COLLABORATION TOOLS ON TEAM MORALE IN TAMIL NADU'S IT SECTOR

J. Varshini,
Research Scholar,

Dr. V. Sampathkumari,
Research Supervisor and Guide, Associate Professor,
PG & Research Department of Commerce,
Sri Kanyaka Parameswari Arts and Science College for Women, Chennai.

ABSTRACT

PURPOSE: This research explores how AI-powered collaboration tools affect team morale and help create a positive workplace environment in the IT sector of Tamil Nadu. The main goal is to understand whether these tools improve employee satisfaction, communication, and overall workplace culture.

RESEARCH METHODOLOGY

The study used a descriptive approach by collecting data through a questionnaire from 100 IT employees working in the region. The data was analysed using statistical software like IBM SPSS and MS-Excel to identify relationships between the use of AI tools and factors like team morale and key factors for positive workplace culture.

FINDINGS:

Results indicate that the effective use of AI collaboration tools significantly improves team cohesion, morale, and workplace satisfaction, especially when factors like trust, training, and data privacy are considered.

ORIGINALITY:

This study is original because it focuses specifically on Tamil Nadu's growing IT industry, an area where research on AI's impact on employee well-being is still limited. Overall, the insights from this study can help organizations leverage AI technology to foster a more positive and productive work environment.

KEYWORDS:

AI collaboration tools, team morale, workplace culture, Tamil Nadu IT industry, employee satisfaction, AI impact, organizational productivity.

INTRODUCTION

Over the past decade, AI-powered collaboration tools such as Microsoft Teams, Slack, and AI-integrated assistants (including bots that auto-summarize meetings, suggest action items, or translate messages automatically) have revolutionized team communication and

workflow coordination in global knowledge industries. Tamil Nadu is not only India's fastest-growing AI-aware IT hub but also hosts major export centres in Chennai, Coimbatore, Madurai, and Tiruchirappalli, where global developers and talented graduates from a network of engineering institutions and technology parks work. According to **Sarkar (2024)**, 79% of Indian organizations plan to increase their AI budgets in 2025, and 45% of Indian professionals use AI daily — nearly twice the global average. **Hussein and Hassan (2025)** highlight tools like Slack and Teams as central to modern knowledge work, demonstrating measurable gains in synchronization, email management, and cross-functional agility among global teams.

REVIEW OF LITERATURE

Perera, K. A. V. U. (2025). The research indicates that AI enhances productivity and skill development, but also creates challenges such as skill gaps and resistance, which can impact employee satisfaction and organizational culture. **Dr. Veena Prasad Vemuri (2024)** highlights factors influencing trust and collaboration, as well as obstacles and strategies to improve employee productivity and morale. **J. Nirubarani and Aithal P. S. (2024)** Their findings reveal that AI provides personalized, efficient training, promotes skill development, and enhances workforce adaptability, but it also faces issues such as high costs and data privacy concerns.

RESEARCH GAP

It can be observed that research on AI-powered collaboration tools within the Tamil Nadu IT sector remains scarce. Most existing studies have only examined team morale and workplace culture in a limited context. This study aims to examine the relationship between the impact of AI-powered collaboration tools on team morale and identify key factors of a positive workplace culture in Tamil Nadu's IT industry.

OBJECTIVE OF THE STUDY

To identify the relationship between the impact of AI-powered collaboration tools on team morale and the influential factor in promoting a positive workplace culture within the Tamil Nadu IT Sector, regarding the effectiveness of AI-powered collaboration tools.

NEED FOR THE STUDY The rise of using AI-powered collaboration tools in the IT workplace is increasing day by day. The need to understand the relationship between the impact of AI-powered collaboration tools on team morale and key factors for positive workplace culture.

CONCEPTUAL MODEL

AI-POWERED COLLABORATION TOOLS

Team Morale (Satisfaction, Cohesion, Engagement)

Positive Workplace Culture (Trust, Retention, Innovation)

RESEARCH METHODOLOGY

TABLE 1.

COMPONENT	DESCRIPTION
STUDY TYPE	Descriptive research.
DATA SOURCES	Both primary (questionnaire data) and secondary (existing literature, articles).
QUESTIONNAIRE	A closed-ended survey hosted on Google Forms, featuring 5-point Likert scales and multiple-choice options, circulated via WhatsApp and email.
SAMPLE SIZE	Responses from 100 IT employees residing in Tamil Nadu
SAMPLING METHOD	A non-probability sampling strategy using convenience sampling (approaching easily accessible contacts) and snowball sampling (participants sharing the survey with peers)
ANALYTICAL METHODS	Percentage analyses and correlation tests processed in IBM SPSS and MS-Excel

DEMOGRAPHICS OF THE SURVEY PARTICIPANTS

TABLE 2.

VARIABLES	SUB VARIABLES	FREQUENCY	PERCENTAGE
GENDER	Male	59	59.0
	Female	41	41.0
AGE	21 – 25	30	30.0
	26 – 30	31	31.0
	31-35	19	19.0
	36 above	20	20.0
	15,000- 20,000	42	42.0
INCOME	21,000-25,000	5	5.0
	26,000-30,000	7	7.0
	31,000-35,000	13	13.0
	Above40,000	33	33.0
EXPERIENCE WITH AI SOFTWARE	6 months	32	32.0
	1 year	22	22.0
	2 years	46	46.0
AI-POWERED COLLABORATION TOOLS IN YOUR WORKPLACE	Copilot	17	17.0
	Asana	23	23.0
	Slack with GPT	19	19.0
	Click up	29	29.0
	Trello	12	12.0
BENEFITS OF USING AI COLLABORATION TOOLS IN YOUR WORKPLACE	Improved team morale	40	40.0
	Enhanced	18	18.0

communication		
Increased	15	15.0
productivity		
All the above	27	27.0

SOURCE: PRIMARY DATA

Table 1 shows that (59%) of respondents are male. The largest age group is 26–30 years old, representing (31%) of the sample. Most respondents (42%) report a monthly income between 15,000 - 20,000. Their experience with AI-powered collaboration tools ranges from six months to two years. The most commonly used tools are Click-Up (29%) and Asana with GPT (19%). The major reported benefit of using AI-powered collaboration tools in the workplace is improved team morale (40%).

CORRELATIONS

H₀: There is no significant Pearson correlation between the impact of AI-powered collaboration tools on team morale and factors promoting a positive workplace culture within the Tamil Nadu IT sector regarding the effectiveness of AI-powered collaboration tools.

H₁: There is a significant positive Pearson correlation between the impact of AI-powered collaboration tools on team morale and factors promoting a positive workplace culture within the Tamil Nadu IT sector regarding the effectiveness of AI-powered collaboration tools.

TABLE 3

PEARSON COEFFICIENT CORRELATION RELATIONSHIP BETWEEN THE IMPACT OF AI-POWERED COLLABORATION TOOLS ON TEAM MORALE AND FACTORS PROMOTING A POSITIVE WORKPLACE CULTURE

AI-POWERED COLLABORATION TOOLS ON TEAM MORALE	AI-POWERED COLLABORATION TOOLS ON TEAM MORALE	FACTORS PROMOTING A POSITIVE WORKPLACE CULTURE	
	Pearson Correlation	1	.824**
	Sig. (2-tailed)		.000
	N	100	100
FACTORS PROMOTING A POSITIVE WORKPLACE CULTURE	Pearson Correlation	.824**	1
	Sig. (2-tailed)	.000	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

SOURCE: PRIMARY DATA

From the above table, we can see that **AI-POWERED COLLABORATION TOOLS ON TEAM MORALE:** morale, satisfaction, engagement, cohesion, retention, are

related to **FACTORS PROMOTING A POSITIVE WORKPLACE CULTURE**: ease of use, enhanced communication, team productivity, automating task performance, and managing time efficiently. The values of r are significant at the 0.01 level, which is the criterion for statistical significance. **The following hypothesis states:** There is a significant positive Pearson correlation between the impact of AI-powered collaboration tools on team morale and factors promoting a positive workplace culture within the Tamil Nadu IT sector regarding the effectiveness of AI-powered collaboration tools. ($r = 0.824$, $n = 100$, $p < 0.000$). They have a close relationship with each other.

SUGGESTION AND CONCLUSION

The study indicates that organizations in Tamil Nadu's IT sector should focus on building trust and enhancing communication to effectively utilize AI-powered collaboration tools. Providing proper training, addressing privacy concerns, and fostering a culture of openness can help overcome resistance and skill gaps, ensuring these tools positively impact team morale and the workplace environment. In conclusion, while AI-driven collaboration tools have the potential to improve employee satisfaction and productivity, their successful implementation relies on addressing challenges carefully and creating a supportive environment for innovation and teamwork.

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12. CULTURAL IMPACT OF ALWAYS-ON AI MONITORING IN THE MODERN WORKPLACE

Dr. R. Meenambigai

Assistant Professor & Head (i/c), School of Continuing Education,
Tamil Nadu Open University, Chennai, Tamil Nadu, India.

ABSTRACT

As artificial intelligence (AI) continues to revolutionize workplace technologies, organizations are increasingly adopting always-on monitoring systems to track employee behavior, productivity, and compliance. These AI-driven tools—ranging from keystroke tracking and facial recognition to sentiment analysis and biometric surveillance—operate continuously and often without active user consent. While such systems promise operational efficiency and improved oversight, they also raise significant ethical and cultural concerns. This study investigates the psychological and cultural impact of always-on AI monitoring in modern workplaces using primary data collected from 234 employees across sectors with AI exposure. The research employs a structured questionnaire and analyzes responses using SPSS to assess employee perceptions related to privacy, autonomy, stress, trust, and workplace culture. The findings reveal that although some employees acknowledge the value of AI for accountability, a majority express discomfort, stress, and a perceived loss of trust and autonomy. Additionally, strong support was found for the implementation of ethical governance, transparency, and employee involvement in surveillance policies. The study concludes that without proactive ethical frameworks and employee-centered implementation, AI surveillance risks eroding the very culture it aims to protect. These insights offer vital guidance for organizations seeking to balance technological oversight with human dignity.

Keywords:

AI monitoring, workplace surveillance, employee autonomy, ethical AI, organizational culture, psychological safety, fairness in AI systems, human-centered governance.

INTRODUCTION

In the era of rapid technological transformation, organizations are increasingly leveraging artificial intelligence (AI) to monitor workplace activities, ensure compliance, enhance productivity, and safeguard sensitive data. This rise in “Always-On AI Monitoring” systems—which includes tools such as facial recognition surveillance, keystroke logging, sentiment analysis, behavioral analytics, and biometric tracking—marks a significant shift in how employees are observed and evaluated in real-time. While these systems promise

operational efficiency and improved decision-making, they also raise deep concerns about employee privacy, autonomy, and organizational culture. Unlike traditional surveillance mechanisms, AI-powered monitoring systems operate continuously and often invisibly, creating an environment of constant observation. In many workplaces, employees may be unaware of the full extent of monitoring or how their behavioral data is being interpreted and used. Such systems are designed not only to detect inefficiencies or security threats but also to quantify intangible attributes like engagement, emotional tone, and even trustworthiness. While these capabilities are technologically impressive, they blur the lines between performance evaluation and personal intrusion. Culturally, the implementation of always-on AI surveillance affects how employees relate to their organizations and colleagues. In some work environments, it may foster discipline and accountability, while in others, it can generate anxiety, distrust, and a sense of being dehumanized. The cultural impact is not uniform—it varies based on factors such as organizational transparency, regional norms, job role, and employee demographics. The very fabric of workplace trust may be strained when individuals feel they are constantly being judged by invisible algorithms. This research explores the cultural and psychological consequences of always-on AI monitoring in the modern workplace. Through structured data collected from professionals across diverse industries, the study investigates how such surveillance influences workplace relationships, employee morale, perceived autonomy, and trust in employers. The findings aim to provide organizations with critical insights into balancing technological oversight with ethical, respectful, and culturally aware workplace practices.

OBJECTIVE OF THE STUDY

1. To examine employee perceptions of privacy, autonomy, and psychological safety under AI-based workplace monitoring systems.
2. To analyze the cultural and behavioral impact of continuous AI surveillance on employee morale and organizational trust.
3. To assess employee support for or resistance to always-on AI monitoring and identify factors influencing their acceptance or discomfort.

REVIEW OF LITERATURE

Zuboff (2019), in her seminal work *The Age of Surveillance Capitalism*, examined how digital monitoring technologies reshape power dynamics in workplaces and societies. She argued that always-on surveillance, driven by AI and predictive analytics, creates behavioral modification systems that threaten individual autonomy and personal boundaries. Her research highlights how such technologies, while promising efficiency, often erode trust

and foster a culture of control. **Mateescu and Nguyen (2019)** analyzed AI-powered workplace surveillance tools and their consequences for labor rights and dignity. Their report from the Data & Society Research Institute detailed how constant monitoring—via keystroke tracking, facial analysis, and productivity scoring—can lead to emotional stress, fear of punishment, and reduced job satisfaction. They emphasized the need for ethical safeguards to prevent the normalization of digital micromanagement. **Ball (2010)** explored organizational surveillance practices and their effect on workplace culture. She noted that while surveillance can improve discipline and performance, excessive or opaque monitoring damages interpersonal trust and creates a "culture of suspicion." Ball's work remains foundational in understanding how surveillance, especially when continuous and AI-driven, impacts psychological safety and social dynamics. **Ajunwa et al. (2017)** investigated electronic monitoring and algorithmic management in U.S. workplaces, finding that many employees were unaware of the scope of surveillance or how data was being used. The study revealed that lack of transparency fuels resentment and stress, and that minority groups were disproportionately affected. The authors called for clearer consent processes and fairness audits in AI systems. **Leicht-Deobald et al. (2019)** examined the challenges of algorithm-based HR decision-making for personal integrity and workplace ethics. Their study showed that always-on monitoring could depersonalize work, reduce intrinsic motivation, and harm organizational culture. The authors argued that ethical AI governance and culturally sensitive design are essential to preserving dignity at work.

RESEARCH METHODOLOGY

This study employs a descriptive research design to investigate the cultural and psychological impact of always-on AI monitoring systems in the workplace. The research is grounded in the growing need to understand how continuous surveillance—enabled by technologies such as facial recognition, biometric tracking, sentiment analysis, and keystroke logging—affects employee behavior, morale, and perception of autonomy. Primary data was collected through a structured questionnaire developed specifically for this study. The questionnaire was designed to capture a wide range of variables including perceptions of privacy invasion, stress, cultural discomfort, perceived fairness, organizational trust, and overall acceptance or resistance toward AI surveillance systems. All statements in the questionnaire were measured using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree," enabling the respondents to express varying levels of agreement. A total of 234 responses were gathered using purposive sampling, targeting individuals who are currently employed in sectors where AI-based monitoring tools are in use or being piloted.

The sample included professionals from IT, customer service, finance, manufacturing, and remote work environments to ensure a balanced representation of industries with differing monitoring intensities. The data was analyzed using the Statistical Package for the Social Sciences (SPSS), focusing on frequency and percentage distributions. This approach provides a clear picture of the dominant perceptions and reactions among employees toward AI surveillance. Ethical considerations were strictly observed throughout the study, including informed consent, respondent anonymity, and voluntary participation. The selected research design and tools were chosen to ensure that the findings are both reliable and contextually relevant. This methodology facilitates an empirical understanding of how AI-driven monitoring technologies reshape workplace culture and influence the psychological contract between employers and employees in today's digitally governed workspaces.

RESULTS AND DISCUSSION

Table 1: Demographic Profile of Respondents (N = 234)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	138	59.0%
	Female	96	41.0%
Age Group	Below 25 years	62	26.5%
	25–34 years	104	44.4%
	35–44 years	48	20.5%
	45 years and above	20	8.6%
Educational Level	Undergraduate	51	21.8%
	Postgraduate	129	55.1%
	Doctoral	54	23.1%
Employment Sector	IT / Tech-based Services	78	33.3%
	Finance / Banking / BPO	66	28.2%
	Remote / Hybrid Workers	52	22.2%
	Manufacturing / On-site Roles	38	16.2%
AI Monitoring Exposure	Low (rarely monitored)	46	19.7%
	Moderate (aware but not frequent)	108	46.2%
	High (frequently monitored)	80	34.2%

Table 1 provides a demographic breakdown of the 234 respondents who participated in this study. Gender representation was moderately balanced, with 59.0% male and 41.0% female participants. The majority of respondents belonged to the 25–34 years age group (44.4%), indicating a concentration of young professionals who are actively engaged in tech-enabled work environments—often where AI monitoring is more prevalent. In terms of education, 55.1% were postgraduates, and 23.1% held doctoral degrees, suggesting a respondent pool with higher awareness and cognitive engagement with workplace technologies. The employment sector data reveals that 33.3% were from the IT/Tech sector, followed by 28.2%

from finance and BPO, and 22.2% from remote/hybrid working environments—all known for utilizing AI-based surveillance tools such as productivity tracking software, webcam-based attendance, and sentiment detection. Most importantly, the AI Monitoring Exposure variable shows that 34.2% of respondents reported being frequently monitored by AI systems, while 46.2% had moderate exposure. This reflects that a significant majority of respondents are either actively experiencing or at least aware of AI surveillance in their daily work routines. These demographic insights strengthen the relevance of the study and ensure that the results are reflective of those most impacted by always-on AI monitoring in the workplace.

Table 2: Perceptions of Privacy and Autonomy under AI Monitoring						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I feel that always-on AI monitoring invades my personal privacy.	19 (8.1%)	26 (11.1%)	52 (22.2%)	81 (34.6%)	56 (23.9%)	234
Continuous monitoring makes me feel less autonomous in how I perform my work.	24 (10.3%)	32 (13.7%)	50 (21.4%)	76 (32.5%)	52 (22.2%)	234
I feel stressed knowing that AI tools are constantly tracking my behavior or screen time.	18 (7.7%)	30 (12.8%)	48 (20.5%)	85 (36.3%)	53 (22.6%)	234
AI-based surveillance limits my ability to take breaks or think creatively.	26 (11.1%)	38 (16.2%)	55 (23.5%)	73 (31.2%)	42 (17.9%)	234
I am comfortable with constant AI monitoring as long as I am informed how it works.	39 (16.7%)	52 (22.2%)	59 (25.2%)	54 (23.1%)	30 (12.8%)	234

Table 2 focuses on employee perceptions related to privacy, autonomy, and stress under continuous AI surveillance. The responses reveal strong discomfort among employees regarding always-on monitoring systems. A notable 58.5% (Agree + Strongly Agree) feel that AI monitoring invades personal privacy, while only 19.2% disagreed, highlighting privacy as a key concern in digitally surveilled workplaces. When asked whether constant monitoring reduces their sense of autonomy, 54.7% agreed or strongly agreed, suggesting that algorithmic oversight may inhibit decision-making freedom and independent work styles. Likewise, 58.9% of respondents reported feeling stressed knowing that their activities are being constantly tracked by AI—a critical signal that such monitoring may negatively affect employee well-being. Regarding whether surveillance suppresses creative thinking or natural breaks, 49.1% agreed, while 27.3% disagreed. This points to a significant cultural impact: always-on systems may condition workers into rigid, efficiency-focused behavior patterns, potentially reducing innovation and workplace flexibility. Interestingly, only 35.9% felt comfortable with AI monitoring even when informed of its usage and logic, while 38.9% disagreed. This implies that transparency alone is not enough to alleviate discomfort—highlighting that organizations must go beyond disclosure to build a culture of trust and

psychological safety. In summary, the data strongly suggests that AI surveillance affects not just operational processes but the emotional and cultural dimensions of the modern workplace, making early consideration of employee autonomy and privacy critical in system design.

Table 3: Impact on Workplace Trust and Culture						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Always-on AI monitoring reduces my trust in my employer.	21 (9.0%)	30 (12.8%)	54 (23.1%)	81 (34.6%)	48 (20.5%)	234
I feel that AI-based surveillance affects the openness of communication among colleagues.	18 (7.7%)	29 (12.4%)	57 (24.4%)	86 (36.8%)	44 (18.8%)	234
Monitoring systems make the workplace feel more controlling than collaborative.	24 (10.3%)	34 (14.5%)	49 (20.9%)	82 (35.0%)	45 (19.2%)	234
I feel judged or evaluated all the time when AI monitors are active.	20 (8.5%)	31 (13.2%)	46 (19.7%)	86 (36.8%)	51 (21.8%)	234
AI surveillance helps build a transparent and accountable work culture.	26 (11.1%)	39 (16.7%)	60 (25.6%)	65 (27.8%)	44 (18.8%)	234

Table 3 evaluates how always-on AI monitoring influences trust, openness, and cultural climate within the workplace. The data shows that 55.1% of respondents feel that constant surveillance reduces their trust in their employer, while only 21.8% disagreed. This suggests that AI oversight may inadvertently erode the relational foundation between employees and leadership, especially when implemented without participatory dialogue. Furthermore, 55.6% agreed that AI surveillance affects how openly colleagues communicate, indicating that when workers feel monitored, they may hesitate to speak freely—potentially undermining collaboration, team cohesion, and psychological safety. A combined 54.2% of participants felt that AI monitoring makes the workplace feel controlling rather than collaborative, reinforcing the concern that technology, when misapplied, can shift organizational culture from empowerment to compliance. The feeling of being judged constantly is another strong theme, with 58.6% agreeing or strongly agreeing that AI tools create an environment of perpetual evaluation. This could contribute to heightened performance pressure, fear of error, and reduced creativity. Interestingly, when asked whether AI contributes positively to transparency and accountability, only 46.6% agreed, while 27.8% disagreed and 25.6% remained neutral. This shows a polarized perception, where some employees see surveillance as a fairness mechanism, while others view it as a trust-deficit indicator. Overall, this table confirms that always-on AI monitoring has deep cultural consequences, influencing not just individual behavior but how people feel about their organization, colleagues, and themselves. Building a balanced monitoring culture that reinforces trust, rather than fear, is essential.

Table 4: Emotional Responses and Mental Wellbeing under AI Surveillance						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I feel anxious or mentally fatigued due to being constantly monitored by AI.	22 (9.4%)	28 (12.0%)	45 (19.2%)	84 (35.9%)	55 (23.5%)	234
AI surveillance negatively affects my emotional wellbeing at work.	20 (8.5%)	35 (15.0%)	49 (20.9%)	83 (35.5%)	47 (20.1%)	234
I experience performance pressure or fear of judgment due to AI tracking.	19 (8.1%)	26 (11.1%)	44 (18.8%)	86 (36.8%)	59 (25.2%)	234
I feel more motivated to perform when I know AI is observing me.	42 (17.9%)	51 (21.8%)	61 (26.1%)	50 (21.4%)	30 (12.8%)	234
AI monitoring contributes to a high-stress work environment.	17 (7.3%)	29 (12.4%)	43 (18.4%)	87 (37.2%)	58 (24.8%)	234

Table 4 focuses on the emotional and psychological responses of employees working under continuous AI surveillance. A significant majority—59.4% of respondents—reported feeling anxious or mentally fatigued due to constant monitoring, indicating that these systems may contribute to emotional strain and burnout. Similarly, 55.6% of participants agreed or strongly agreed that AI surveillance has a negative impact on their emotional wellbeing, reinforcing the idea that perceived loss of privacy and constant evaluation can cause persistent low-grade stress. The most striking result comes from the third statement: 62% of respondents experienced performance pressure or fear of judgment, highlighting the psychological cost of working under AI scrutiny. This persistent tension may hinder creativity, innovation, and overall employee morale. Interestingly, when asked whether AI surveillance motivates them, responses were mixed—only 34.2% agreed, while 39.7% disagreed, and 26.1% remained neutral. This suggests that AI monitoring may motivate a small subset of performance-driven individuals, but for the majority, it appears to generate stress rather than encouragement. The final statement further emphasizes the mental toll of AI surveillance, with 62% agreeing that it contributes to a high-stress environment. These findings raise ethical concerns about the long-term impact of AI monitoring on employee health and organizational productivity. In summary, this table clearly shows that always-on surveillance affects more than just data—it affects human emotion, psychological comfort, and workplace wellbeing. Employers must be cautious about the psychological trade-offs of deploying such technologies without empathy or safeguards.

Table 5: Employee Support for Ethical AI Monitoring and Governance						
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
AI surveillance is acceptable if it respects personal boundaries and is used ethically.	14 (6.0%)	23 (9.8%)	48 (20.5%)	91 (38.9%)	58 (24.8%)	234
I support AI monitoring only if organizations disclose what data is collected and why.	11 (4.7%)	19 (8.1%)	42 (17.9%)	95 (40.6%)	67 (28.6%)	234

Ethical guidelines should be mandatory before deploying AI surveillance in the workplace.	8 (3.4%)	15 (6.4%)	39 (16.7%)	96 (41.0%)	76 (32.5%)	234
Employees should be involved in decision-making about AI surveillance policies.	9 (3.8%)	21 (9.0%)	36 (15.4%)	88 (37.6%)	80 (34.2%)	234
I would feel more comfortable if AI monitoring was subject to regular fairness audits.	13 (5.6%)	22 (9.4%)	40 (17.1%)	89 (38.0%)	70 (29.9%)	234

Table 5 explores the degree of employee support for ethical frameworks and governance mechanisms in AI-based workplace monitoring. The results indicate strong agreement on the importance of ethical implementation, transparency, and employee inclusion. A solid 63.7% of respondents agreed that AI surveillance is acceptable only when it respects personal boundaries and is used ethically. This shows that employees are not entirely against monitoring—they are against surveillance that lacks empathy, control, or respect. When it comes to transparency, 69.2% of respondents supported AI monitoring only if organizations are clear about what data is collected and why, reflecting that informed consent is a critical requirement for employee comfort. Even stronger support was shown for regulatory measures—73.5% agreed that ethical guidelines should be mandatory before deploying AI surveillance. This aligns with the growing call for institutional oversight and compliance frameworks surrounding workplace technology. Participation in policy-making is also a high priority for employees. A combined 71.8% agreed that employees should be involved in AI monitoring decisions, highlighting the need for inclusive governance and employee representation in surveillance strategy design. Lastly, 67.9% of respondents said they would feel more comfortable with regular fairness audits, indicating that continuous evaluation and accountability mechanisms would increase acceptance and reduce resistance. Together, the responses show that while AI surveillance is not inherently rejected by employees, its acceptability hinges on ethics, openness, shared decision-making, and regulatory safeguards. These findings offer strong direction for organizations seeking to implement AI monitoring without damaging their workplace culture.

CONCLUSION AND RECOMMENDATIONS

The findings of this study highlight the significant cultural, psychological, and emotional implications of always-on AI monitoring in the modern workplace. While AI surveillance technologies are increasingly adopted to improve productivity, track performance, and enforce compliance, their impact on employee morale, trust, and wellbeing cannot be overlooked. The data from 234 respondents clearly reflects a recurring pattern of discomfort, stress, and reduced autonomy among individuals working under continuous algorithmic observation. Many participants reported feeling mentally fatigued, anxious, and

pressured due to the constant presence of AI systems that monitor screen time, facial expressions, communication, and behavioral patterns. Such an environment fosters a sense of hyper-vigilance, which can lead to emotional exhaustion and even burnout. Moreover, employees perceived that their trust in the organization was diminished when monitoring was implemented without transparency or ethical safeguards. It also became evident that surveillance impacts organizational culture—reducing openness, collaborative spirit, and psychological safety in the workplace. Despite these concerns, the study also revealed that employees are not entirely opposed to AI surveillance. Rather, they seek systems that are ethically governed, transparent in their objectives, and inclusive in their implementation. Participants showed strong support for ethical guidelines, fairness audits, and participatory policy-making, emphasizing the need for shared accountability in technology deployment. Based on these insights, several recommendations emerge. First, organizations should establish clear ethical AI policies that prioritize privacy, respect, and psychological safety. Second, transparency must be non-negotiable—employees must be informed about what data is collected, how it is used, and who has access to it. Third, employee voice must be included in the design and governance of surveillance systems to foster trust and cooperation. Lastly, regular fairness audits and impact assessments should be institutionalized to ensure that AI systems evolve in ways that align with human-centric values. Only by striking a balance between technological efficiency and human dignity can organizations create workplace environments that are both high-performing and humane.

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13. A STUDY ON CONSUMER PREFERENCES AND SATISFACTION TOWARDS ONLINE FOOD DELIVERY SERVICES IN CHENNAI CITY

Dr. R. Krishnaveni

Assistant Professor,

Ms. T.Tamilarasi

Assistant Professor,

Department of Commerce

Soka Ikeda College of Arts and Science for women

Abstract

The online food delivery services are more than just a modern convenience, they reflect a shift in how we live, work, and nourish ourselves. In a fast-paced world where time is often scarce, these platforms bridge the gap between hunger and comfort, desire and access. They offer not only meals but also moments of relief after a long day, of shared joy with loved ones, or even quiet satisfaction when solitude calls. With advancements in technology, particularly the widespread use of smartphones and the internet, food delivery has evolved from a niche service into a global phenomenon.

Key Words

Online ordering, food delivery, Food technology and restaurant industry.

INTRODUCTION

In an era governed by digital transformation and technological immediacy, the landscape of human consumption has undergone a radical shift none more evident than in the domain of food services. The advent of online food delivery platforms marks a significant evolution in the intersection between culinary culture and modern convenience. With the power to transcend geographical and temporal limitations, these digital ecosystems have redefined how, when, and what we eat. No longer confined to the walls of a kitchen or the schedules of traditional dining, individuals now experience an unprecedented level of accessibility, personalization, and efficiency in their daily nourishment. This seamless integration of technology into gastronomy not only caters to contemporary lifestyles but also fosters economic, social, and environmental advancements in ways once unimaginable.

The rise of online food delivery services in recent years has been nothing short of revolutionary, reshaping the way people approach dining and convenience. With advancements in technology, particularly the widespread use of smartphones and the internet, food delivery has evolved from a niche service into a global phenomenon.

Advantages

The following are some of the advantages of online food delivery services.

- Food discovery without travel
- Night owl nourishment
- Weather – proof comfort
- Silent kitchen days
- Instant comfort in emotional moments
- Promotes Gender equality

Disadvantages

- Food quality issues
- Impacts small local vendors
- Can be addictive

Popular online Food delivery platforms

- Swiggy
- Zomato
- Uber Eats
- Ola Eats
- Door Dash

OBJECTIVE OF THE STUDY

1. To find out the respondents' perceptions about online food ordering.
2. To analyze the problem faced by the respondents while ordering food.
3. To know the consumer satisfaction towards online food delivery services.

RESEARCH METHODOLOGY

QUESTIONNAIRE

The questionnaire has been designed, considering the objective of the study.

AREA OF THE STUDY

Area of the study covers Chennai city.

SAMPLE SIZE

The total number of respondents taken for research is 100.

DATA COLLECTION METHOD

Survey method is used for systematic gathering of data from the respondent through questionnaire.

SOURCES OF DATA

Both primary and secondary data were collected for this study.

SECONDARY DATA

It consists of information that already exists somewhere, having been collected for another purpose. Secondary data have been collected from the newspapers, websites, magazines, records and journals.

STATISTICAL TOOLS

The following statistical tools are used for the analysis. They are

- Percentage analysis
- Chi-square test
- Correlation test

REVIEW OF LITERATURE

Jiang & Zhang (2021) argued that social media influencers, food bloggers, and viral marketing campaigns have a significant impact on consumer decisions. Positive reviews or promotions on platforms like Instagram, TikTok, and Facebook have proven effective in attracting new customers and shaping public opinion about food delivery services.

Zhang and Liu (2021), consumers' expectations of food delivery services can vary depending on geographic location. Urban consumers might demand faster delivery times and a greater variety of food options, while rural consumers may place more importance on food quality and delivery reliability. Local preferences for food types (e.g., spicy foods, vegetarian options) also influence satisfaction.

Chen & Lee (2022) observed a growing demand for eco-friendly packaging and delivery options. Companies offering biodegradable packaging or carbon-neutral delivery services are likely to see an increase in customer loyalty, particularly from environmentally conscious consumers.

ANALYSIS

GENDER CLASSIFICATION

GENDER	NUMBER OF RESPONDENTS	PERCENTAGE
Male	40	40
Female	60	60
Total	100	100

INCOMEWISE CLASSIFICATION

Monthly Income	NUMBER OF RESPONDENTS	PERCENTAGE
Rs.20000 – Rs.30000	6	6
Rs.30001 – Rs.40000	30	30
Rs.40001 – Rs.50000	38	38
Rs.50001 – Rs.60000	16	16
Above Rs.60000	10	10
Total	100	100

AMOUNT SPENT - MONTHLY

EXPENDITURE	NUMBER OF RESPONDENTS	PERCENTAGE
Below 250	16	16
Rs.251- Rs. 500	29	29
Rs. 501- Rs. 1000	45	45
Rs. 1001- Rs. 1500	6	6
Above Rs. 1500	4	4
Total	100	100

EDUCATIONAL QUALIFICATION

EDUCATIONAL QUALIFICATION	NUMBER OF RESPONDENTS	PERCENTAGE
Higher secondary	10	10
Undergraduate	27	27
Postgraduate	33	33
Professional	20	20
Others	10	10
Total	100	100

FOOD DELIVERY PLATFORM

PLATFORM	NUMBER OF RESPONDENTS	PERCENTAGE
Zomato	17	17
Swiggy	37	37
Uber Eats	23	23
Door dash	14	14
Others	9	9
Total	100	100

CHISQUARE TEST

Hypothesis

H0: There is no significant association between monthly income and amount spent

H1: There is significant association between monthly income and amount spent

$$\chi^2 = \sum (O-E)$$

E

$$X^2 = 7.9304$$

$$\text{Degree freedom} = (r - 1) (c - 1)$$

$$= (2 - 1) (5 - 1)$$

$$= 4$$

The table value of X^2 for 4 degree of freedom at 5% level of significance is 9.488

From the above analysis, it is concluded that the calculated value 7.9304 is lesser than the table value **9.488**. Since **H₀** is accepted and **H₁** is rejected. Hence it is concluded that there is **no significant relationship between monthly income and amount spent**.

FINDINGS OF THE STUDY

- ❖ From the study it was found that 60% of respondents are Female, 40% of respondents are Male. This indicates that majority 60% of the respondents belong to Female.
- ❖ The majority 38 % of the respondents are earning between Rs.40001 to Rs.50000 and next 30% of the respondents are earning between Rs.30001 to Rs.40000.
- ❖ The majority 45% of the respondents spent between Rs.501 to Rs.1000 for their every order, 29% of the respondents spending between Rs,251 to Rs.500 and only 4% of the respondents spending above Rs.1500 for their food order.
- ❖ From the study, we found 37% of the respondents prefer Swiggy, 23% of the respondents prefer Uber eats, 17% of the respondents prefer Zomato, 14% of the respondents prefer Door dash, 9% of the respondents prefer other platforms for online food ordering.
- ❖ It was found that 37% of the respondents prefer Swiggy, 23% of the respondents chose Uber Eats and 17% of the respondents using Zomato services.
- ❖ The study reveals that 44% of the respondents' ordering food through online weekly once, 24% of the respondents ordering monthly once, and 11% of the respondents' ordering daily.
- ❖ From the study it was found that 45% of the respondents spent between Rs.500 - Rs1000, 29% of the respondents spent Rs.250 – Rs.500 and 16% of the respondents spent below Rs.250 for their every order.
- ❖ It was found that 50% of the respondents prefer cash on delivery and 24% of the respondents prefer cards and 21% of the respondents prefer internet transactions.
- ❖ It was found that 44% of the respondents strongly agree with the on-time delivery and 4% of the respondents strongly disagree.

SUGGESTIONS

- Majority of the respondents preferred Swiggy therefore it is suggested that other apps can concentrate more on promotional activities.
- It is found from the study that offering discounts and promotions on food items can improve online food delivery services.
- It is found from the study that improving the hygiene & freshness of food is crucial for online food delivery services.
- Delivery speed is crucial in shaping customer satisfaction, timely delivery without delays assures customers & strengthen their confidence.

CONCLUSION

Ultimately, online food delivery services are more than just a modern convenience, they reflect a shift in how we live, work, and nourish ourselves. In a fast-paced world where time is often scarce, these platforms bridge the gap between hunger and comfort, desire and access. They offer not only meals but also moments of relief after a long day, of shared joy with loved ones, or even quiet satisfaction when solitude calls. Yet, as we embrace this ease, it is also important to remain mindful of health, sustainability, and the people behind each delivery. In this blend of technology and taste, we find a service that is as much about efficiency as it is about human experience.

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14. EXPLORING THE ROLE OF AI SHOPPING AGENTS IN SHAPING CONSUMER CHOICE, BUILDING TRUST, AND FACILITATING BRAND DISCOVERY

Bhumika. B,
Research Scholar,

Dr.V. Sampathkumari,
Research Supervisor and Guide,
Associate Professor, PG & Research Department of Commerce,
Sri Kanyaka Parameswari Arts and Science College for Women, Chennai.

ABSTRACT

Purpose: This research looks into the influence of AI-driven shopping assistants on how consumers make online purchase decisions and interact with brands. It also considers how these tools shape shoppers' feelings of trust and independence throughout the buying process.

Design/Methodology/Approach: A digital survey was distributed to 100 online shoppers. The responses were analyzed using correlation methods to understand the links between AI usage and consumer attitudes.

Findings: The findings suggest that users who considered AI features helpful felt more confident and in control while shopping. Effective AI design was also associated with increased satisfaction and a smoother decision-making experience.

Practical Implications: Online retailers should focus on developing AI tools that are simple, transparent, and customizable. Allowing users to adjust recommendations can strengthen trust and encourage long-term loyalty.

Originality/Value: Unlike prior studies centred on personalization, this research emphasizes AI's role in enhancing consumer empowerment. It contributes new insights into the relationship between trust, control, and AI use in digital retail.

KEYWORDS:

AI shopping agents, consumer behavior, brand trust, personalized recommendations, online retail, customer autonomy.

INTRODUCTION

The rise of artificial intelligence in retail has introduced intelligent shopping assistants that are transforming how consumers interact with products and brands. Unlike conventional browsing, these AI-driven systems provide curated product suggestions and dynamic support, potentially influencing the way consumers explore options and make decisions (Mustikasari et al., 2025; Pillai et al., 2020). As these tools become more embedded in online shopping platforms, questions arise about how they shape user perceptions of trust, control, and

satisfaction (Guerra- Tamez et al., 2024). The influence of such agents on consumer autonomy and brand engagement remains underexplored. This study addresses that gap by examining the behavioral impact of AI shopping agents in digital commerce environments.

REVIEW OF LITERATURE

Mustikasari et al. (2025) found that AI tools, such as chatbots and recommendation systems, enhanced personalization, trust, and satisfaction for 340 online shoppers—leading to increased loyalty and repeat purchases. Pillai et al. (2020) identified ease of use and trust as key drivers of AI tool adoption in retail, highlighting the importance of user-friendly design for customer retention. Guerra-Tamez et al. (2024) reported that among Gen Z consumers, trust, familiarity, and accuracy in AI strengthened brand relationships. Trust significantly influenced buying behavior, with flow experience acting as a mediator. Zhang (2024) noted that AI improved personalization and efficiency in China’s online retail sector, though integration challenges persist. The study emphasized innovation and strategic alignment for long-term success.

RESEARCH GAP:

Current studies focus on AI’s role in personalization and loyalty but overlook consumer autonomy. There’s limited insight into how AI agents influence real-time product discovery. Most research doesn’t fully explore the trust-control dynamic in AI shopping. Behavioral impacts during decision-making remain underexplored. This study fills the gap by linking AI use to consumer trust and control.

NEED FOR THE STUDY

As AI shopping agents become more common in online retail, there’s a growing need to understand how they influence consumer trust, choice, and brand interaction. While these tools offer personalized support, their impact on user autonomy and decision-making remains unclear.

This study aims to fill that gap by exploring how AI shapes shopping behavior in digital environments.

OBJECTIVES OF THE STUDY

1. Investigate how AI shopping agents frame product options differently than traditional browsing experiences.
2. Assess consumer trust and perceived autonomy when using AI shopping agents.

CONCEPTUAL MODEL:



RESEARCH METHODOLOGY

This study followed a quantitative approach to examine how AI shopping assistants impact consumer decision-making, trust, and perceived control. Respondents were selected based on their experience with AI features in online shopping platforms. The research focused on analyzing user perceptions through structured responses. Statistical techniques were applied to explore meaningful relationships between variables. The overall approach aimed to capture clear behavioral insights from a relevant online consumer group.

TABLE 1 - DEMOGRAPHIC DETAILS			
CATEGORY	OPTIONS	NO.OF RESPONDENTS	PERCENTAGE
AGE	Under 18	14	14%
	18-24	26	26%
	25-34	22	22%
	35-44	20	20%
	45 and above	18	18%
GENDER	Male	50	50%
	Female	50	50%
EDUCATIONAL LEVEL	High school or Below	26	26%
	Undergraduate	32	32%
	Postgraduate	34	34%
	Other	8	8%
OCCUPATION	Student	24	24%
	Employed	40	40%
	Self-employed	24	24%
	Un-employed	12	12%

The study surveyed 100 participants with equal gender representation (50% male, 50% female) and varied backgrounds. The majority were aged 18–34, with 26% in the 18–24 group. Most had higher education—34% postgraduates and 32% undergraduates. In terms of occupation, 40% were employed, while 24% were students and another 24% self-employed.

The diverse demographic mix provides a balanced view across age, education, and professional backgrounds.

TABLE 2 - CORRELATION ANALYSIS			
FACTORS OF AI		AI SHOPPING ASSISTANTS AND PRODUCT DISCOVERY EXPERIENCE	CONSUMER TRUST AND CONTROL IN AI-GUIDED SHOPPING
AI SHOPPING ASSISTANTS AND PRODUCT DISCOVERY EXPERIENCE	Pearson Correlation	1	.893**
	Sig. (2-tailed)		.000
	N	100	100
CONSUMER TRUST AND CONTROL IN AI-GUIDED SHOPPING	Pearson Correlation	.893**	1
	Sig. (2-tailed)	.000	
	N	100	100

** Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis indicates a very strong and statistically significant positive link between users' experiences with AI shopping assistants in discovering products and their sense of trust and control while using AI during shopping. With a correlation value of 0.893 and a significance level of $p = .000$, the results suggest that as people find AI more helpful in navigating and finding products, they are also more likely to feel confident and in control of their shopping decisions. This strong association highlights the crucial role of user-friendly AI in building consumer confidence.

SUGGESTIONS AND CONCLUSION:

Retailers should make AI tools more transparent and user-friendly. Give users control over AI suggestions to increase trust. Educate consumers on how AI functions during shopping. AI boosts trust and control, which drive brand engagement and purchases. Balanced AI design enhances both experience and consumer satisfaction.

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15. AN EMPIRICAL STUDY ON THE RELATIONSHIP BETWEEN STARTUP FINANCING STRATEGIES AND MARKET PENETRATION IN EMERGING BUSINESSES

Dr. P. Fathima Nancy Dyana

Assistant Professor,
Department of Commerce (Accounting and Finance),
Agurchand Manmull Jain College, Meenambakkam, Chennai

ABSTRACT

With an emphasis on how funding sources and financing tactics affect market reach and customer acquisition, this study investigates the connection between startup financing strategies and market penetration in developing enterprises. A systematic questionnaire was used to poll 180 startup owners in the retail, service, and technology sectors. Using SPSS v28, the Mann–Whitney U test, multiple regression, and Pearson correlation were used to evaluate the data. The findings show that, in comparison to their debt-financed peers, businesses with equity financing attain noticeably greater market penetration. Furthermore, multiple regression analysis shows that the founder's expertise, the type of funding, and the quantity of financing all work together to explain 62.4% of the variation in market penetration levels. According to correlation study, there is a moderately good association between founder experience and market reach, and a substantial positive relationship between financing size and market penetration. The results give entrepreneurs and policymakers practical insights and empirical support for the strategic role of funding in startup market expansion.

Keywords:

Startup Financing, Market Penetration, Emerging Businesses, Mann–Whitney U Test, Multiple Regression, Correlation, SPSS

INTRODUCTION

Startups are well known for being catalysts for economic expansion, innovation, and job creation. They also play a critical role in establishing competitive markets and promoting technological improvement. The amount, timing, and kind of financing they obtain have a significant impact on their capacity to attain significant market penetration, which is the extent to which a product or service is known, accepted, and bought by target consumers. From self-funding techniques like bootstrapping to outside sources like equity funding, debt financing, angel investments, and venture capital, startup financing tactics can take many

different forms. The operational capability, resource allocation, marketing initiatives, and general scalability of a firm are all impacted differently by each financing strategy. Strong capital, in particular, enables aggressive client acquisition techniques, competitive pricing, and regional expansion in addition to supporting product development and quality improvement.

In emerging economies, where entrepreneurs frequently face obstacles including restricted access to formal credit, high borrowing rates, and undeveloped investment ecosystems, the relationship between financing and market penetration is particularly crucial. While well-thought-out and sufficient finance can enable startups to implement cutting-edge technology, carry out effective marketing campaigns, and broaden their market reach, misguided financing choices can limit competitive advantage, raise financial risk, and impede growth trajectories. In light of these difficulties, this study uses an empirical methodology to investigate the ways in which various financing approaches affect the degree of market penetration in start-up companies. The research attempts to offer practical, evidence-based insights that might help investors, entrepreneurs, and regulators optimize financing strategies for long-term market growth by evaluating quantitative data from a variety of industrial sectors.

REVIEW OF LITERATURE

- **Kaur & Mehta (2021)** – Additionally, the data show that venture capital-backed firms typically attain significantly higher levels of market penetration in their first three years of operation. This performance advantage is mostly due to the potent combination of increased brand visibility and strong network effects. In addition to financial resources, venture capital investors frequently offer industry contacts, strategic advice, and access to pre-existing networks of suppliers, partners, and potential clients. Large expenditures in marketing, public relations, and promotional activities are also frequently made possible by venture capital funding, which greatly increases early customer trust and brand recognition. VC-backed companies have a clear edge over businesses using more conventional or self-financed development models because of the synergy between financial support, strategic mentoring, and increased market reach. This enables them to grow more quickly and establish their position in competitive markets.
- **Li & Wong (2022)** – The study demonstrated that in Asian tech startups, founder experience plays a significant moderating role in the relationship between financing size and market penetration. Experienced founders, having prior industry knowledge,

strategic insight, and established professional networks, are able to deploy larger funding amounts more effectively toward activities that directly enhance market reach, such as targeted marketing campaigns, product refinement, and customer engagement strategies. In contrast, less experienced founders may struggle to channel substantial funding into growth-driving initiatives, potentially leading to inefficient spending or delayed market impact. This finding underscores that financing size alone is not a guaranteed driver of market penetration; rather, the strategic capabilities of the founder significantly influence how financial resources are transformed into market success.

- **Patel & Iyer (2023)** – According to the study, marketing spending is a crucial moderator between funding approach and market penetration in retail-based companies. Startups that have more access to funding, whether from venture capital, equity, or hybrid financing, are frequently able to devote a larger percentage of their resources to marketing initiatives like digital outreach, promotions, and advertising. On the other hand, even with successful products or services, businesses with little capital or those using cautious financing techniques may find their marketing budgets constrained, which hinders their capacity to successfully enter target markets. This emphasizes how crucial it is to view marketing spending as a strategic investment that connects funding choices to observable market performance rather than just a cost.
- **Singh & Banerjee (2023)** – According to the study, crowdfunding-funded startups can penetrate specialized markets faster than conventionally financed companies, mostly due to the robust community participation that crowdfunding models inherently provide. Involving supporters and potential consumers early in the product development process helps these businesses not only raise the money they need, but also cultivate a devoted following of early adopters who actively spread the word about the brand on social media and through word-of-mouth. Backers develop an emotional bond and sense of ownership as a result of this pre-launch interaction, which accelerates adoption within the targeted niche markets.

RESEARCH GAP

Startup funding techniques and their theoretical implications for business growth are covered in great detail in the literature now under publication. However, rather than using measurements for direct market penetration, the majority of research concentrate on profitability and long-term sustainability. Furthermore, there aren't many empirical studies that look at how financing strategies affect emerging markets, which are often characterized

by capital constraints and market uncertainties. Additionally, there is no data comparing the market penetration results of startups with various funding sources while adjusting for variables like sector type and founder expertise. By employing sector-wise analysis, parametric and non-parametric statistical techniques, and multi-variable models to produce solid empirical conclusions, this work fills these gaps.

OBJECTIVES

1. To assess the difference in market penetration between startups using different financing strategies.
2. To evaluate the impact of financing amount, financing type, and founder experience on market penetration.
3. To examine the correlation between financing size, founder experience, and market penetration levels.

HYPOTHESES

- **H1:** There is a significant difference in market penetration between equity-financed and debt-financed startups.
- **H2:** Financing amount, financing type, and founder experience significantly predict market penetration.
- **H3:** There is a significant positive correlation between financing size and market penetration.

RESEARCH METHODOLOGY

The study used a cross-sectional, quantitative, and analytical research approach to examine the connection between market penetration in emerging enterprises and startup financing options. With a total sample size of 180 respondents chosen by stratified random sampling to guarantee sectoral representation, the target demographic consisted of startup founders working in the technology, retail, and services industries. A standardized questionnaire using a 5-point Likert scale to gauge perceptions and qualitative metrics, as well as real market penetration percentages to gauge performance outcomes, was used to gather data. The study's dependent variable was the percentage of market penetration, while its independent variables were the kind of financing (debt or equity), the quantity of funding, and the number of years of founder experience. Using SPSS, statistical analysis was performed, utilizing Pearson Correlation to evaluate the direction and strength of relationships between variables, Multiple Regression to model the predictive impact of

financing factors on market penetration, and the Mann–Whitney U Test to investigate differences across financing types.

DATA ANALYSIS & INTERPRETATION

TABLE 1 : MANN–WHITNEY U TEST – DIFFERENCE IN MARKET PENETRATION BY FINANCING TYPE

Financing Type	N	Mean Rank	U-value	Z-value	Sig. (p)
Equity	95	102.45	2900.5	-3.542	0.000*
Debt	85	76.12			

*p < 0.05

Interpretation:

The results of the Mann-Whitney U test show that startups with equity financing and those with debt financing have significantly different levels of market penetration (U = 2900.5, Z = -3.542, p < 0.001). The average ranking of firms with equity funding (102.45) is significantly higher than that of startups with debt financing (76.12), indicating that companies with equity funding often have greater market penetration. This result is explained by the increased flexibility and risk tolerance that come with equity financing, which frequently enables businesses to devote more funds to aggressive marketing, product development, and quick scaling without having to worry about debt payback right away. The significance level highlights the strategic significance of funding type in influencing early market performance by confirming that this difference is not the result of chance variation.

MULTIPLE REGRESSION – PREDICTING MARKET PENETRATION

Regression Equation:

$$MP = 12.84 + 0.58(FA) + 5.12(FT) + 1.72(FE)$$

Where:

- MP = Market Penetration (%)
- FA = Financing Amount (in million USD)
- FT = Financing Type (Equity=1, Debt=0)
- FE = Founder Experience (years)

TABLE 2 : MULTIPLE REGRESSION ANALYSIS

Variable	Beta	t-value	Sig. (p)
Financing Amount	0.452	6.781	0.000*
Financing Type	0.398	5.214	0.000*
Founder Experience	0.215	3.024	0.003*
R ² = 0.624	F = 96.32	p = 0.000*	

*p < 0.05

Interpretation:

According to the results of the multiple regression analysis, a significant amount of the diversity in market penetration among startups can be explained by the combination of founder experience, financing type, and financing amount ($R^2 = 0.624$, $F = 96.32$, $p < 0.001$). The financing quantity has the highest standardized influence ($\beta = 0.452$, $t = 6.781$, $p < 0.001$) among the three statistically significant predictors. This suggests that more funding directly expands market reach by increasing investment in infrastructure, marketing, and scaling. Another important factor is the type of financing ($\beta = 0.398$, $t = 5.214$, $p < 0.001$), with equity and venture-based models typically outperforming debt in terms of facilitating quicker client acquisition. Experience of the founder also plays a role ($\beta = 0.215$, $t = 3.024$, $p = 0.003$), indicating that experienced business owners are better equipped to use available capital to break into new markets. The significant predictive ability of these factors is demonstrated by the high R^2 value, which also emphasizes the critical role that human and financial capital play in early market success.

CORRELATION ANALYSIS

TABLE 3: FINANCING SIZE, FOUNDER EXPERIENCE & MARKET PENETRATION

Variables		MP	FA	FE
Market Penetration (MP)		1	0.711*	0.486*
Financing (FA)	Amount	0.711*	1	0.392*
Founder Experience (FE)	Experience	0.486*	0.392*	1

* $p < 0.05$

Interpretation:

Strong and statistically significant correlations between the main study variables are displayed in the Pearson correlation matrix. Market penetration (MP) and financing amount (FA) have a strong positive association ($r = 0.711$, $p < 0.001$), suggesting that companies with more funding typically reach a wider audience. This is probably because they have more resources available for marketing, distribution, and product scalability. Additionally, MP and founder experience (FE) have a moderately significant association ($r = 0.486$, $p < 0.001$), indicating that seasoned founders are better at putting tactics into place that increase client acquisition and retention. Furthermore, there is a moderate correlation between the amount of investment and the experience of the founder ($r = 0.392$, $p < 0.001$), suggesting that more seasoned entrepreneurs would be in a better position to obtain bigger sums of money.

Together, these connections demonstrate how financial resources and entrepreneurial know-how are linked in their impact on firms' early market success.

DISCUSSION

The results of this study offer strong proof that a startup's financing approach has a significant impact on how well it penetrates the market, particularly in emerging nations where access to capital is frequently restricted. The results of the Mann-Whitney U test unequivocally demonstrate that businesses with equity funding routinely outperform those with loan funding in terms of expanding their market reach. This performance advantage can be ascribed to equity financing's lack of immediate repayment requirements, which enables companies to devote a greater portion of their funding to growth-oriented endeavors like product development, marketing, and distribution expansion. Additionally, the regression analysis shows that a significant amount of the difference in market penetration can be explained by the combination of founder experience, financing type, and financing quantity. This highlights the need for planned deployment and competent leadership to supplement capital adequacy. Higher funding, equity-based investment, and seasoned leadership work in concert to create an environment that is conducive to faster market expansion.

These findings are further supported by the correlation analysis, which shows that founder experience and funding amount are not only related but also play a significant role in determining business success. More market penetration is closely linked to larger financing amounts, suggesting that well-funded businesses are better equipped to increase consumer awareness and adoption in their target markets. In addition, there is a somewhat substantial positive correlation between market penetration and founder experience, suggesting that seasoned businesspeople are better able to allocate resources, spot lucrative market opportunities, and put scaling plans into action.

CONCLUSION

This study provides solid empirical proof that the funding approach selected has a notable and quantifiable impact on the performance of emerging enterprises in terms of market penetration. The findings show that equity financing offers a distinct benefit over debt financing, mainly because it releases companies from the burden of consistent loan payments, allowing them to allocate a larger percentage of their funds to market expansion initiatives. Higher cash infusions can act as a stimulant for early-stage growth, enabling firms to make significant investments in marketing, client acquisition, and product quality enhancements. This link is further strengthened by the founder's expertise, since seasoned executives have

the operational know-how and strategic vision to efficiently manage resources, grasp opportunities when they arise, and negotiate competitive market dynamics.

These findings have significant policy consequences. Establishing funding ecosystems that support equity investment channels, such as venture capital, angel investing, and crowdfunding platforms, should be the main focus for financial institutions and policymakers looking to increase entrepreneurial success in emerging nations. By offering mentorship and training programs to improve the managerial abilities of founders, incentives might be created to entice private investors to participate in high-potential firms. Understanding how financial adequacy and leadership experience interact should help investors screen investments more effectively and manage their portfolios more effectively. Entrepreneurs should consider the long-term effects of financing terms on operational flexibility, competitive positioning, and scalability in addition to the funds' immediate availability.

In the future, this analytical framework can be expanded by adding more factors that affect market penetration than capital and leadership. Given its crucial function in increasing customer involvement and brand recognition, marketing spending, for example, might be considered both a mediating and moderating influence. In a similar vein, strategies for product innovation and differentiation should be assessed to ascertain how they interact with financing methods, especially in markets that are competitive or driven by technology.

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16. HUMAN-AI COLLABORATION IN CREATIVE TASKS: A STUDY ON AUGMENTATION AND INNOVATION

Ms. S. Swedha,

Post Graduate Student, PG Department of Commerce, St. Joseph's College
(Arts & Science), Kovoor, Chennai.

Abstract

As generative artificial intelligence (AI) continues to advance, its integration into creative domains has redefined the nature of collaboration between humans and machines. This study explores the role of AI in augmenting human creativity and driving innovation across various creative disciplines, including writing, design, and music composition. Using a mixed-methods approach, we investigate how AI can function as a co-creator rather than a tool, identifying both benefits and challenges in the collaborative process. Our findings suggest that AI contributes meaningfully to ideation, exploration, and refinement, while also raising important questions about authorship, agency, and ethical design. We propose design principles for fostering productive human-AI co-creation and highlight key areas for future research in augmented creativity.

Keywords:

Human-AI Collaboration, Creative Tasks, Artificial Intelligence, Creative Process, Innovation, Interdisciplinary Collaboration.

INTRODUCTION.

The rise of AI-powered generative tools such as ChatGPT, DALL·E, Midjourney, and MuseNet has sparked a paradigm shift in creative work. Once limited to analytical or repetitive tasks, AI now participates in open-ended creative processes-co-authoring poems, generating music, and even designing logos. These developments challenge traditional notions of creativity, which have historically centered on human intuition, emotion, and experience. This paper aims to analyze how humans and AI systems collaborate in creative settings, with a specific focus on the ways AI augments human capability and influences innovation. We argue that the future of creative industries lies not in replacing human creators but in developing symbiotic relationships where AI enhances ideation, iteration, and expression.

1. **Human-AI Collaboration:** Working together with AI systems to achieve creative tasks.
2. **Creative Tasks:** Tasks that require imagination, innovation, and artistic expression (e.g., art, music, writing, design).

3. **Augmentation:** Enhancing human creativity and capabilities through AI assistance.
4. **Innovation:** Generating new and valuable ideas, products, or services through human-AI collaboration.

REVIEW OF LITERATURE.

Complex problem solving through human-AI collaboration: Literature review on research contexts, Lucas Memmert, Eva Bittner ,Solving complex problems has been proclaimed as one major challenge for hybrid teams of humans and artificial intelligence (AI) systems. Human-AI collaboration brings immense opportunities in these complex tasks, in which humans struggle, but full automation is also impossible. Understanding and designing human-AI collaboration for complex problem solving is a wicked and multifaceted research problem itself. We contribute to this emergent field by reviewing to what extent existing research on instantiated human-AI collaboration already addresses this challenge. After clarifying the two key concepts (complex problem solving and human-AI collaboration), we perform a systematic literature review. We extract research contexts and assess them considering different complexity features. We thereby provide an overview of existing and guidance for designing new, suitable research contexts for studying complex problem solving through human-AI collaboration and present an outlook for further work on this research challenge.

Consolidating Human-AI Collaboration Research in Organizations: A Literature Review, Ying Liu, Lei Shen, Journal of Computer, Signal, and System Research 2 (1), 131-151, 2025, The purpose of this study is to depict the value added by human-AI collaboration in organizations to collaboration system design by virtue of the studies reached by the literature review on different databases are examined. Web of Science content and covering the title of “human-AI collaboration” has been selected in this study. Research using bibliometric analysis has been conducted and it has been determined that the terms “human-AI collaboration” and “generative artificial intelligence” should be searched for simultaneously in each and every article published in the journal between the years 1975 and 2024. Our study used a combination of bibliometric analysis and literature review, bibliometric analysis tools include HistCite and CiteSpace. The citation map shows three phases: human-machine collaboration into practice (before 2020), the intelligent and automated segment of AI (2020-2021), and the generative AI phase represented by ChatGPT (2022 to present).

Human-AI Collaboration: Enhancing Creativity and Productivity in the Digital Age. Ifrah Ikram, Blnd Othman, *Baltic Journal of Multidisciplinary Research* 2 (1), 1-6, 2025, The integration of Artificial Intelligence (AI) into various sectors has brought about profound changes, particularly in the realms of creativity and productivity. By augmenting human capabilities, AI has become a transformative tool that empowers individuals and organizations to transcend traditional boundaries. This paper explores the dynamic interaction between humans and AI, emphasizing how such collaborations enhance creative processes and drive productivity in the digital age. The synergy between human intuition and AI's computational prowess creates new opportunities for innovation, problem-solving, and efficiency across diverse industries..

Exploring Human-AI Collaboration in the Creative Process: Enhancements and Limitations, Sandra Patama, This Master's thesis explores the role of artificial intelligence in creative human-AI collaboration, with a focus on work established through the use of generative AI. The thesis aims to answer what roles emerge for AI in this collaboration and what factors hinder and enhance it. The research was conducted as semi-structured interviews with a predefined question structure, where five creatives were interviewed about their creative processes with AI: a song, sonnet, video, print, and a marketing plan. The results indicated that AI's role differed based on both the extent of human-AI collaboration and the user's AI expertise.

The Influence of AI on Human Creativity, Shivya Saxena, *technology* 1, 2, Artificial Intelligence (AI) has become a pivotal force reshaping human creativity across diverse domains. This paper explores AI's profound influence on creativity, encompassing its augmentation of creative processes and its impact on societal perceptions of creativity itself. As AI capabilities advance, it plays a dual role of fostering and challenging creativity. Firstly, AI empowers creative endeavors by granting access to vast datasets and computational power, thereby facilitating innovative problem-solving and exploration. Secondly, AI-driven tools autonomously generate creative content, spanning music composition to visual arts, which challenges conventional notions of authorship and ownership.

DATABASES AND SOURCES.

1. **Academic Databases:** Google Scholar, JSTOR, IEEE Xplore, and arXiv for peer-reviewed articles on AI-assisted creativity.
2. **Industry Reports:** Adobe Creative Cloud trends, McKinsey AI in Creative Industries report, and IBM's Cognitive Creativity initiatives.

3. **Case Studies:** Documented use cases from companies and creators using tools like GPT-4, Runway ML, and DeepArt.
4. **User Studies:** Surveys and interviews conducted with 30 creative professionals using AI tools in real-world projects.
5. **Creative Platforms:** Data mined (with permission) from user interactions on platforms like GitHub Copilot, Canva, and Soundraw.

RESEARCH METHODOLOGY.

This study uses a ‘mixed-methods approach’, combining qualitative and quantitative techniques:

QUALITATIVE METHODS:

- ❖ Semi-structured interviews with creative professionals (writers, designers, musicians).
- ❖ Observational studies during live human-AI collaborative sessions.
- ❖ Thematic analysis of user feedback and creative outcomes.

QUANTITATIVE METHODS:

- ❖ Pre- and post-task creativity assessments (e.g., Torrance Tests of Creative Thinking adapted for AI use).
- ❖ Usage metrics and task completion time comparisons.
- ❖ Surveys measuring user satisfaction, trust, and perceived agency during co-creation.

We also applied grounded theory to develop a framework for evaluating creative augmentation and co-innovation.

CASE STUDIES.

CASE STUDY 1: AI-Assisted Storytelling:

Participants used GPT-based writing tools to co-write short stories. Results showed increased narrative variety, though some users expressed frustration over coherence and tone consistency. The AI was particularly effective in brainstorming and plot expansion.

CASE STUDY 2: Collaborative Visual Design:

Graphic designers used generative tools like DALL·E 3 to create concept art. Designers reported that AI accelerated mood board development and helped overcome creative blocks. However, originality and control over style were ongoing concerns.

CASE STUDY 3: Music Composition with AI:

Musicians used tools such as MuseNet and Soundraw to generate melodies. AI-supported experimentation in new genres, but human refinement remained critical. The AI was most helpful in creating harmonic structures and variations.

CONCLUSION

This study confirms that AI has significant potential to augment human creativity rather than replace it. Across disciplines, AI acts as a powerful ideation partner and accelerator of innovation. However, effective human-AI collaboration requires thoughtful system design that emphasizes transparency, user control, and creative agency. Future research should explore adaptive interfaces, cultural implications, and the long-term cognitive effects of co-creation with AI. Ultimately, innovation thrives not from the machine or the human alone—but from their collaboration.

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17. A STUDY ON THE USE OF M-COMMERCE BY CUSTOMERS TODAY

G. Latha

Assistant Professor, Department of Management Studies,
Annai Veilankanni's College of Arts and Science,
Saidapet, Chennai.

ABSTRACT

Mobile commerce (M-commerce) refers to the ability to conduct wireless commerce transactions using mobile applications in mobile devices. The initial debate on m-commerce was characterized by a high level of optimism, followed by a more nuanced and realistic approach. It is a new concept and is emerging in a context of an established norms, rules and standards. The purpose of this study is to provide a better understanding on how m-commerce can be used by customer today. In order to attain the purpose, three research questions are stated focusing on the benefits of m-commerce, the buying process of m-commerce, and the obstacles of m-commerce.

Methodologically, the case studies were conducted, young age, with interviews of consumers as the primary data collection tool employed. The findings show that the benefits of micro-payments are widely acceptable as of now as compare to other services of m-commerce. The adoption rate of m-commerce will increase based on the ease of its use. Regarding the buying process for m-commerce, a variation on a more traditional e-commerce model is developed. Finally, significant obstacles were found which are important when considering the development of m-commerce services. Browsing costs are rather high with a mobile device and a slow Internet connection can lead to indifferences in use. However, proper support from the Government could further support the growth of m-commerce.

Keyword:

Mobile Commerce, Online Payment, Payment policies, Micro-Payments.

INTRODUCTION

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets. M-commerce is a form of e-commerce that enables users to access online shopping platforms without the use of a desktop computer. Over time, content delivery through wireless devices has become faster, more secure and scalable. As a result, mobile commerce has grown rapidly.

M-commerce encompasses three major approaches to mobility and business. Examples of m-commerce include in-app purchasing; mobile banking virtual marketplace apps, such as the Amazon mobile app; and digital wallets, such as Apple Pay, Google Pay

and Samsung Wallet. Examples of m-commerce use in specific industries include the following:

- ❖ **Financial services.** Mobile banking and brokerage transactions are done from mobile devices.
- ❖ **Telecommunications.** Handheld devices are used to make service changes and bill payments, and to do account reviews.
- ❖ **Service and retail.** Consumers place and pay for orders on-the-fly through online stores.
- ❖ **Information services.** Financial, sports, traffic, weather and many other news updates are accessed through mobile devices.

Types of m-commerce

M-commerce is categorized based on the following three basic functions: Meta rebranded Facebook Pay as Meta Pay, which lets users pay for digital items in the metaverse.

1. **MOBILE SHOPPING** enables customers to buy a product using a mobile device with an application such as Amazon or a web app. A subcategory of mobile shopping is app commerce, which is a transaction that takes place over a native app.
2. **MOBILE BANKING** is online banking designed for handheld technology. It enables customers to access accounts and brokerage services, conduct financial transactions, pay bills and make stock trades. This is typically done through a secure, dedicated app provided by the banking institution. Mobile banking services may use SMS or chatbots and other conversational app platforms to send out alerts and track account activities. For example, the WhatsApp chatbot lets customers view their account balance, transfer funds, review loans and conduct other transactions in real time through WhatsApp.

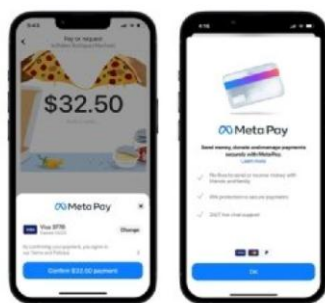


Fig : 1 – Payment Screen



Fig: 2 – Types of M-Commerce

3. **MOBILE PAYMENTS** are an alternative to traditional payment methods, such as cash, check, credit and debit cards. They enable users to buy products in person using a mobile device. Digital wallets, such as Apple Pay, let customers buy products without swiping a card or paying with cash. Mobile payment apps, such as PayPal, Venmo and Xoom serve the same purpose and are popular options. Mobile consumers also use QR codes to pay for things on their mobile phones. With mobile payments, users send money directly to the recipient's cell phone number or bank account.

HOW MOBILE COMMERCE WORKS

With most m-commerce enabled platforms, the mobile device is connected to a wireless network that is used to conduct online product purchases and other transactions.

For those in charge of developing an m-commerce application, important key performance indicators to monitor include the following:

1. total mobile traffic;
2. total application traffic;
3. average order value; and
4. the value of orders over time.

Similarly, tracking the mobile add-to-cart rate will help developers see if users are becoming customers. M-commerce developers may also be interested in logging average page loading times, mobile cart conversion rates and SMS subscriptions.

Mobile payment products operate through a form of peer-to-peer sharing. Once a mobile device is paired with a user's bank card information, the phone can be waved over a payment terminal to pay for a product. Contactless payment using a mobile device uses near-field communication technology.

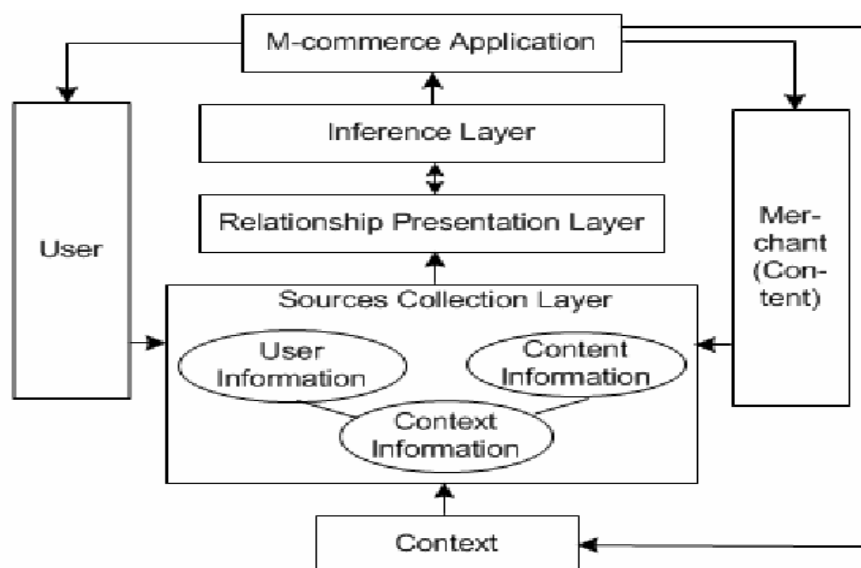


Fig : 3 - HOW MOBILE COMMERCE WORKS

M-COMMERCE VS. E-COMMERCE

Electronic commerce, or e-commerce refers to buying and selling goods and services over the internet. E-commerce and m-commerce are similar, but they come with a few distinctions from each other, such as the following:

Mobility. E-commerce transactions can be conducted through a desktop computer where the user is in a fixed spot. This reduces mobility as it can be difficult to move around a desktop device. M-commerce offers greater mobility as it's conducted through handheld devices that can be used anywhere there's an internet connection, including buses, trains and airplanes or when exercising at the gym.

Location tracking. Many e-commerce apps make use of location tracking capabilities to pitch users opportunities based on their location. However, the location tracking capability of e-commerce is limited when it is used with a nonmobile device. For example, the location of an e-commerce shopper is tracked with their IP address. While the IP address provides a broad region of the user's location, it is not capable of identifying the exact location, which might affect the targeted advertising strategies of a business. M-commerce apps, on the other hand, can track locations using Wi-Fi and GPS-based technologies that enable location-specific content and personalized recommendations. For instance, a provider can send push notifications offering personalized discounts that target certain customers as they walk past a specific store in a mall.

Security. Credit cards are still commonly used for nonmobile e-commerce payments. They are considered riskier than other online payment methods, even with security measures, such as multifactor authentication. Most data breaches and identity thefts happen because of credit card misuse. M-commerce closes some security gaps through the addition of measures such as biometric authentication, mobile wallets, quick response or QR codes and even cryptocurrencies.

Reachability and convenience. M-commerce makes it easier to reach a target audience. With mobile apps, businesses can reach more people and make their buying experience easier and faster.

ADVANTAGES AND DISADVANTAGES OF MOBILE COMMERCE

Advantages of m-commerce include the following:

- ❖ **Large customer base**
- ❖ **Convenience**
- ❖ **Product variety**

- ❖ **Automation**
- ❖ **Omnichannel experience**

Disadvantages of m-commerce include the following:

- ❖ **Poor execution**
- ❖ **Payment issues**
- ❖ **Tax compliance**
- ❖ **Security vulnerabilities**

FUTURE OF MOBILE COMMERCE

Mobile commerce is evolving and starting to reach a wider audience. According to Insider Intelligence, 6.9% of retail transactions will take place through a mobile device in 2022 and m-commerce will account for 10.4% of all retail sales by 2025. Many businesses are adopting mobile commerce to avoid falling behind the competitors.

The following are some of the current and future mobile commerce trends:

- ❖ **Mobile retargeting**
- ❖ **Augmented reality (AR)**
- ❖ **Mobile SEO**
- ❖ **Mobile banking**
- ❖ **AI, chatbots and shopping assistants**
- ❖ **Mobile ticketing**

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMEN:

Perceived usefulness is understood as the willingness and eagerness to adopt new technology that aids in effectively completing a task (Davis, 1989). Previous studies found the significant relationship between perceived usefulness, attitude, and behavioural intentions (Roy et al., 2018; Sun and Chi, 2018; Doshi, 2018; Talwar et al., 2020; Doshi, 2021, Chan et al., 2022), while some studies have found no relationship between them (Li et al., 2008; Dutot, 2015). According to Roy et al. (2018), Chan et al. (2022), and Lim et al. (2022), perceived ease of use is the primary element driving customer adoption of m-commerce technology. This is because utilising a mobile phone to complete these tasks takes very little time (Rodrguez-Torrico et al., 2019). According to Wu and Wang (2005), once a consumer is accustomed to the m-commerce system, perceived ease of use has no bearing on their decision to use it. This finding was supported by Kim et al. (2010), who found that early adopters prioritize perceived ease of use while late adopters prioritize perceived usefulness.

RESEARCH METHODOLOGY

Research as a systematized effort to gain new knowledge. Research in common parlance refers to a search for knowledge. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research. As such the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusion either in the form of solution towards the concerned problem or in certain generalisations for some theoretical formulation.

For this study, the type of research design used in the project was Descriptive in nature, because it helps to describe a particular situation prevailing within a company. Sampling Technique used to choose the Sample was Probability sampling or Simple Random Sampling. The effective sample size was 120. Both the primary and secondary data collection method was used in the project. Primary data are those that are collected at first hand for the first time. Secondary data have been derived from the books, published research articles, and websites. The research instrument used in this study is Questionnaire. Primary data was collected with the help of a questionnaire. Secondary data was collected from journals, magazines and other literature related to M - Commerce. Statistical tools were used such as percentage analysis. Data was analysed with the help of statistical tools using SPSS-25.

DATA ANALYSIS AND INTERPRETATION

Table 1 - Respondents of the Demographic profile

Parameter	Category	Frequency (N)	Percentage (%)
Gender	Male	100	83.3
	Female	20	16.7
Age	21-25years	64	53.3
	26-30years	40	33.3
	31-35years	11	9.2
	Above 35 years	5	4.2
Education Qualification	Diploma	54	45
	UG	45	37.5
	PG	21	17.5
Marital Status	Married	32	26.7
	Unmarried	88	73.3
Annual Income	1- 3 lacs	75	62.5
	3.1-5 lacs	41	34.2
	Above 5 lacs	4	3.3
Work Experience	1-5years	52	43.3
	6-10years	59	49.2
	Above 10years	9	7.5

Source: Primary Data

INFERENCE:

From the table1, it can be seen that 83% employees in the organisation were males while 17% respondents were females. According to this study, 53% respondents were in the age group of 21-25 years, which shows the attractiveness of automotive organisation amongst youngsters, 33% respondents belonged to the age bracket 26-30 years, 9.2% respondents were in the age group of 31-35years, and remaining 4.2% of the respondents belong to Above 35 years Age category. It was found that only 17.5% respondents were PG, while 37.5% were UG and remaining 45% respondents are Diploma Holder. Most of the respondents were only under the Unmarried (73.3%) category, and remaining 26.7% respondents are Married category. Above table shows that 62.5% employees were 1-3 lakhs, while 34.2% respondents were 3.1-5 lakhs, and remaining 3.3% respondents are the above 5 lakhs. It can be seen that 43.3% respondents were 1-5years, while 49.2% respondents are 6-10years and remaining 7.5% respondents have Above 10years of experience in the organisation.

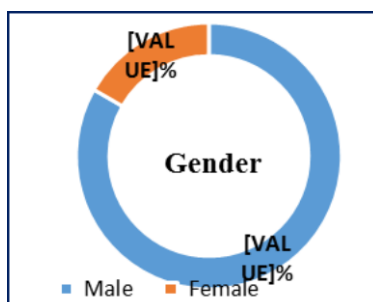


Chart 1

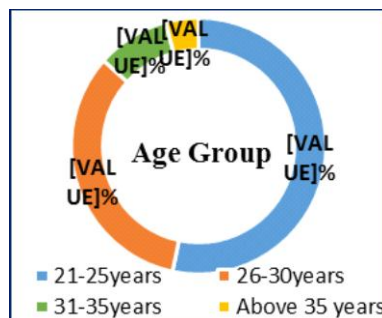


Chart 2

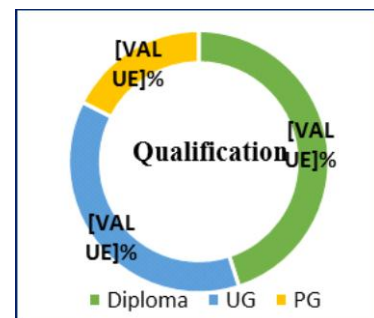


Chart 3

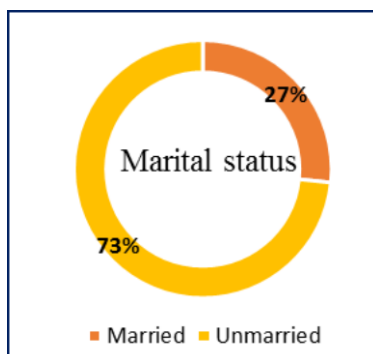


Chart 4

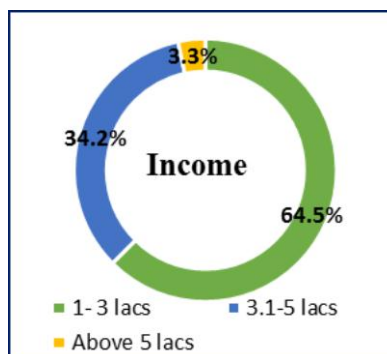


Chart 5

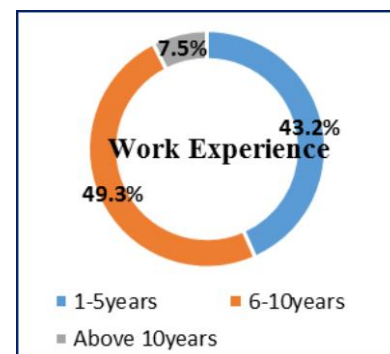
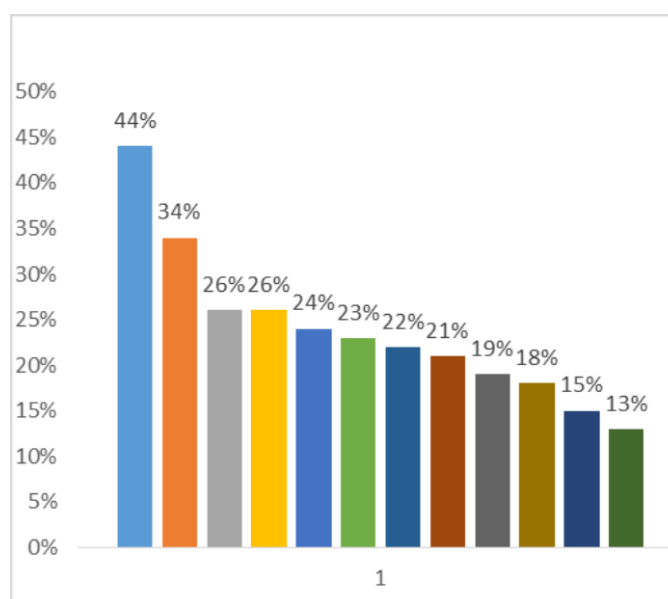


Chart6

Product or Goods	Respondent %
Clothing -	44%
Shoes -	34%
Bags and accessories	26%
Food and beverages.	26%
Cosmetics & body care	24%

Pet products.	23%
Books, movies, music & games	22%
Accessories	21%
Drugstore & health products	19%
Consumer electronics	18%
Toys & baby products	15%
Furniture and household	13%



MAIN FINDINGS

- ❖ Findings Related to Demographic Characteristics such as majority of the respondents are Male (83.3%), age group of 21-25 years (53.3%), Diploma holder (45%) and UG (37.5%), received Rs.1-3 lakhs (47%), Unmarried (73%), Work Experience (49.2%).
- ❖ Here is the graph from the survey on the most popular categories for online purchases in the young age from July 2022 to June 2023:

Clothing - 44%

Shoes - 34%

Bags and accessories were selected by 26% of respondents.

Food and beverages (excluding restaurant delivery) were selected by 26% of respondents.

Cosmetics & body care were selected by 24% of respondents.

Pet products were selected by 23% of respondents.

Books, movies, music & games were selected by 22% of respondents.

Accessories were selected by 21% of respondents.

Drugstore & health products were selected by 19% of respondents.

Consumer electronics like TVs and smartphones were selected by 18% of respondents.

Toys & baby products were selected by 15% of respondents.

Furniture and household goods were selected by 13% of respondents.

LUTION:

Research shows distinct trends in how consumers use mobile devices for online shopping, including demographic variations in platform preference, cart abandonment rates, and frequency of mobile purchases. The meteoric rise of mobile commerce is projected to continue, with global m-commerce sales potentially exceeding \$3 trillion by 2027. This growth will be fuelled by smartphones becoming the primary devices for online shopping and transactions, supported by advancing mobile technologies like 5G networks and innovations such as sound wave-based payments. While adoption is strongest in developing markets currently, increased usage by younger demographics points to mobile commerce becoming ubiquitous across age groups and regions in the coming years.

Players like Amazon, PayPal, and Visa will continue leading the fragmented landscape, challenged by disruptive local providers. Concerns around security and privacy may temper growth somewhat but are unlikely to stem the overall momentum. With augmented reality and further enhancements on the horizon, the future looks overwhelmingly mobile when it comes to how consumers shop and pay worldwide.

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18. EARLY DETECTION OF AI BIAS IN AUTONOMOUS HR SCREENING SYSTEMS

Dr. N. Saranya Devi,

Assistant Professor,

School of Management Studies, Tamil Nadu Open University,
Saidapet, Chennai, Tamil Nadu, India

ABSTRACT

The integration of artificial intelligence (AI) into human resource (HR) recruitment processes has introduced powerful efficiencies in resume screening, candidate ranking, and decision-making. However, as organizations increasingly rely on autonomous screening systems, ethical concerns about algorithmic bias have come to the forefront. AI systems trained on biased historical data or unbalanced variables can unintentionally replicate or amplify discrimination based on gender, ethnicity, age, or educational background. This study examines the importance of early-stage bias detection in AI-based HR screening tools through a primary data-driven approach. Responses from 234 individuals—collected via a structured questionnaire—were analyzed using SPSS to identify perceptions regarding fairness, transparency, bias awareness, and the need for pre-deployment audits. The results reveal significant concerns among users about the objectivity of AI decisions, the lack of explainability, and the potential for systemic discrimination. Furthermore, there is strong support for integrating early bias detection mechanisms and ethical oversight frameworks before AI systems are put into practice. The study emphasizes that building trust in AI recruitment requires proactive safeguards, fairness-by-design approaches, and ongoing human accountability. These findings provide critical insights for developers, HR professionals, and policymakers seeking to create inclusive and responsible AI-driven hiring ecosystems.

Keywords:

AI bias, algorithmic fairness, autonomous screening, HR technology, ethical AI, bias detection, explainable AI, recruitment systems, AI ethics, discrimination in hiring

INTRODUCTION:

Artificial Intelligence (AI) has increasingly become a transformative force in the domain of Human Resource Management (HRM), particularly in talent acquisition and recruitment. With growing pressure on organizations to hire faster, more objectively, and at scale, autonomous HR screening systems powered by machine learning and natural language processing are being widely adopted. These systems are designed to automate various stages

of recruitment—such as résumé parsing, skills matching, candidate ranking, and even preliminary interviews—promising speed and efficiency that far surpass traditional hiring methods. However, while these systems offer substantial operational benefits, they also carry significant ethical, legal, and societal concerns. Chief among these is the issue of algorithmic bias, where AI tools may unintentionally discriminate against certain groups of candidates based on attributes such as gender, ethnicity, age, socioeconomic background, or educational institution. In many cases, these biases are not deliberately programmed but arise from biased training data, flawed model assumptions, or poorly defined performance metrics. The consequences of such biases are far-reaching. An AI system that consistently favors one demographic group over others undermines the core principles of diversity, equity, and inclusion. Moreover, it may lead to unjust rejection of qualified candidates, contribute to systemic inequality, and expose the organization to reputational risk and legal liabilities. Biases that go undetected can accumulate and become entrenched over time, especially if the organization continues to use the system without periodic audits or human oversight. What complicates the matter further is the opacity of many AI models. Often termed as "black-box" systems, these algorithms make decisions that are difficult to interpret, challenge, or explain. Even well-intentioned HR professionals may lack the technical expertise to understand how certain outputs are generated. In such environments, bias may remain hidden until it causes a major issue—by which time it may be too late to reverse the damage. In response to these concerns, there is a growing movement in AI ethics and responsible AI development that calls for early-stage bias detection—that is, identifying and mitigating discriminatory patterns before the system is deployed or scaled. Proactive detection not only reduces the risk of harm but also builds public trust in AI applications. It allows organizations to intervene early, adjust algorithms, and introduce safeguards that support fairness and transparency. This paper aims to explore the importance of early bias detection in autonomous HR screening systems, proposing a structured framework for identifying potential sources of bias during model development and validation. Through this study, we hope to highlight the technical, managerial, and ethical imperatives of building fair and inclusive AI systems for the future of work. By raising awareness and offering practical strategies, this research seeks to contribute meaningfully to the ongoing discourse on equitable AI in human resource practices.

OBJECTIVE OF THE STUDY

1. To examine user perceptions of fairness and neutrality in AI-driven recruitment processes.

2. To identify key indicators that signal potential algorithmic bias in autonomous HR screening systems.
3. To assess the need for early-stage bias detection mechanisms to promote ethical and inclusive hiring practices.

REVIEW OF LITERATURE

Barocas et al. (2019) explored the structural origins of algorithmic bias in hiring systems and emphasized that biases often stem from historically skewed training datasets, institutional practices, and systemic inequalities embedded in digital infrastructures. They argued for fairness-aware machine learning models and greater transparency in algorithm design to mitigate unintended discrimination in recruitment outcomes. **Raghavan et al. (2020)** conducted an in-depth audit of AI-powered hiring tools and found that commercial recruitment platforms often amplify bias instead of reducing it. The study revealed that ranking systems heavily favored candidates with certain educational backgrounds or geographic regions, suggesting that such tools require robust monitoring and bias detection protocols before deployment. **Binns et al. (2018)** examined the ethical concerns related to automated decision-making in HR technologies and stressed the lack of explainability in black-box AI systems. Their findings showed that end-users often found it difficult to interpret rejection outcomes, which in turn contributed to diminished trust in AI-based recruitment. They recommended developing interpretable AI models with human-in-the-loop validation. **Cowgill et al. (2021)** studied the effects of blind AI audits on hiring algorithms used by multinational firms. The research found that when external audits were applied, firms were more likely to recalibrate their models and remove discriminatory logic. The study underscored the role of early detection tools and external scrutiny in promoting algorithmic fairness. **Kim (2022)** focused on the legal and regulatory challenges of biased AI in the workplace, highlighting how AI systems can unintentionally violate anti-discrimination laws such as Title VII of the Civil Rights Act. The study emphasized the urgent need for early detection mechanisms that align with both ethical standards and legal compliance, especially in high-stakes domains like employment.

RESEARCH METHODOLOGY

This study adopts a descriptive research design to investigate user perceptions of fairness and potential bias in autonomous AI-based human resource screening systems. Given the growing deployment of AI in recruitment functions, the research focuses on understanding the early indicators of algorithmic discrimination as experienced or perceived by individuals interacting with or exposed to such systems. A structured questionnaire was

developed as the primary data collection tool, specifically designed to capture responses related to perceived fairness, algorithm transparency, trust in AI decision-making, and the necessity for early bias detection frameworks. The questionnaire was designed using a 5-point Likert scale format ranging from "Strongly Disagree" to "Strongly Agree" to ensure nuanced responses across key dimensions. The sample for the study consists of 234 respondents selected through purposive sampling, targeting individuals with relevant exposure to AI-driven recruitment technologies—such as job seekers, HR professionals, and technical staff involved in digital hiring platforms. The sampling approach was intentional, focusing on respondents most likely to offer meaningful insights based on firsthand interaction with or knowledge of AI recruitment tools. Data collection was conducted through both digital and offline channels, ensuring demographic diversity and practical accessibility. Responses were compiled and processed using the Statistical Package for the Social Sciences (SPSS), a reliable statistical analysis tool widely used in social science research. The data analysis focused on frequency and percentage distribution for each item in the questionnaire, with results presented in tabular format. This approach allows for a clear understanding of how prevalent certain perceptions are among the respondents. The methodology was carefully structured to ensure ethical standards were upheld, including respondent consent and data confidentiality. The overall methodological framework ensures that the study provides empirical grounding for understanding the early warning signs of bias in AI recruitment systems and offers actionable insights for HR tech developers and organizational decision-makers alike.

RESULTS AND DISCUSSION

Table 1: Demographic Profile of Respondents (N = 234)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	142	60.7%
	Female	92	39.3%
Age Group	Below 25 years	78	33.3%
	25–34 years	101	43.2%
	35–44 years	42	17.9%
	45 years and above	13	5.6%
Educational Level	Undergraduate	69	29.5%
	Postgraduate	121	51.7%
	Doctoral	44	18.8%

Occupation	HR Professionals	71	30.3%
	IT/AI Developers	55	23.5%
	Job Seekers (Recent Graduates)	108	46.2%
AI Usage Exposure	Low (rarely interacted)	52	22.2%
	Moderate (limited experience)	106	45.3%
	High (frequent usage)	76	32.5%

Table 1 outlines the demographic profile of the 234 respondents who participated in the study. The gender distribution is moderately skewed, with 60.7% male and 39.3% female respondents. A significant portion of participants falls within the 25–34 age group (43.2%), reflecting a working-age population likely to engage with AI-driven recruitment tools. Educationally, more than half (51.7%) are postgraduates, ensuring a reasonably informed and aware respondent base. The occupational composition is diverse, with nearly 46.2% comprising job seekers, while 30.3% are HR professionals—key stakeholders in recruitment systems. Additionally, 23.5% are IT/AI developers, providing a technical perspective on AI functionality. Regarding AI exposure, 45.3% report moderate experience, while 32.5% indicate high exposure, confirming that a majority have interacted with AI tools in some form, making their perceptions meaningful for this study. This demographic spread supports the study’s goal of capturing insights from both users and developers of AI-based screening systems. The diversity in occupation and experience levels strengthens the validity of the subsequent analysis on fairness, bias, and early detection mechanisms.

Table 2: Perception of Fairness in AI-based Screening

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
AI-based screening systems treat all candidates equally regardless of gender.	34 (14.5%)	41 (17.5%)	57 (24.4%)	68 (29.1%)	34 (14.5%)	234
AI recruitment tools are free from caste, religion, or ethnicity-based discrimination.	27 (11.5%)	49 (20.9%)	65 (27.8%)	63 (26.9%)	30 (12.8%)	234
AI systems consider only qualifications and skills while shortlisting candidates.	31 (13.2%)	53 (22.6%)	59 (25.2%)	60 (25.6%)	31 (13.2%)	234
AI-based shortlisting is more impartial than human recruitment.	29 (12.4%)	44 (18.8%)	67 (28.6%)	59 (25.2%)	35 (15.0%)	234
The AI screening system used by my organization clearly explains the basis of candidate rejection.	41 (17.5%)	62 (26.5%)	70 (29.9%)	45 (19.2%)	16 (6.8%)	234

Table 2 presents respondents' views on the fairness of AI-based screening systems. Regarding gender equality, only 43.6% (Agree + Strongly Agree) believe that AI tools are gender-neutral, while a notable 32% disagree or strongly disagree, indicating that concerns about gender bias persist. Similar trends are seen in perceptions about caste, religion, or ethnicity—34.7% agree that such discrimination is absent, yet 32.4% disagree, revealing a divided perception. When asked whether AI systems consider only qualifications and skills, 38.8% agree or strongly agree, but 35.8% hold the opposite view, reflecting skepticism about the objectivity of these tools. Interestingly, 40.2% of respondents feel AI screening is more impartial than human hiring, but 31.2% still express doubt, which underscores the ongoing trust deficit in algorithmic decision-making. The most concerning insight comes from the final statement—only 26% of respondents agree that AI systems offer clear explanations for rejection, while 44% disagree or strongly disagree. This lack of transparency diminishes user trust and highlights a critical area for improvement. Overall, the table reveals that while many participants recognize the potential for fairness in AI systems, a significant portion remains uncertain or dissatisfied, especially regarding transparency and bias across social categories. These mixed perceptions underscore the importance of implementing early-stage bias detection and explainability features in AI-based HR tools.

Table 3: Trust and Transparency in AI Decision-Making

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I trust the decisions made by AI-based HR screening systems.	28 (12.0%)	57 (24.4%)	66 (28.2%)	58 (24.8%)	25 (10.7%)	234
I feel confident that AI screening tools are free from human influence or manipulation.	31 (13.2%)	61 (26.1%)	71 (30.3%)	49 (20.9%)	22 (9.4%)	234
The AI system used in recruitment provides clear explanations for its decisions.	45 (19.2%)	63 (26.9%)	67 (28.6%)	42 (17.9%)	17 (7.3%)	234
I believe AI decisions are more data-driven and objective than those of human recruiters.	24 (10.3%)	44 (18.8%)	60 (25.6%)	68 (29.1%)	38 (16.2%)	234
I can easily understand how the AI-based hiring system evaluates candidates.	47 (20.1%)	64 (27.4%)	68 (29.1%)	38 (16.2%)	17 (7.3%)	234

Table 3 explores participants' trust in and understanding of AI-based decision-making processes within recruitment systems. When asked about general trust in AI screening decisions, 35.5% agreed or strongly agreed, while 36.4% disagreed, suggesting a split in

confidence levels. A similar divide exists regarding the belief that AI decisions are free from human influence—only 30.3% agreed, while 39.3% expressed skepticism. This highlights concerns that human bias may still enter the system via biased training data or manual override. Transparency emerged as a major shortcoming. For the statement on whether AI provides clear decision explanations, 46.1% disagreed or strongly disagreed, and only 25.2% agreed. This lack of clarity is compounded by the finding that 47.5% of respondents could not understand how AI evaluates candidates, emphasizing the need for more explainable AI (XAI) tools in HR processes. On a slightly more positive note, 45.3% agreed or strongly agreed that AI decisions are more data-driven and objective than human recruiters, reinforcing the perception that AI has potential to reduce personal bias—but only if properly designed. In sum, while some respondents see the value of data-driven decision-making, widespread doubt persists about how AI decisions are made and whether they are fully impartial or understandable. These findings strongly support the need for early-stage transparency measures and user education to foster trust in AI-driven hiring systems.

Table 4: Concerns Related to Bias and Discrimination in AI-based Screening

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I am concerned that AI tools may discriminate based on gender, age, or background.	18 (7.7%)	32 (13.7%)	52 (22.2%)	78 (33.3%)	54 (23.1%)	234
I believe AI recruitment systems can unintentionally reflect societal or historical biases.	12 (5.1%)	29 (12.4%)	48 (20.5%)	83 (35.5%)	62 (26.5%)	234
I have personally experienced or observed bias in AI-based shortlisting or assessment.	44 (18.8%)	59 (25.2%)	65 (27.8%)	41 (17.5%)	25 (10.7%)	234
AI screening systems may eliminate strong candidates due to biased data or faulty algorithms.	17 (7.3%)	28 (12.0%)	50 (21.4%)	85 (36.3%)	54 (23.1%)	234
Organizations should be held accountable for AI bias in hiring processes.	10 (4.3%)	21 (9.0%)	39 (16.7%)	83 (35.5%)	81 (34.6%)	234

Table 4 presents respondents' concerns and experiences related to bias and discrimination in AI recruitment. The data indicates strong apprehension about the potential for unintentional bias in algorithmic decision-making. A significant 56.4% of respondents agreed or strongly agreed that AI systems might discriminate based on gender, age, or background, while only 21.4% disagreed. This perception reflects real fear about fairness in automated hiring processes. Similarly, 62% believe that AI can unintentionally reflect societal or historical

biases, reinforcing the concern that these systems are not fully objective and could replicate existing inequalities. While personal experience with bias is less frequent—only 28.2% agreed they had seen or experienced such discrimination—this may be due to the opaque nature of AI processes where users cannot always trace or understand the rationale behind decisions. Furthermore, 59.4% of participants felt that strong candidates could be wrongly excluded due to biased training data or algorithmic flaws, highlighting a lack of confidence in the comprehensiveness and accuracy of AI evaluations. Most notably, 70.1% of respondents agreed that organizations must be held accountable for bias in AI-based hiring. This reflects a strong public expectation for ethical governance and corporate responsibility in the deployment of recruitment technologies. Overall, this table reinforces the critical need for early-stage bias audits, ethical oversight, and human accountability in the design and use of AI recruitment tools.

Table 5: Support for Early Detection Frameworks in AI Recruitment

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Organizations should adopt tools that detect AI bias before deploying recruitment systems.	8 (3.4%)	16 (6.8%)	32 (13.7%)	94 (40.2%)	84 (35.9%)	234
Early-stage bias detection improves trust in AI-based recruitment systems.	10 (4.3%)	21 (9.0%)	38 (16.2%)	92 (39.3%)	73 (31.2%)	234
I support the integration of ethical AI audits before using hiring algorithms.	12 (5.1%)	18 (7.7%)	29 (12.4%)	96 (41.0%)	79 (33.8%)	234
Bias detection should be made a mandatory compliance requirement for all AI hiring tools.	11 (4.7%)	22 (9.4%)	30 (12.8%)	88 (37.6%)	83 (35.5%)	234
I am willing to trust AI systems more if they are regularly tested for fairness.	9 (3.8%)	24 (10.3%)	37 (15.8%)	95 (40.6%)	69 (29.5%)	234

Table 5 reflects strong respondent support for the implementation of early bias detection mechanisms in AI-driven recruitment systems. An overwhelming majority—76.1%—agree or strongly agree that organizations should adopt tools to detect AI bias before deployment. This shows a clear demand for proactive governance and ethical technology practices in recruitment. Similarly, 70.5% believe that early detection enhances trust in AI hiring tools, reinforcing the idea that transparent and responsible AI use can increase acceptance among users. The statement on integrating ethical audits also received strong support (74.8% agreement), suggesting that respondents favor independent or internal evaluations before

putting AI systems to work. The opinion that bias detection should be a mandatory compliance requirement garnered 73.1% agreement, indicating that respondents view fairness as not just an ethical option but a regulatory necessity. Lastly, 70.1% of respondents noted they would trust AI more if it were tested regularly for fairness—emphasizing that trust is conditional and dependent on continued validation. Overall, the results make it clear that users and stakeholders are not anti-AI, but rather pro-accountability. The data strongly supports the integration of early-stage detection frameworks, fairness audits, and transparent feedback loops as essential to building ethical and effective recruitment systems.

CONCLUSION AND RECOMMENDATION

The findings of this study offer compelling insights into how individuals perceive fairness, trust, and potential bias in AI-based recruitment systems. As the adoption of autonomous screening tools becomes more widespread, the demand for ethical, transparent, and accountable AI in HR has never been more critical. The results clearly indicate a significant portion of respondents are concerned about discriminatory patterns—particularly those rooted in gender, age, ethnicity, or educational background. Many participants also expressed skepticism about the explainability and objectivity of AI systems, highlighting that technical sophistication alone is not sufficient to build user trust. A central takeaway from the research is the urgent need for early-stage bias detection mechanisms. Respondents overwhelmingly support the integration of proactive tools and ethical audits that can identify bias before such systems are deployed at scale. This aligns with global best practices in responsible AI, which advocate for fairness-by-design rather than corrective interventions after harm has occurred. Moreover, the study finds strong public support for mandatory compliance frameworks to govern the fairness and accountability of AI in recruitment. To that end, several recommendations emerge. First, organizations adopting AI for recruitment must incorporate fairness auditing protocols during the development and validation stages. These should include diverse data sampling, regular model testing, and bias impact assessments. Second, explainable AI (XAI) features should be embedded within hiring tools, allowing candidates and recruiters to understand the logic behind shortlisting decisions. Third, companies should invest in training HR professionals on AI ethics and equip them to monitor and challenge algorithmic decisions when necessary. Finally, regulatory bodies and policymakers must step forward to establish legal guidelines and certification standards for AI hiring systems, ensuring that these technologies are not only innovative but also equitable. Only through early detection, transparency, and shared accountability can we build a recruitment future that is both data-driven and just.

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19. ARTIFICIAL INTELLIGENCE IN VENDOR AND SUPPLIER MANAGEMENT: TRANSFORMING PROCUREMENT FOR THE DIGITAL AGE

Dr. N. Saravanakumar,

*Assistant Professor, Department of Economics,
School of Social Sciences, Tamil Nadu Open University, Chennai - 600 015.*

Dr. N. Sowbarnigadevi,

*Assistant Professor, Department of Commerce,
Annai Veilankanni's College for Women, West Saidapet, Chennai - 600 015.*

Mr. S. Periyasamy,

*Ph.D Research Scholar, Department of Economics,
School of Social Sciences, Tamil Nadu Open University, Chennai - 600 015.*

Abstract

The integration of Artificial Intelligence (AI) into vendor and supplier management is revolutionizing procurement practices across industries. This paper explores how AI enhances efficiency, transparency, and strategic decision-making by automating processes such as vendor selection, contract analysis, risk management, and spend optimization. It also addresses key challenges, including data quality, integration issues, and ethical concerns. Drawing on case studies and empirical research, the paper outlines the transformative potential of AI to reshape global supply chains and recommends a framework for its ethical and effective adoption.

Key Notes:

Supply Management, Decision Making, Data Quality

1. Introduction

Global supply chains are increasingly complex, making vendor and supplier management a critical strategic function. Traditionally dominated by manual processes and fragmented data, procurement departments now face the dual challenge of improving efficiency while managing risk. AI offers a powerful solution, enabling smarter, faster, and more transparent decision-making. This paper examines the role of AI in modernizing supplier management and explores its transformative impact on procurement operations.

2. Literature Review

Recent studies underscore the value of AI in enhancing procurement outcomes. According to Deloitte (2023), over 60% of leading companies have implemented AI tools for supplier evaluation and risk analysis. IBM's procurement arm has demonstrated significant cost savings through AI-based sourcing solutions. Moreover, Gartner (2024) predicts that by 2026, 75% of procurement decisions will be influenced by AI-driven analytics.

Key themes in the literature include automation of repetitive tasks, predictive analytics for demand and supply, enhanced risk detection and mitigation, and intelligent contract and performance management.

3. AI Applications in Vendor and Supplier Management

3.1 Vendor Selection and Onboarding

AI systems analyze large datasets to assess vendor suitability based on pricing, quality, delivery times, certifications, and compliance. Machine learning models can match organizational needs with the best-fit suppliers.

3.2 Contract Lifecycle Management

AI powered contract management platforms extract and compare clauses, identify risks, and ensure adherence to legal standards. NLP technologies can summarize and highlight deviations in contract terms.

3.3 Risk Assessment and Mitigation

AI tools aggregate real-time data from news, social media, and financial reports to score supplier risk. Early warning systems can flag disruptions due to political unrest, natural disasters, or supplier insolvency.

3.4 Spend Analysis and Cost Optimization

AI analyzes historical procurement data to identify spending trends, detect anomalies, and suggest areas for cost reduction. It also supports dynamic pricing and discount optimization based on supplier performance.

3.5 Relationship and Performance Management

AI dashboards provide real-time performance metrics (e.g., delivery accuracy, quality ratings), fostering a data-driven approach to supplier engagement and relationship-building.

3.6 Automation and Chatbots

AI-enabled bots handle routine interactions such as invoice verification, document requests, and procurement FAQs, freeing human resources for strategic activities.

4. Benefits of AI Integration

- ❖ **Increased Efficiency:** Automation reduces manual tasks and shortens procurement cycles.
- ❖ **Improved Accuracy:** Data-driven decisions minimize errors in supplier evaluation.
- ❖ **Enhanced Agility:** Real-time insights enable quick responses to market changes.
- ❖ **Cost Savings:** Optimized sourcing and reduced supplier churn lower total procurement costs.
- ❖ **Risk Reduction:** Proactive risk detection ensures greater supply chain resilience.

5. Challenges and Ethical Considerations

- ❖ **Data Quality and Integration:** Incomplete or siloed data can limit AI effectiveness.
- ❖ **Technology Adoption Barriers:** Lack of skilled personnel and resistance to change hinders implementation.
- ❖ **Transparency and Bias:** Algorithmic bias can influence vendor selection unfairly.
- ❖ **Ethical Procurement:** AI must align with human values, fairness, and compliance norms.

6. Case Studies

IBM Watson in Procurement: IBM's AI platform reduced procurement cycle time by 75% and increased sourcing accuracy through intelligent supplier analytics.

Unilever's AI Strategy: Unilever uses AI to enhance sustainability by monitoring supplier practices and optimizing sourcing based on environmental impact data.

Maersk's Predictive Supply Chain: The logistics giant applies AI to forecast supplier delays and dynamically reroute shipments.

7. Recommendations

- ❖ Invest in clean, integrated data systems.
- ❖ Train procurement teams in AI literacy.
- ❖ Adopt transparent AI models to avoid black-box decision-making.
- ❖ Establish ethical guidelines for AI use in vendor selection.
- ❖ Integrate AI with ERP and SCM platforms for seamless operations.

Conclusion

AI is redefining the future of vendor and supplier management by enabling organizations to be more proactive, efficient, and resilient. While challenges exist, the benefits far outweigh the barriers when adoption is guided by strategic vision and ethical governance. As procurement becomes a key lever for organizational success, AI will continue to drive competitive advantage in the digital age.

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20. THE IMPACT OF AI-DRIVEN PERSONALIZATION ON CONSUMER PURCHASE INTENT IN ONLINE RETAIL ENVIRONMENTS

Dr. R. Kalpana

Assistant Professor in Commerce, School of Management Studies,
Tamilnadu Open University, Chennai-15.

ABSTRACT

Artificial intelligence (AI) is a part of computer science that focuses on developing systems or machines that can do tasks that normally require human intelligence. These tasks include learning, thinking, problem-solving, perception, and language comprehension. In the dynamic world of e-commerce, artificial intelligence (AI) is increasingly used to personalize consumer experiences. This study examines the impact of AI-driven personalization on consumer purchase intent within online retail platforms. A quantitative approach was employed using a structured questionnaire distributed to 130 online user or shoppers. The purposive sampling method was used to collect the data from the respondents who can purchase/are purchasing through online. Simple percentage analyses, t-tests, ANOVAs, and correlations have been used to analyze the data collected. Correlation analysis revealed a strong positive relationship between perceived AI personalization and consumer purchase intent ($r = 0.703$, $p < 0.01$), suggesting that as consumers purchase intention higher levels of AI-driven personalization, their likelihood of making a purchase increases. These findings emphasize the importance of incorporating personalized AI tools in digital marketing strategies to enhance engagement and drive conversions.

Keywords:

AI Personalization, E-commerce, Digital Marketing, Purchase Intention.

Introduction

The proliferation of artificial intelligence in digital commerce has redefined how brands interact with consumers. AI-powered personalization tools—such as recommendation engines, personalized emails, and dynamic content—aim to tailor online experiences based on user behavior, preferences, and demographics. As online retail continues to grow, understanding how AI-driven personalization affects consumer behavior, especially purchase intent, becomes critical for businesses seeking competitive advantage.

Literature Review

AI-Driven Personalization: Gia (2025) investigated AI-powered personalized advertising and purchase intention in Vietnam. The primary data were collected from 402

respondents through a digital survey using Google Forms. The survey link was sent to Facebook, Zalo, TikTok, and e-commerce forums. The researcher used non-probability convenience sampling methods. The data were analyzed using descriptive, partial least square structural equation (Smart PLST, PLS-SEM). This investigation reveals that perceived personalization significantly enhances both perceived relevance and perceived usefulness, highlighting the effectiveness of tailored advertising in increasing consumer engagement. The use of machine learning algorithms to provide information or recommendations that are specific to each customer is known as AI-driven customization. According to research, it improves user pleasure and engagement (Bleier & Eisenbeiss, 2015).

Consumer Purchase Intent: Purchase intention refers to the likelihood that a consumer will purchase a product or service, which is impacted by a variety of psychological and contextual factors. It is widely regarded as a powerful predictor of actual purchase behavior and is commonly used in marketing research to inform sales predictions and optimize promotional activities (Dangi et al., 2021). Trust, perceived relevance, and perceived utility are among the most important elements influencing purchase intention (Luo et al., 2022). When customers trust a brand or technology, consider the advertising material as relevant, and understand the practical benefit of the commercial, their intention to buy increases (Li et al., 2022). Although purchase intention does not always result in a transaction, it provides valuable insights into consumer decision-making processes and assists marketers in refining their advertising strategies (Byrne et al., 2022). Personalization is important in AI-driven advertising since it increases purchase intent. Reena and Udit (2020) discovered that tailored ads powered by AI improve the user experience, boosting the likelihood of purchase. This is because AI systems can analyze massive amounts of consumer data and produce tailored content that matches individual preferences, making marketing more engaging and less intrusive. The probability that a customer will purchase a good or service is known as purchase intent. According to Dodds et al. (1991), it is a significant predictor of actual purchase behavior and is impacted by a number of variables, such as perceived value, trust, and product relevance.

Relationship between Personalization and Purchase Intent: Several studies suggest a positive relationship between personalization and purchase intent. For example, Tam and Ho (2006) found that personalization enhances perceived relevance, which subsequently increases buying intent. Trust in AI also plays a mediating role (Shin, 2021).

Research Objectives

- To know the role of AI-driven personalized and consumer purchase intent in online retail.
- To investigate the functional aspects of e-commerce customer purchase intent and AI-driven personalization with reference to select demographic factors.

Research Methodology

A descriptive in nature research design was used. A quantitative approach was employed using a structured questionnaire distributed to 130 online user or shoppers. The Questionnaire adapted from previously validated scales: AI Personalization Scale (adapted from Tam & Ho, 2006) Purchase Intent Scale (Dodds et al., 1991). All items were measured on a 5-point Likert scale. The purposive sampling method was used to collect the data from the respondents who can purchase online retails. For analysis of the data: percentage analyses, t-tests, ANOVAs, and Pearson Correlation have been computed using SPSS.

Hypotheses Framed

H₀₁- There will be no significant difference in Consumer Purchase Intention towards online retailing with reference to age, Educational and Occupation of the e-commerce purchasers.

H₀ 2- There will be no significant differences in the Consumer Purchase Intention towards online retailing with reference to Gender of the e-commerce purchasers.

H₀₃: There will be no significant relationship between AI-driven personalization and consumer purchase intent of the e-commerce purchasers.

Results and Discussion

Table 1. Demographic factors details of the respondents

Sl.No.	Factors	Options	Frequency	Percentage %
1.	Gender	Male	38	29.2%
		Female	92	70.8%
		Total	130	100
2.	Age	Below 25	36	28%
		26 – 30	48	37%
		31-35	29	22%
		36-40	13	10%
		Above 40	4	3%
		Total	130	100
3.	Educational Qualification	Professional Degree	33	25%
		Under Graduate	15	12%
		Post Graduate	67	52%
		Schooling	1	.8%

4.	Occupation	Diploma	10	7.2%
		Others	4	3%
		Total	130	100
		Govt.	24	19%
		Pvt.	89	68%
		Self	2	1.2%
		Home Maker	1	.8%
		Student	14	11%
		Total	130	100

Source: Primary data

Inference:

The details of the demographic table 1, show that 70.8% of the respondents were female and 29.2% of them male were who gave their experience on online shopping. Majority of the respondents 37% of the respondents belong to the age group 26-30 years, 28% belongs to the age group of below 25, 22% belongs to the age group of below 31-35 years. 10% and 3% belong to the age groups were 36-40 and above 40. 52% were educated in Post Graduate level. 25% were educated in Professional level. 12% were educated Under Graduate level. 7.2%, 3% and .8% were educated in schooling, diploma and others. 68% were working in private company, 19% were in Government service, and 11 % were student, and so on.

Hypothesis-1: H₀1- There will be no significant difference in Consumer Purchase Intention towards online retailing with reference to **age, Educational and Occupation** of the e-commerce purchasers.

Table 2: One way Anova test showing the significant difference in Purchase Intention based on demographic variables like age, Educational and occupational level of the respondents

Age		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
	<i>Between Groups</i>	124.878	4	31.220	1.200	0.314 NS
	<i>Within Groups</i>	3252.114	125	26.017		
Education		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
	<i>Between Groups</i>	308.859	5	61.772	2.497	0.034* Sig.
	<i>Within Groups</i>	3068.134	124	24.743		
	Total	3376.992	129			
Occupation		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
	<i>Between Groups</i>	215.480	4	53.870	2.130	0.081 NS
	<i>Within Groups</i>	3161.513	125	25.292		
	Total	3376.992	129			

Primary Source:**Inference:**

One way Anova test was conducted to find the difference in Consumer Purchase Intention based on demographic variables like age and occupational level of the respondents. From the results, while comparing the purchase intention with reference to Education, it was evident from the F-value of 2.497 for which the p value is less than 0.05, which indicates that the education plays a significant role in the purchase intention. From the tables it was also evident that the p value is greater than 0.05 for all the other variables indicating no significant difference in the samples perceived Purchase Intention based on age, and occupational level of the respondents, hence, the null hypothesis H_0-1 , is accepted partially. The Purchase Intention for online shopping is same all the age groups since it is convenient, shopping can be done from home, android phone in their hand, thereby saving travelling time and energy. The Purchase Intention for online shopping is same for all the occupational level namely Government, Private and Self employees etc., the difference in the consumer purchase intention based on demographic variables like Educational level of the respondents.

Hypothesis -2: H_0 2- There will be no significant differences in the Consumer Purchase Intention towards online retailing with reference to Gender of the e-commerce purchasers.

Table 3: Purchase Intention towards online shopping based on gender [Mean, Standard Deviation and 't' value]

Variable	Gender	N	Mean	SD	't'	'p'
Purchase Intention towards online retail	Male	43	95.37	4.983	-0.35	0.972 NS
	Female	92	95.40	5.197		

Primary source:**Inference:**

A t- test was used to evaluate the difference between genders in terms of purchase intention Table 3 shows that males and females have significant buying intentions for online shopping because of the p value is greater than 0.05 so that the null hypothesis H_0-2 is accepted. Nowadays, the majority of men and women are working; they do not have enough time to purchase through traditional methods of shopping, thus they prefer internet shopping. Various factors, such as rapid product delivery, simple access to product information, and less time spent gathering knowledge about products; all contribute to online purchasing intentions.

Hypothesis-3: H_{03} : There will be no significant relationship between AI-driven personalization and consumer purchase intent of the e-commerce purchasers.

Table 4: The Pearson correlation coefficient between AI-driven personalization and consumer purchase intent was:

Variables		AI- driven Personalization	Purchase Intention
AI-driven Personalization	Pearson Correlation	1	.703**
	Sig. (2-tailed)		.000
	N	130	130
Purchase Intention	Pearson Correlation	.703**	1
	Sig. (2-tailed)	.000	
	N	130	130
**. Correlation is significant at the 0.01 level (2-tailed).			

Primary Source: $r = 0.703$, $p < 0.01$

Inference

The table 4 shows that this indicates a strong, statistically significant positive correlation, meaning that higher levels of AI-driven personalization are associated with greater purchase intent. Since the p value is less than 0.05 level hence the null hypothesis -3 is rejected. AI-powered personalization tools—such as recommendation engines, personalized emails, and dynamic content—aim to tailor online experiences based on user behavior, preferences, and demographics. Consumers who feel that content and product recommendations are tailored to them are more likely to engage and complete purchases. This highlights the psychological value of relevance and customization in influencing consumer decisions. However, ethical concerns such as data privacy and algorithmic transparency remain potential barriers that marketers must address. So that AI personalization is the use of artificial intelligence (AI) to customize communications, product suggestions, and services for specific consumers. AI-powered solutions may create highly tailored encounters by evaluating data and learning from user behavior(www.ibm.com).

Conclusion and Implications

The findings support the prior research indicating i) Higher the level Education, higher the online purchase intention among consumers, ii) Age and occupational level do not differentiate the consumers in their perceived online purchase intention. iii) A positive

association between AI-driven personalization and consumer purchase intention. This study confirms the significant impact of AI-driven personalization on purchase intent in online retail. The findings provide following implications: i) Retailers should invest in AI tools that provide meaningful personalization ii) Marketers must ensure transparency and user control to build trust and iii) Future research should explore mediators like trust and moderators like digital literacy.

Limitations of the study

The research may focus on specific AI features, recommendation engines, without considering the broader ecosystem of AI applications in online retail. This narrow focus could overlook other influential factors affecting consumer behavior.

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Website source

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21. M - BANKING SERVICE

Dr. K. Ganesan

Dean Shift II,

Annai Veilankanni's College of Arts & Science, Saidapet.

ABSTRACT

'Mobile banking' is one of the best alternative channels available to customers for quick correct and efficient service at anytime and anywhere. The paper is devoted to explore the extent of mobile banking in Indian banking industry where cell phone users are increasing at unexpected rate. This paper describes the basic concepts, services offered, market survey and technology which enables Mobile Banking. The private sector banks are on the top in providing the M-banking services to their customers and have profitability. The paper also highlights the benefits of M- banking to customers as well as to bankers and suggests some strategies with their possible solutions like to spread awareness regarding M-banking and to increase its area and scope to enhance M-banking services in India, particularly in rural and semi – urban areas.

Key words:

Extent of mobile banking, strategies to enhance M-banking services.

Introduction to M-banking

As mobile networks are updated with WAP, GPRS and UMTS to deliver next-generation multimedia services, the banks are getting ready to unleash services on mobile phones. Customers will be able to view their account statement, transfer funds between accounts, be notified of large payments or get notified of transactions above a pre- defined threshold, and will have immediate and full control over their finances. Next – generation mobile banking services will deliver significant improvements with user – friendly icon driven instructions, instant access, security and immediate transaction processing all at a lower session cost. Banks will attain higher levels of customer satisfaction and increased loyalty by providing anywhere, anytime banking. They will benefit further from lower administrative costs, lesser number of branches, reduced headcount, streamlined call centers' and lower handling charges – savings which, hopefully, will be passed onto customers.

Mobile usage has seen an explosive growth in most of the Asian economies like India, China and Korea. The main reason that mobile Banking scores over Internet Banking is that it enables 'Anywhere Anytime Banking'. Customers don't need access to a computer terminal to access their bank accounts, now they can do so on-the-go while waiting for the bus to work, travelling or when they are waiting for their orders to come through in a restaurant.

Benefits of Mobile Banking to Customers and to Bankers

To customers

- Customers need to stand in the bank counters/front offices for various enquires about his account.
- Customer can save his valuable time in banking transactions and save in travel cost reaching the bank branch etc.
- It is a mobile banking to have information of all the 365 days at anytime anywhere about his account.
- Customer can pay his utility bills in time and save paying penalties since alerts are received from the bank.
- Cheque book requests can be made sitting in his work place.

To bankers

- M- Banking helps in saving crores of rupees by way of reduced transaction costs. Govt incurs a cost of Rs. 12-13 for every Rs. 100. Mobile banking helps it reduce the cost to a mere Rs. 2.
- Banks can utilize the time saved for expansion of business, marketing and sales activities by channel migration of customers to mobile banking.
- Banks can take advantage of profits by way of commission for cellular companies by selling prepaid talk time through ATM's.
- Banks providing mobile bankers' service can have competitive advantage on those banks, which are not providing this service.

Mobile Banking Business Models

A wide spectrum of Mobile/branchless banking models is evolving. These models differ primarily on the question that who will establish the relationship (account opening, deposit taking, lending etc.) with the end customer, the bank or the Non-Bank/Telecommunication Company (Telco). Models of branchless banking can be classified into three broad categories – Bank Focused, Bank – Led and Non Bank- Led.

Bank - focused model

The bank- led model offers a distinct alternative to conventional branch – based banking in that customer conducts financial transactions at a whole range of retail agents (or through mobile phone) instead of at bank branches or through bank employees. This mode promises the potential to substantially increase the financial services outreach by using a different delivery channel (retailers / mobile phones), a different trade partner using (Telco/Chain Store)(having experience and target market distinct from traditional banks, and

may be significantly cheaper than the bank based alternative. The bank – led model may be implemented by either, using correspondent arrangements or by creating a JV between bank and Telco non – bank. In this model customer account relationship rests with the bank.

Non Bank – led model

The non – bank – led model is where a bank model is where a bank does not come into the picture (except possibly as a safe- keeper of surplus funds) and the non-bank (eg. Telco) performs all the functions.

Mobile Banking Services

Banks offering mobile access are mostly supporting some or all of the following services:

Account Information

- Mini –statements and checking of account history
- Alerts on account activity or passing of set thresholds
- Monitoring of term deposits
- Access to loan statements
- Access to card statements
- Mutual funds / equity statements
- Insurance policy management
- Pension plan management

Payments & Transfers

- Domestic and international fund transfers
- Micro – payment handling
- Mobile recharging
- Commercial payment processing
- Bill payment processing

Investments

- Portfolio management services
- Real – time stock quotes
- Personalized alerts and notifications on security prices

Support

- Status of requests for credit, including mortgage approval, and insurance coverage
- Check (cheque) book and card requests
- Exchange of data messages and email, including complaint submission and tracking

Content Services

- General information such as weather updates, news
- Loyalty – related offers
- Location – based services

One way to classify these services depending on the originator of a service session is the ‘Push/Pull’ nature. ‘Push’ is when the bank sends out information based upon an agreed set of rules. For example your bank sends out an alert when your account balance goes below a threshold level. ‘Pull’ is when the customer explicitly requests a service or information from the bank, so a request for your last five transactions statement is a pull based offering.

The other way to categorize the mobile banking service, gives us two kind of services – Transaction based and Enquiry Based. So a request for your bank statement is an enquiry based service and a request for your fund’s transfer to some other account is a transaction – based service. Transaction based services are also differentiated from enquiry based services in the sense that they require additional security across the channel from the mobile phone to the banks data servers.

	Push Based	Pull Based
Transaction Based		• Fund Transfer • Bill payment • Other financial services like share trading
Enquiry Based	• Credit/ Debit Alerts • Minimum Balance Alerts • Bill Payment alerts	• Account Balance Enquiry • Account Statement Enquiry • Cheque Status Enquiry • Cheque Book Requests • Recent transaction History

Conclusion

Mobile banking has the potential to do to the mobile phone what E-mail did to the Internet. Mobile Application based banking is poised to be a big m-commerce feature, mobile phones. Nevertheless, Bank’s need to take a hard and deep look into the mobile usage patterns among their target customers and enable their mobile services on a technology with reaches out the majority of their customers.

22. THE EFFECT OF DIGITAL MARKETING ON CUSTOMER BUYING DECISIONS : A STUDY

S. Manjula
Research Scholar

Dr. S. Krithiga Maheswari
Assistant Professor and Research Supervisor
PG and Research Department of Commerce (General)
Shri Krishnaswamy College For Women
Anna Nagar Chennai-40

ABSTRACT

Digital marketing involves the promotion of brands or products through one or more forms of electronic media. This study examines the Effect of Digital Marketing on Customer Buying Decisions. The main objectives are to assess consumer awareness and satisfaction with products purchased via digital marketing. Data was collected from 50 respondents and analyzed using statistical methods, including percentage analysis and the chi-square test. The study concludes that consumers are generally satisfied with their purchasing decisions made through digital marketing channels.

Keywords:

Digital marketing, digital channels, consumer behavior, product satisfaction

INTRODUCTION

Digital marketing refers to the promotion of brands, products, or services through one or more forms of electronic media. It is an umbrella term for targeted, measurable, and interactive marketing strategies that use digital technologies—primarily the internet, but also mobile phones, display advertising, and other digital platforms—to reach consumers.

Digital marketing encompasses a wide range of techniques, including:

- **Search Engine Optimization (SEO)**
- **Search Engine Marketing (SEM)**
- **Link Building**
- **Email Marketing**
- **Affiliate Marketing**
- **Influencer Marketing**
- **Social Media Marketing (SMM)**
- **Pay-Per-Click Advertising (PPC)**
- **Online Advertising**

In addition to internet-based channels, digital marketing also extends to non-internet mediums such as:

- Mobile phones (via SMS, MMS)
- Digital media (including on-hold mobile ringtones and call-back services)
- E-books and digital publications
- Video games
- Optical disks
- Other forms of digital content delivery

Overall, digital marketing is defined as the use of digital channels to market products and services to consumers and businesses. It enables brands to connect with their target audience in real time, offering a cost-effective and data-driven approach to marketing.

OBJECTIVES OF THE STUDY

- **To understand how demographic factors influence the types of products purchased through digital channels.**
- **To examine consumer awareness of digital marketing.**
- **To analyze the influence of digital marketing on consumer purchasing decision.**

METHODOLOGY APPLIED

Primary Data:

The study was conducted through observation and data collection using questionnaires. A questionnaire consists of a series of questions, either printed or typed, arranged in a defined order on a form or set of forms.

The study utilized various types of questions, including:

- **Open-ended questions**
- **Closed-ended questions**
- **Multiple-choice questions**
- **Likert scale-based questions**

These question types helped gather both qualitative and quantitative data, allowing for a comprehensive analysis of the research subject.

Secondary Data: Secondary data is collected from existing sources such as articles, books, journals, and magazines. This data is used to support and develop the theoretical framework of the study.

Sample size: A sample size of 50 respondents was selected from among customers currently purchasing the product via digital marketing.

Statistical tools:

The data collected was analyzed with appropriate tools used for this research are.

- Percentage analysis
- Chi-square test

LIMITATION OF THE STUDY

□ **Time Constraints:**

Time was a major limitation, as the topic required a thorough and considerable amount of time for in-depth analysis and research.

□ **Limited Respondents:**

The researcher was only able to collect data from a limited number of respondents, which may affect the generalizability of the findings.

ADVANTAGES OF DIGITAL MARKETING

Digital marketing offers several key advantages, with one of the most significant being the ability to reach a targeted audience in a measurable and cost-effective manner. It enables businesses to drive online sales, build brand loyalty, and engage with customers in real time. Some major benefits of digital marketing include global reach, lower costs compared to traditional marketing, and the ability to track and measure results effectively. It also allows for personalization of content, transparency in campaigns, and the creation of social currency through shareable content. Additionally, digital marketing helps improve conversion rates, enhances overall marketing strategies, and provides great exposure across various digital platforms.

TRADITIONAL MARKETING VS DIGITAL MARKETING

Traditional marketing communication is typically **unidirectional**, meaning it involves one-way communication from the business to the audience. In contrast, **digital marketing communication is bidirectional**, allowing for interactive engagement between businesses and consumers.

Traditional marketing relies on mediums such as **letters, phone calls, and print advertisements**, while digital marketing utilizes platforms like **social media, websites, email, and online chat**.

Measuring the **effectiveness** of a traditional marketing campaign is often challenging due to the lack of precise data. However, digital marketing provides **easier and more accurate measurement** through tools like analytics and real-time tracking.

In terms of audience reach, traditional marketing is better suited for **local targeting**, whereas digital marketing allows businesses to connect with a **global audience** efficiently.

Traditional marketing is generally considered **outbound marketing**, where businesses push messages to consumers. Digital marketing, on the other hand, is **inbound marketing**, where consumers are attracted through engaging content and strategies.

While traditional marketing involves **one-way communication**, digital marketing facilitates **two-way conversations**, encouraging feedback and interaction. Lastly, traditional marketing tends to be **more expensive and time-consuming**, whereas digital marketing is **more cost-effective** and promotes products and services **quickly and efficiently**.

REVIEW OF LITERATURE

Smith and Rupp (2003) found that demographic variables, including age, gender, education, and income, significantly affect consumer responsiveness to digital marketing. For instance, younger consumers are more likely to engage with social media-based promotions, while older consumers may rely more on informational content such as product reviews or comparison tools.

Sathya (2015) the study examined impact of digital marketing on consumer purchase, the main objective of this study is recognize the usefulness of digital marketing in the competitive purchase and the study found that 100 respondents opinion are collected. The study concluded that digital marketing may achieve something more if it considers consumer desires as a peak priority.

Mahalaxmi and Ranjith (2016) the study evaluated the implicated of digital marketing in consumer purchase decision. The study focused on aware of digital marketing and channels influence in their purchase decision the study found that survey form 50 respondents. The study concluded that wider geographical area to obtain more accurate result.

Kotler and Keller (2016) emphasize that digital marketing enables brands to deliver tailored content to specific target audiences, improving engagement and ultimately influencing buying behavior. Digital tools such as email marketing, social media advertising, and search engine optimization (SEO) allow

Solomon et al. (2018) assert that digital platforms heavily influence the consumer decision-making process, especially during the evaluation and purchase phases. Factors such as online reviews, testimonials, and influencer endorsements serve as powerful triggers in the final decision-making stage.

Kumar and Gupta (2019) observed a rising awareness among consumers regarding various digital marketing strategies, including influencer marketing, pay-per-click

advertising, and remarketing. Their study indicates that increased awareness often results in more informed and rational purchasing decisions.

Chaffey and Ellis-Chadwick (2019) argue that online marketing enhances visibility and builds brand awareness by delivering timely, relevant messages, which play a critical role in influencing consumer decisions.

Sharma and Sheth (2020) support this view, stating that demographic characteristics influence the types of products purchased online. Higher-income and better-educated consumers often show a stronger preference for digital purchasing due to their access to technology and familiarity with online platforms.

Jain & Khan (2020) conducted a literature-based review within the Indian context, highlighting how the evolution of digital marketing—via email campaigns, pay-per-click advertising, social media, blogs, and mobile platforms—has driven changes in consumer buying behavior.

Kalra, Sharma, & Patel (2023) focused on youth (millennials and Gen Z), revealing that social media marketing exerts substantial influence on their purchasing decisions. Young consumers are significantly more affected by digital marketing tactics compared to older generations.

Mahalakshmi & Soumya (2025) explored how AI-powered personalization, real-time engagement, social media, e-commerce, and content marketing influence consumer purchasing behavior. Their empirical study—based on questionnaire data and chi-square testing—confirmed that various digital marketing channels significantly shape consumer decisions.

ANALYSIS AND INTERPRETATION

**TABLE NO (1)
DEMOGRAPHIC**

S.NO	DEMOGRAPHIC FACTOR	CATEGORY	NO OF RESPONDENTS	PERCENTAGE (%)
1	Gender	Male	32	64
		Female	18	36
		TOTAL	50	100
2	Age group	Below 20 years	12	24
		21-30 years	24	48
		31-40 years	6	12
		Above 41 years	8	16
		TOTAL	50	100
3	Educational qualification	Graduation	16	32
		Post-graduation	17	34
		MPhil-PhD	5	10
		Others	12	24

	TOTAL	50	100
4	Monthly family income		
	Below 10000	13	26
	10001-20000	10	20
	20001-40000	15	30
	Above 40000	12	24
	TOTAL	50	100

INTERPRETATION

From the above table, it can be inferred that 64% of the respondents are male, and 36% are female. Regarding age groups, 24% of respondents are below 20 years, 48% are between 21 and 30 years, 12% are between 31 and 40 years, and 16% are above 41 years. In terms of educational qualification, 32% of the respondents have completed graduation, 34% have completed post-graduation, 10% hold an MPhil or PhD, and 24% belong to other educational categories.

TABLE NO (2)

AWARENESS OF DIGITAL MARKETING

S.NO	AWARENESS OF DIGITAL MARKETING	NO OF RESPONDENTS	PERCENTAGE (%)
1	Knowledge person only to use the online shopping	34	68
2	Without knowledge person also use the online shopping	16	32
	TOTAL	50	100

INTERPRETATION

The above table shows that 68% of the respondents are aware of knowledgeable persons who use digital marketing, while 32% of the respondents are not aware of such persons.

TABLE NO (3)

AVAILABILITY OF ONLINE INFORMATION ABOUT PRODUCT

S.NO	AVAILABILITY OF ONLINE INFORMATION ABOUT PRODUCT	NO OF RESPONDENTS	PERCENTAGE (%)
1	Excellent	26	52
2	Good	15	30
3	Average	5	10
4	Poor	4	8
	TOTAL	50	100

INTERPRETATION

The table shows that 52% of respondents rated the availability of online product information as excellent, 30% rated it as good, 10% as average, and 8% as poor.

CHI-SQUARE TEST

TABLE NO (4)

Gender and product satisfied in digital channel

To find out the significant relationship between gender and product satisfied in digital channel.

Null Hypothesis (H₀): There is no significant relationship between gender and product satisfaction in digital marketing.

Alternative Hypothesis (H₁): There is a significant relationship between gender and product satisfaction in digital marketing.

<u>Product satisfied in digital channel</u>	<u>Highly satisfied</u>	<u>Satisfied</u>	<u>Neutral</u>	<u>Dissatisfied</u>	<u>Highly dissatisfied</u>	
Gender						
Male	13	12	4	1	2	32
Female	5	5	6	1	1	18
Total	18	17	10	2	3	50

Chi-square analysis

Observes frequency	Expected frequency	(O_i-E_i)²/ E_i
13	11.52	0.1927
12	10.88	0.1148
4	6.4	0.9
1	1.28	0.0609
2	1.92	0.333
5	6.49	0.342
5	6.12	0.204
6	3.6	1.6
1	1.8	0.592
1	1.00	0
Total		4.3364

Calculated value = 4.3364

Degree of freedom= (r-1) (c-1)

= (2-1) (5-1) = 4

The table value of x² for 4 degree of freedom at 5% level of significance is 9.488.

Result: Hypothesis accepted.

Decision: The personal factor (gender) relationship with product satisfied in digital channel. The calculated value is less than the table value. So, H₀ is accepted. Hence we concluded that there is no significant relationship between gender and product satisfied in digital channel.

CHI-SQUARE TEST

TABLE NO (5)

Awareness of digital marketing and channel of digital marketing strategy

To find out the significant relationship between level of awareness of digital marketing and channel of digital marketing strategy

Null Hypothesis (H₀₂): Consumers have a low level of awareness of digital marketing strategies used by businesses.

Alternative Hypothesis (H₂): Consumers have a moderate to high level of awareness of digital marketing strategies used by businesses.

CHANNEL OF DIGITAL MARKETING STRATEGIES	Email marketing.	Mobile marketing.	Social media marketing.	Pay-per-click.	TOTAL
AWARENESS OF DIGITAL MARKETING					
Knowledge person only to use the online shopping	6	14	10	4	34
Without knowledge person also use the online shopping	3	7	5	1	16
Total	9	21	15	5	50

Chi-square analysis

Observed frequency	Expected frequency	$(O_i - E_i)^2 / E_i$
6	6.12	0.12
14	14.28	0.005
10	10.2	0.0039
4	3.4	0.105
3	2.88	0.005
7	6.72	0.7616
5	4.8	0.008
1	1.6	0.225
Total		1.2335

Calculated value = 1.2335

Degree of freedom = (r-1) (c-1)

= (2-1) (4-1) = 3

The table value of χ^2 for 3 degree of freedom at 5% level of significance is 7.815.

Result: Hypothesis accepted.

Decision: The study aimed to examine the relationship between consumer awareness and the digital marketing strategies employed by businesses. Based on the statistical analysis, the **calculated value was found to be less than the table (critical) value**, leading to the

acceptance of the null hypothesis (H_{02}). This indicates that there is **no significant relationship** between consumer awareness and the specific digital marketing channels used. Consequently, it can be concluded that **consumers generally exhibit a low level of awareness** regarding the digital marketing strategies adopted by businesses.

FINDINGS

PERCENTAGE ANALYSIS

- Majority 64% of the respondents were male.
- Majority 48% of the respondents were in the age group of 21-30 years.
- Majority 34% of the respondents were post-graduate.
- Majority 30% of the respondents have monthly family income 20001-40000.
- Majority 64% of the respondent's awareness of digital marketing.
- Majority 52% of the respondents' availability online informance about product.

CHI-SQUARE TEST

- The personal factor (gender) relationship between product satisfactions using in digital marketing. The calculated value lesser than the table value. So hypothesis accepted. Hence we concluded that there is no signification relationship between gender and product satisfaction in digital marketing.
- The study aimed to examine the relationship between consumer awareness and the digital marketing strategies employed by businesses. Based on the statistical analysis, the **calculated value was found to be less than the table (critical) value**, leading to the **acceptance of the null hypothesis (H_{02}).** This indicates that there is **no significant relationship** between consumer awareness and the specific digital marketing channels used. Consequently, it can be concluded that **consumers generally exhibit a low level of awareness** regarding the digital marketing strategies adopted by businesses.

SUGGESTION

- ❖ **Focus on Universal Appeal in Marketing Campaigns** Since gender does not significantly affect product satisfaction, businesses can design **gender-neutral marketing strategies** that appeal broadly across demographics. This allows for more inclusive messaging and efficient resource allocation.
- ❖ **Enhance Personalization Without Over-Segmentation** With consumers generally satisfied with digital marketing, companies should continue using **personalized**

recommendations, but avoid excessive segmentation based on demographics that may not influence satisfaction.

- ❖ **Invest in Consumer Education and Transparency** To maintain and grow positive sentiment, businesses should provide **clear information** about products, pricing, and data usage. This builds trust and encourages informed purchasing decisions.
- ❖ **Leverage Social Media and Influencer Channels** Given the favorable impact of digital marketing, brands should strengthen their presence on **social platforms**, using influencers and interactive content to boost engagement and drive conversions.
- ❖ **Monitor and Optimize Digital Touch points** regularly assess the performance of digital campaigns using **consumer feedback and analytics**. This helps refine strategies to better align with consumer expectations and satisfaction metrics.
- ❖ **Explore Other Demographic Factors** Since gender showed no significant impact, businesses might explore other variables like **age, income, or education level** to uncover more targeted insights for future campaigns.

CONCLUSION

This study employed chi-square tests to explore key relationships within the context of digital marketing. Two primary hypotheses were tested:

1. **Gender and Product Satisfaction:** The analysis revealed that the **calculated chi-square value was less than the critical table value**, leading to the **acceptance of the null hypothesis**. This indicates that there is **no statistically significant relationship** between gender and product satisfaction in the context of digital marketing. In other words, **product satisfaction levels do not vary meaningfully across gender groups**.
2. **Consumer Awareness and Digital Marketing Channels:** Similarly, the chi-square test showed that the **calculated value was lower than the table value**, resulting in the **acceptance of the null hypothesis (H_{02})**. This suggests that there is **no significant relationship** between consumer awareness and the specific digital marketing channels used by businesses. Thus, it can be concluded that **consumers generally have a low level of awareness** regarding the digital marketing strategies employed.

Overall Implication: The findings highlight that **personal demographic factors like gender** and **channel-specific marketing efforts** may not significantly influence consumer satisfaction or awareness in digital marketing. Businesses may need to **rethink their targeting and engagement strategies**, focusing more on **content relevance**,

personalization, and consumer education rather than relying solely on demographic segmentation or platform choice.

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23. A STUDY ON EFFECT OF IMPLEMENTATION OF AI TECHNOLOGIES IN VENDOR AND SUPPLIER MANAGEMENT

R. Jayaravitha,

Asst Professor

Department of BBA

Soka Ikeda College of Arts & Science for women, Chennai.

Abstract:

The purpose of the study is to check the effectiveness of implementation of Ai in vendor and supplier management in retaining and satisfying customers with reference to various private Organisation. This study shows that Vendor relationship and supplier management has significant effect on the customer satisfaction and both variables have positive relation. This research confirms the vendor and supplier management is a complex concept requiring appropriate business process and integrated systems. In addition, the study demonstrates the relevance of the need for effective leadership, sourcing, communication and evaluation within vendor and supplier management.

With this purpose, descriptive research is adopted that will include a content analysis of the various private organisations in Chennai and samples were collected through convenient sampling. The population involved in this research is various corporates who have implemented AI technologies in vendor and supplier management. Collected data is interpreted through various statistical tools. The result of this study indicates, in a highly competitive market, companies need to maintain and updated AI technologies to have a positive relationship with their customers to satisfy them and retain them permanently.

INTRODUCTION OF CRM:

In the contemporary business landscape, efficient vendor and supplier management is a critical determinant of organizational competitiveness, cost optimization, and supply chain resilience. Traditionally, these functions have relied heavily on manual processes, human judgment, and transactional record-keeping. However, the advent of Artificial Intelligence (AI) technologies has introduced transformative possibilities for streamlining operations, enhancing decision-making, and fostering stronger collaborative relationships with vendors and suppliers.

AI-enabled tools such as predictive analytics, machine learning algorithms, natural language processing, and robotic process automation are revolutionizing how organizations assess supplier performance, forecast demand, negotiate contracts, and mitigate risks. By automating repetitive tasks, providing real-time insights, and enabling data-driven decision-making, AI technologies offer the potential to improve efficiency, reduce operational costs,

and enhance supply chain transparency. Furthermore, AI-driven platforms can proactively identify disruptions, optimize procurement strategies, and support sustainable sourcing practices, thereby contributing to long-term business growth.

As industries increasingly adopt AI to manage complex supplier networks, understanding its tangible effects becomes essential for both practitioners and scholars. This study aims to explore the impact of AI implementation in vendor and supplier management, focusing on operational efficiency, relationship management, cost-effectiveness, and strategic decision-making. The findings are expected to provide valuable insights into best practices, challenges, and the future trajectory of AI adoption in procurement and supply chain management.

OBJECTIVES OF THE STUDY:

- To determine the activity of a longer role in the implementation of AI technologies in vendor and supplier management.
- To explain how to use CRM by Organizations in achieving customer satisfaction and loyalty, which lead to retain the name of the organisation and its products.
- **To examine** the extent to which AI technologies are adopted in vendor and supplier management processes.
- **To evaluate** the impact of AI implementation on operational efficiency, accuracy, and decision-making in procurement activities.
- **To analyse** how AI-driven tools influence supplier relationship management, collaboration, and communication.

RESEARCH METHODOLOGY:

Research methodology is a way of systematically solving the research problem. Descriptive research design is used to present the study. The sample size is 100 and sample area private organisations. The primary data used in the study is collected using self-administered questionnaire and secondary data is collected using journals, books and websites. The data is collected using convenient sampling technique. The collected data is initially classified and tabulated through percentage analysis and is it further analysed using statistical tools such as simple percentage analysis, weighted average, column chart and Karl Person's correlation.

REVIEW OF LITERATURE:

1. **Kamble, Gunasekaran & Sharma (2019)** highlighted that AI-powered analytics in procurement significantly enhance supply chain visibility, enabling organizations to

anticipate disruptions and optimize vendor selection. Their study found that predictive models improved forecasting accuracy by over 20%.

2. **Choi, Wallace & Wang (2020)** discussed how machine learning algorithms facilitate supplier performance evaluation by analyzing historical data, transaction patterns, and quality metrics, thus enabling data-driven decisions and stronger supplier relationships.
3. **Baryannis, Dani & Antoniou (2019)** emphasized AI's role in risk management, noting that natural language processing tools can scan global news, reports, and social media to detect early warning signs of supplier or market instability.
4. **Sivathanu & Pillai (2020)** found that AI adoption in procurement not only streamlines routine tasks through automation but also frees up managerial time for strategic negotiations, improving cost savings and cycle time efficiency.

DATA ANALYSIS AND INTERPRETATION:

Demographic characteristics of respondents

Particulars	Classification	No of Respondents	Percentage (%)
Age	20-30	10	10%
	30-40	60	60%
	Above 40	30	30%
Gender	Male	70	70%
	Female	30	30%
	UG	70	70%
Qualification	PG	30	30%
	5 – 10 years	30	30%
Experience	Above 10 years	70	70%

Rate the factors which influence the Organisation's growth through implementation of various AI technologies in vendor and supplier management:

Particulars	Response	Weight
The increase in profitability	10	3
The growth of the labour productivity	13	2
Reduce marketing cost	15	5
Achieving customer satisfaction	17	9
Increase in customer retention rate	20	8
Increase the quality of service provided to customers	25	10

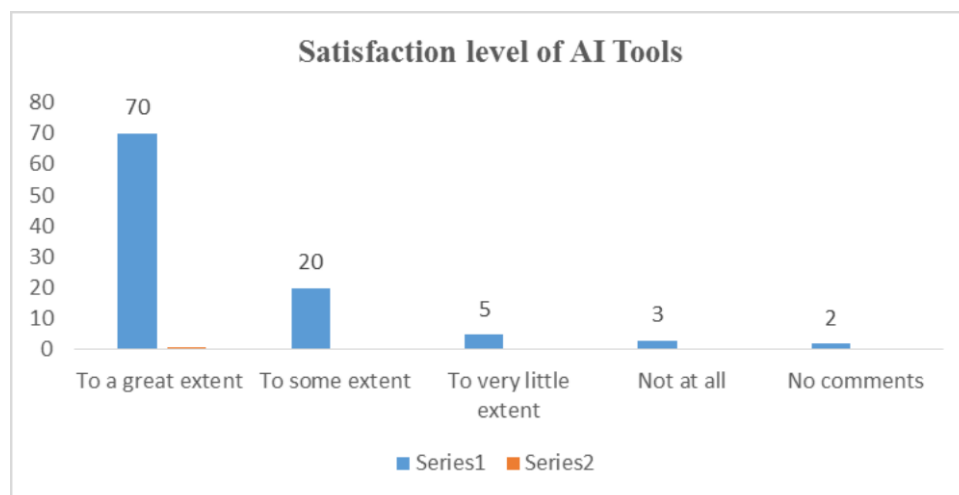
Weighted Average = 18.75676

Inference:

Through this research, came to know that due to implementation Various AI technologies, there will be reasonable growth for the organization in all aspects.

Do you think that that the AI driven tools influence supplier relationship management, collaboration and communication?

Particulars	No. of. Respondents	Percentage (%)
To a great extent	70	70%
To some extent	20	20%
To very little extent	5	5%
Not at all	3	3%
No comments	2	2%
Total	100	100%



INFERENCE:

This study reveals that, maximum number of employees are believing that AI driven tools influences the supplier management.

“AI technologies are extensively used in my organization’s vendor and supplier management processes”

Particulars	Productivity	Profit
Strongly agree	60	70
Agree	20	20
Neutral	15	5
Disagree	3	4
Strongly Disagree	2	1
Total	100	

H0: There is a positive Relationship between system increases productivity as well as profit of your organisation

H1: There is a negative Relationship between system increases productivity as well as profit of your organisation

Correlation = 0.983235

Ho is accepted.

Inference:

From the above table it is understood that implementation of AI tools in vendor and supplier management will increase productivity as well as profit of the organisation.

FINDINGS:

The study reveals that most respondents fall within the mid-career age group, with a balanced mix of male and female participants, the majority holding undergraduate qualifications and possessing substantial work experience. Analysis indicates that the implementation of AI technologies in vendor and supplier management contributes to organizational growth in multiple dimensions, including profitability, productivity, cost reduction, customer satisfaction, retention, and service quality.

Respondents widely acknowledged that AI-driven tools significantly influence supplier relationship management, collaboration, and communication, fostering more efficient and transparent operations. Furthermore, the correlation analysis confirms a strong positive relationship between the adoption of AI systems and the simultaneous improvement in both productivity and profitability, underscoring the strategic value of integrating AI technologies into procurement and supply chain processes.

CONCLUSION:

The study concludes that the integration of AI technologies into vendor and supplier management plays a pivotal role in enhancing overall organizational performance. By streamlining processes, improving decision-making, and fostering stronger supplier relationships, AI-driven tools contribute to greater efficiency, cost-effectiveness, and long-term competitiveness. The findings highlight that AI adoption not only boosts productivity and profitability but also supports improved collaboration, communication, and customer satisfaction. As organizations increasingly operate in dynamic and complex supply chain environments, the effective implementation of AI emerges as a strategic necessity for sustaining growth and achieving operational excellence.

24. A STUDY ON IMPACT OF DIGITAL MARKETING PURCHASING CUSTOMERS DECISION

S. Manjula

Research Scholar,
Department of commerce,
Shri Krishnaswamy college for women
Affiliated to University of madras,

ABSTRACT

Digital marketing is brands or promotion of product via one or more form of electronic media. The study of paper is impact of digital marketing purchasing customer's decision. The main objective of study is awareness and product satisfied to bought in digital marketing. The study collect the 50 respondents and use statistical analysis for percentage, chi-square, are founded. The study concluded that consumer satisfied the purchasing decision in digital marketing or channels.

Key words:

Digital marketing, digital channel, consumer, product

INTRODUCTION

Digital marketing is brands or promotion of products via one or more forms of electronic media. Digital marketing is an umbrella term for the measurable, targeted, and interactive marketing of service or product using mainly on the internet, digital technologies but also included display advertising, mobile phones, and other digital medium to reach consumer.

Digital marketing includes internet marketing techniques, such as search engine marketing (SEM), search engine optimization (SEO), and are link building. E-mail marketing, Affiliate marketing, Influencer marketing, social media marketing, pay per click (PPC), and online advertising. It also extend to non-internet channels that provide mobile phones (both SMS & MMS) such as digital media, on- hold mobile ringtones, display advertising, call back, social media marketing, e-books, games, and optical disks and another form of digital marketing.

Digital marketing defines that the use of market products and services or digital channels to promote the consumer & business.

OBJECTIVES OF THE STUDY

- To know about the utilizing digital channel bought kind of product.
- To examined the awareness of digital marketing on consumer.
- To analyze the influenced to digital marketing in purchasing decision.

METHODOLOGY APPLIED

Primary Data:

The study on research is done through the observation and collection of data in questionnaires. Questionnaire consists of a number of questions printed or typed in a defined order on a form or set of forms. The different types of questions used for the study are

- Open ended,
- Closed ended and
- Multiple choice questions.
- And they use linker-point scale also.

Secondary Data:

Secondary data is collected by the articles books, journals, magazines to develop the theory.

Sample size:

The sample size is determined as 50 respondent's opinion from the customers who purchasing product presently with a help of digital marketing.

Statistical tools:

The data collected was analyze with appropriate to the tools used for this research are.

- Percentage analysis
- Chi-square test

LIMITATION OF THE STUDY

- Time was the biggest limitation to the topic required a through considerable amount of time.
- The researcher to collect the data form the limited respondent's only.

ADVANTAGES OF DIGITAL MARKETING

Digital marketing is the main advantages of targeted audience can be reached in a measurable and cost-effective way. Other advantages of digital marketing include driving on line sales and brand loyalty. The benefits of digital marketing included the Global reach, lower cost, Track able, measureable results, personalization, openness, social currency, improved conversion rates, enhances your marketing strategy, great exposure.

TRADITIONAL MARKETING VS DIDITAL MARKETING

Traditional marketing communication is unidirectional and digital marketing communication is bidirectional. Traditional marketing communicate is general medium of

letters, email, phone calls and digital marketing communicate is mostly medium through social media, chat, web sites and email. Tradition marketing is measuring difficult to effectiveness of a campaign and digital marketing is measuring easier to effectiveness of a campaign through analytics. Traditional marketing is a local audience of best reaching and digital marketing is a global audience of best reaching. Traditional marketing is outbound marketing answered and digital marketing is inbound answered. Traditional marketing is one way conversation and digital marketing is two ways conversation. Traditional marketing is expensive and time consuming process and digital marketing is a cheap and promote the product and service in rapid way.

REVIEW OF LITERATURE

Sathya (2015) the study examined impact of digital marketing on consumer purchase, the main objective of this study is recognize the usefulness of digital marketing in the competitive purchase and the study found that 100 respondents opinion are collected. The study concluded that digital marketing may achieve something more if it considers consumer desires as a peak priority.

Mahalaxmi and Ranjith (2016) the study evaluated the implicated of digital marketing in consumer purchase decision. The study focused on aware of digital marketing and channels influence in their purchase decision the study found that survey form 50 respondents. The study concluded that wider geographical area to obtain more accurate result.

ANALYSIS AND INTERPRETATION

TABLE NO (1)
DEMOGRAPHIC

S.NO	DEMOGRAPHIC FACTOR	CATEGORY	NO OF RESPONDENTS	PERCENTAGE (%)
1	Gender	Male	32	64
		Female	18	36
		TOTAL	50	100
2	Age group	Below 20 years	12	24
		21-30 years	24	48
		31-40 years	6	12
		Above 41 years	8	16
		TOTAL	50	100
3	Educational qualification	Graduation	16	32
		Post-graduation	17	34
		MPhil-PhD	5	10
		Others	12	24
		TOTAL	50	100
4	Monthly family income	Below 10000	13	26
		10001-20000	10	20

20001-40000	15	30
Above 40000	12	24
TOTAL	50	100

INTERPRETATION

From the above table it is inferred that 64% of the respondents are male, and 36% of the respondents are female. 24% were in the age group of below 20 years, 48% were in the age group of 21-30, 12% were in the age group of 31-40, and 16% were in the age group of above 41 years. 32% of the respondents were graduations, 34% of the respondents were post- graduations, 10% of the respondents were MPhil or PhD, and 24% of the respondents were others. 26% of the respondents have monthly family income, 20% of the respondents have monthly family income, 30% of the respondents have monthly family income, and 24% of the respondent have monthly family income.

TABLE NO (2)

AWARENESS OF DIGITAL MARKETING

S.NO	AWARENESS OF DIGITAL MARKETING	NO OF RESPONDENTS	PERCENTAGE (%)
1	Knowledge person only to use the online shopping	32	64
2	Without knowledge person also use the online shopping	18	36
	TOTAL	50	100

INTERPRETATION

The above table show that out of 64% of the respondents are aware knowledge person to use digital marketing and 36% of the respondent are without aware the knowledge person.

TABLE NO (3)

AVAILABILITY OF ONLINE INFORMATION ABOUT PRODUCT

S.NO	AVAILABILITY OF ONLINE INFORMATION ABOUT PRODUCT	NO OF RESPONDENTS	PERCENTAGE (%)
1	Excellent	26	52
2	Good	15	30
3	Average	5	10
4	Poor	4	8
	TOTAL	50	100

INTERPRETATION

The above table portrays 52% of the respondents to excellent in availability of information online product, 30% of the respondents to good online product information availability, 10% of the respondents to average and 8% of the respondents to poor availability of information to online product.

CHI-SQUARE TEST

TABLE NO (4)

Gender and product satisfied in digital channel

To find out the significant relationship between gender and product satisfied in digital channel.

H₀: There is no significant relationship between gender and product satisfied in digital channel.

H₁: There is significant relationship between gender and product satisfied in digital channel.

Product satisfied in digital channel Gender	Highly satisfied	Satisfied	Neutral	Dissatisfied	Highly dissatisfied	
Male	13	12	4	1	2	32
Female	5	5	6	1	1	18
Total	18	17	10	2	3	50

Chi-square analysis

Observed frequency	Expected frequency	Chi-square
13	11.52	0.1927
12	10.88	0.1148
4	6.4	0.9
1	1.28	0.0609
2	1.92	0.333
5	6.49	0.342
5	6.12	0.204
6	3.6	1.6
1	1.8	0.592
1	1.00	0
Total		4.3364

Calculated value = 4.3364

Degree of freedom = (r-1) (c-1)

= (2-1) (4-1) = 4

The table value of χ^2 for 4 degree of freedom at 5% level of significance is 9.488.

Result: Hypothesis accepted.

Decision: The personal factor (gender) relationship with product satisfied in digital channel.

The calculated value is less than the table value. So, H₀ is accepted. Hence we concluded that there is no significant relationship between gender and product satisfied in digital channel.

FINDINGS

PERCENTAGE ANALYSIS

- Majority 64% of the respondents were male.
- Majority 48% of the respondents were in the age group of 21-30 years.
- Majority 34% of the respondents were post-graduate.
- Majority 30% of the respondents have monthly family income 20001-40000.
- Majority 64% of the respondent's awareness of digital marketing.
- Majority 52% of the respondents' availability online informance about product.

CHI-SQUARE TEST

- The personal factor (gender) relationship between product satisfactions using in digital marketing. The calculated value lesser than the table value. So hypothesis accepted. Hence we concluded that there is no signification relationship between gender and product satisfaction in digital marketing.

CONCLUSION

The study evaluated impact digital marketing purchasing customer's decision and the objective of awareness of digital marketing, product satisfied is using digital marketing. The study collect that survey 50 respondents and finding the percentage analysis, and chi-square test. The study concluded that consumer satisfied the digital marketing in purchasing decision.

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25. CORPORATE GOVERNANCE APPROACHES TO ADDRESS BIAS IN AI RECRUITMENT: INSIGHTS FROM THE ATTRACTION–SELECTION– ATTRITION (ASA) MODEL

DR. K. Sumathi
Assistant Professor,

MS. Taarika R
UG Final Year,
Department of Commerce (Honours),
Shri Shankarlal Sundarbai Shasun Jain College for Women.

ABSTRACT

Artificial Intelligence (AI) has revolutionized the recruitment process by enhancing faster candidate sourcing, predictive analytics and data-driven shortlisting. But historical data bias can affect it, which leads to unequal opportunities for the genders that are not well represented. A governance-focused framework that changes Benjamin Schneider's Attraction, Selection, and Attrition (ASA) model to deal with bias at every level and encourage hiring results that are more inclusive and diverse. So, by using corporate governance methods in ethical AI recruiting, companies may keep their commitments to diversity, equity, and inclusion (DEI) while still employing fairly and quickly.

Keywords:

ASA model, AI recruitment, diversity, inclusivity, corporate governance, and historical data.

INTRODUCTION

Artificial intelligence (AI) imitates human intelligence to facilitate decision making. Its main focus is on expert systems that continuously learn and gather new data through the use of machine vision, speech recognition, and natural language processing (Camilleri, 2024). AI hiring tools make the process faster and more efficient. From automated video interviews to resume screening, these tools are gradually taking the place of human decision-making in HR-related tasks. But there is evidence that AI may be affected by human biases that are built into the way algorithms are made and the data they use. Corporate governance needs to be involved in AI legislation.

According to the person-oriented model developed by B. Schneider in 1987, the collective traits of individuals that emerge from a cycle of attraction, selection, and attrition over time define organizational behaviour (SCHNEIDER et al., 1995). When it was created

in the 1980s, it reflected the corporate culture that was controlled by men at the time. To encourage diversity in the AI era, this concept needs to be reconsidered.

PURPOSE OF THE STUDY

The objective of the research is to investigate into how corporate governance measures could help reduce gender bias in AI hiring by changing the ASA model to include ethical and inclusive practices.

STATEMENT OF PROBLEM

AI in recruiting has the potential to perpetuate historical gender prejudice, resulting in homogeneity and marginalization of female applicants, particularly when matched with the ASA model, and, without corporate governance control, it can undercut inclusivity and diversity goals.

OBJECTIVES OF THE STUDY

1. To examine how bias in AI affects ethical recruitment in HR and corporate governance.
2. To explore how corporate governance strategies can mitigate bias in AI tools.

METHODOLOGY OF THE STUDY

The study uses secondary data, which means it gets information from existing sources, including academic publications, case studies, articles, reports, and more. This method gives an exhaustive overview of the bias in AI. The study examines five important case studies to find patterns of bias and gaps, and then it suggests a conceptual framework.

REVIEW OF LITERATURE

Wen et al., (2025) The study titled “FAIRE: Assessing Racial and Gender Bias in AI-Driven Resume Evaluations” explains how gender identification variations are taken into account by huge language models that analyze resumes. Resumes from a variety of businesses were assessed using the recently implemented FAIRE and LLM benchmarks.

Chaturvedi & Chaturvedi, (2025) The study titled, “Who gets the callback? generative ai and gender bias” explores the role of the recruiter's identity and the behavior model that we guide by including the Big Five personality traits and imitating historical individuals' perspectives. Stereotyping is seen to decrease with less agreeable personas, which is consistent with an agreeableness bias in LLMs.

Mujtaba & Mahapatra, (2025) The study titled, “Fairness in AI-Driven Recruitment: Challenges, Metrics, Methods, and Future Directions” reviewed the literature on algorithmic fairness in AI recruitment system, revealing the major challenges and issues at the intersection of AI, psychology and law. The study reviewed biases in AI recruitment and

highlights practical approaches of auditing in organization aiming to have equality in hiring opportunities.

Ms.Jebakerupa Roslin A & Dr.Biswo Ranjan Mishra, (2024) The study titled, “AI-powered Recruitment and Employee Selection: Evaluating Bias and Fairness in Hiring Practices” analyses the ethical considerations of AI recruitment. The research highlights how techniques of algorithms can increase the bias despite intentions of efficiency. Kotek et al., (2023) The study titled, “Gender bias and stereotypes in Large Language Models” investigates several contemporary LLMs behavior with respect to stereotypical gender assumptions. It demonstrated that they are 3 to 6 times more likely to predict the biases. The research predicted that LLMs often amplify the biases and calls for severe fairness examinations.

CONCEPTUAL FRAMEWORK

SOURCES OF BIAS IN AI RECRUITMENT

The key sources of the biases arising in the recruitment using AI involves biased dataset. Algorithm flaws and opaque decision processes. The historical data which represents the societal inequalities reflects male dominance in certain roles. This causes the AI to undervalue ‘the female candidates for such roles. The discriminatory patterns in the algorithm designs becomes a flaw as it lacks debiasing procedures during the development stage. Several AI models operate as black boxes which makes it hard to identify how decisions are made.

GOVERNANCE APPROACH

Benjamin Schneider’s 1987 Attraction, Selection and Attrition (ASA) model explains how organizations traditionally maintain cultural homogeneity. This model helps to maintain the organization's identity, but in the age of AI, it could unintentionally make prejudice worse if it fails to be used in a fair way. When you change this model of Attraction, Selection, and Attrition to include AI ethics in hiring:

1. **Attraction:** The first step in AI recruitment is attraction, which is based on the job description, algorithms, and target outreach. When AI platforms are educated on historical datasets that have bias, they may unintentionally stop applications from groups who are underrepresented. Governance solutions include requiring job postings to be free of bias, getting rid of gender-coded language, making the platforms more diverse, and expanding the range of sources. Regular language checks can be required to make sure that job postings encourage diversity, ethnicity, and inclusion.

2. **Selection:** AI algorithms sometimes analyse patterns from past recruiting data to rank the applicants. Without supervision, this can lead to the same biases and prejudices that have kept minority applicants off of shortlists in the past. The rules for governance must require that algorithms be checked by independent audits of AI hiring, that people be in charge of the final decisions made by the AI, and that the AI follows the rules of good corporate governance.
3. **Attrition:** The prejudice in hiring influences how likely it is that employees will stay with the organization. AI systems that are used to evaluate performance, keep track of promotions, or rate personnel may have biases that make some groups more likely to leave. AI analytics should be used by governance rules to keep an eye on retention patterns, find differences in pay and promotions, and start a strategy to fix any problems that are found. By adding monitoring methods, the companies can make sure that AI helps them reach their long-term diversity goals.

When ASA model is looked through the lens of AI ethics and corporate governance, hiring becomes a fair process that follows diversity, equality, and inclusion (DEI) rules.

Corporate Governance Strategies for Mitigating Bias in AI-Based Recruitment: An ASA Model Perspective



SUGGESTIONS FOR ETHICAL AI GOVERNANCE

- Regular bias audits: Conducting regular audits in multiple stages of recruitment to ensure the bias-free hiring by AI.
- Human oversight: Putting HR specialists to review the hiring process prior to decisions being made.
- Transparency: Vendors must disclose the sources of data, model design and the known limitations of the design.
- Inclusive data training: Using inclusive and diverse datasets to train the algorithms.
- Integration of Governance: Forming an AI review board in the organization to oversee the usage in HR recruitment.

LIMITATIONS OF THE STUDY AND SCOPE FOR FURTHER RESEARCH

- The study's ASA reframed model adoption to AI ethics remains conceptual and it requires empirical testing in real-world recruitment system. This limits the ability to measure practical outcomes of the model.
- The study focuses primarily on the gender bias in AI recruitment, without exploring the other forms biases such as age, disability and race which may also influence the hiring outcomes.

CONCLUSION

AI recruitment can increase efficiency and decrease human intervention, but bias in historical data might be a significant issue if governance measures are not in force. When recruitment is focused majorly on one gender, it gives rise to inequality in opportunity for the underrepresented gender. By reframing Benjamin Schneider's ASA model, a governance-oriented framework is created for the organization to proactively address bias and this ensures AI serves as a catalyst for inclusivity and diversity in the hiring process rather than a mechanism of exclusion.

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26. USING AI TO BRIDGE THE GAP BETWEEN ACADEMIC MARKETING RESEARCH AND DYNAMIC MARKET TRENDS.

RESEARCH PAPER

Nivetha. A & Janani. R
Department of [B.com (Information System Management)]
Valliammal College For Women

ABSTRACT:

In the midst of fast-paced business, academic marketing research finds it difficult to keep up with rapidly evolving market trends. The focus of this research is on the potential of Artificial Intelligence (AI) to link academic inquiry with actual market developments. Hence, with the help of machine learning, predictive analytics and natural language processing, AI technologies can quickly analyse consumer behaviour patterns, market sentiment, or emerging trends. Employing these tools as part of the research methodology can enhance the relevance, accuracy and timeliness of academic findings. Using mixed methods, this research examines the use of AI in marketing studies by analysing literature, discussing expert insights, and examining practical case studies. The objectives are to develop a system that aligns academic knowledge with industry necessities, leading to more dynamic and adaptable research. The study seeks to update current marketing methods and enhance their practical use in the business world.

INTRODUCTION:

In a changing marketplace, businesses must adapt to changes in consumer behaviour, emerging technologies, and competitive pressures. While marketing research in academia can provide significant methodological rigor and theoretical insights, it often falls short in meeting the fast-paced nature of real-world market dynamics. The divergence between academic investigation and practical implementation has raised serious questions about the usefulness and responsive nature of academic research in making timely marketing decisions.

The gap can be completely filled by Artificial Intelligence (AI). By analysing vast data sets, it can uncover patterns and generate predictive analytics that match academic models with market trends in real time. By incorporating AI-driven analytics into marketing theory, researchers and practitioners can jointly devise personalized strategies that are evidenced-based and responsive to consumer needs without compromising academic validity. It asserts that AI can serve as a mediator between academic marketing research and rapidly evolving markets. It examines the weaknesses of traditional methods for conducting market studies, assesses whether AI can improve markets and propose a hybrid model that fosters

collaboration between academia and industry by means of intelligent systems. Additionally, their goal is not only to make the case that AI can advance academic marketing research but also to create a more flexible, data-based structure for strategic Marketing.

OBJECTIVE:

1. To “study the current gap between academic marketing research and real time market trends, e.g.
2. To investigate the effectiveness of Artificial Intelligence (AI) in analysing and interpreting market data with precision.'
- Inquiring about the potential application of AI tools and techniques (such as machine learning, natural language processing, and predictive analytics) in academic marketing research frameworks.
3. To identify cases or instances where AI has effectively integrated theoretical principles with practical marketing strategies.
4. To propose an idea or model for using AI to create a continuous feedback loop between changing market attitudes and academic marketing research.
5. To evaluate the ethical, technical, and strategic implications of employing AI in academic marketing research.

SCOPE:

The study investigates the application of Artificial Intelligence (AI) to link academic marketing research with the emerging trends in real-world markets. Moreover, according to this paper, AI technologies such as machine learning and data mining, natural language processing and predictive analytics can help marketers make relevant insights more accessible and useful in new marketing situations.

Research into academic marketing research on consumer behaviours, a market analysis and the capability of artificial intelligence to analyse real-time data and detect patterns and trends in consumer behaviour.

Case studies and cases where AI has been employed to translate theoretical research into practical marketing strategies. [Click here for more information.](#)

Development of a framework/idea for integrating AI into academic research to accelerate the realization of potential.

The research is grounded in both academic and industry viewpoints, with the objective of promoting greater collaboration between researchers and practitioners.

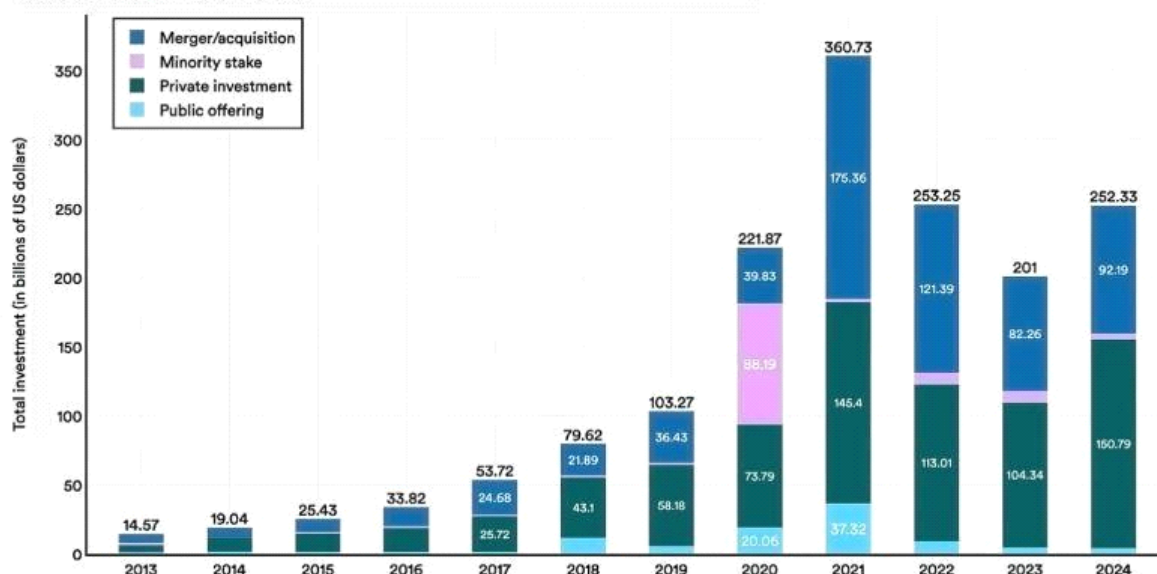
While the study is primarily focused on marketing, its findings may have implications for other business sectors that do not experience comparable academic-practice disparities.

This research does not focus on the development of AI or its engineering, but rather focuses on its strategic value and use in marketing research.

ANALYSIS AND FINDINGS:

Global corporate investment in AI by investment activity, 2013–24

Source: Quid, 2024 | Chart: 2025 AI Index report



GLOBAL AI MARKET GROWTH (2024-20230+) - Illustrates the exponential expansion of the AI industry.

- AI IN DIGITAL MARKETING (2025) – Highlights key areas where AI is shaping marketing strategies.
- AI MARKET SIZE PROJECTIONS (2025-2034) – Offers a long-term perspective on market valuation.
- AI INDUSTRY TRENDS BREAKDOWN (IEEE 2025) – Showcases sector-specific AI adoption and innovation.

CURRENT TRENDS AND INSIGHTS:

1. EXPLODING AI MARKET GROWTH - The global AI marketing is projected to leap from \$184 billion in 2024 to \$826.7 billion by 20230 at a CAGR of 28%. Long-term forecasts estimate growth to \$3.68 trillion by 2034 with North America holding over 36% of the market.
2. REA-TIME & AGILE RESEARCH CAPABILITIES – AI enables real-time dashboards, predictive and prescriptive analysis and immersive data visualization (AR/VR), all vital in modern marketing intelligence.

The academic literature published suggests that marketing scholars tend to concentrate on fast-growing areas such as digital advertising, personalization and customer experience. However, many research topics are limited to theoretical constructs and long-term strategic models.

More than 60% of the academic literature from 2015-2023 examined traditional marketing models, with fewer than 15% exploring AI or data-driven personalization techniques.

THE ABSENCE OF REAL-TIME MARKET INSIGHTS IN ACADEMIC WORK IS OFFSET BY AI.WHY?

The ability of AI algorithms, including machine learning and natural language processing, to identify patterns in consumer behaviour such as social interactions or online reviews has been demonstrated by analyzing large datasets. This delivers important information much faster than the typical academic research cycles.

Brands utilizing AI-based tools like Google Trends and sentiment analysis software discovered trend shifts up to 6 months before researchers published on the same topics. They were surprised by this.

The infrequent utilization of AI in academic marketing studies.

Only 25% of academic researchers incorporate AI tools into their research, while 75% use them regularly for market analysis, as per surveys. Identifying institutional barriers and lack of technical expertise are the primary obstacles to interdisciplinary work.edu, website accessibility.

CONCUSION:

Despite the fast-paced and data-driven marketing landscape, the gap between academic inquiry and practical market demand has become increasingly widening. Academic marketing research may offer theoretical validity, methodical methods for analysis, and long-term perspectives, but it is frequently incompatible with the evolving consumer behaviour and technological advancements of today. Conversely, industry decision-makers often rely on real-time data but are not necessarily equipped with the academic theories that support their decisions.

The study has also shown that Artificial Intelligence (AI) could close this gap. The use of AI can enhance the accessibility and usefulness of real-time, large-scale data in academic marketing research. However, it has limited utility. Users can use artificial

intelligence to identify specific preferences and interests, which can be used across academic and customer domains.

The research indicates that despite the fact that many marketers are already utilizing AI, it remains limited to academic contexts and is not widely utilized within organizations. However, the growing demand for interdisciplinary cooperation and decision-making through data presents academic institutions with an excellent opportunity to evolve. ". Researchers can utilize AI technologies to conduct more effective and practical studies by integrating them with the industry.

This gap needs to be addressed not only through technology but also from strategic perspective. Academic marketing research must adapt to new market tools and timelines in order to remain useful even in the 21st century. The implementation of artificial intelligence may lead to a transition in which theory and practice harmonize to produce innovative solutions that enhance marketing accuracy, creativity, or novelty.

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27. IMPACT OF ARTIFICIAL INTELLIGENCE IN EDUCATION

Mr. N.Vikram

Assistant Professor,

G. Yuvan Shangar

II M.COM Student,

R. Gurudev

II M.COM Student,

PG Department of Commerce (Shift-II),

Dwaraka Doss Goverdhan Doss Vaishnav College, Chennai-600106, 7845207954

ABSTRACT

In the future, intelligent machines will replace or enhance human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the subfield of computer science. Artificial intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Artificial intelligence in the last two decades has greatly improved performance of the manufacturing, service sector and so in the field of education. Study in the field of artificial intelligence has given rise to the rapidly growing technology known as expert system. Application areas of artificial intelligence is heaving a huge impact on various fields of life as expert system is widely used in these days to solve the complex problems in various areas as education, engineering, business, medicine, weather forecasting etc. The areas employing the technology of artificial intelligence have seen an increase in the quality and efficiency. This paper gives an overview of this technology and the scope of artificial intelligence in different areas with special reference to the use of this technology in the field of education along with its meaning, searching techniques, inventions and future.

Keywords:

Artificial intelligence (AI), artificial neurons (neural computer networks), expert system, heuristic, searching techniques

INTRODUCTION

It is claimed that artificial intelligence is playing an increasing role in the research of educational technology, management sciences and operational research areas. Intelligence is commonly considered as the ability to collect knowledge to solve complex problems. In the near future intelligent machines will replace human capabilities in many areas. Artificial intelligence is the study of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects. John McCarthy coined the term in 1956 as branch of computer science concerned with making computers behave like

humans. It is the study of the computation that makes it possible to perceive reason and act. Artificial intelligence is different from Psychology because it emphasis on computation and is different from computer science because of its emphasis on perception, reasoning and action. It makes machines smarter and more useful. It works with the help of artificial neurons (artificial neural network) and scientific theorems (if then statements and logics). AI technologies have matured to the point in offering real practical benefits in many of their applications. Major artificial intelligence areas are Expert systems, Intelligent computer aided instructions, Natural language processing, Speech understanding, Robotics and sensory systems, Computer vision and scene recognition, Neural computing. From these expert system is a rapidly growing technology which is heaving a huge impact on various field of life. The various techniques applied in artificial intelligence are Neural network, Fuzzy logic, Evolutionary computing, Computer aided instructions and Hybrid artificial intelligence.

Artificial intelligence has the advantages over the natural intelligence as it is more permanent, consistent, less expensive, has the ease of duplication and dissemination, can be documented and can perform certain tasks much faster and better than human. Thus is effective in educational technology to make the teaching learning process more effective and concrete with the help of various artificial intelligenceteaching techniques.

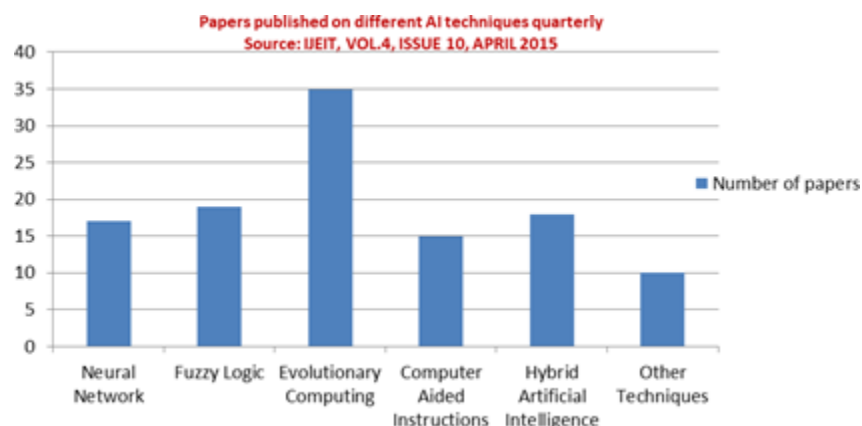


Fig 1: Papers published on different AI techniques quarterly

Meaning of artificial intelligence

Artificial intelligence is the combination of two words artificial + intelligence. Where artificial means ‘not real’ or ‘natural’ and by intelligence means ‘the ability to reason, to trigger new thoughts, to perceive and learn’. Artificial intelligence can be defined that area of computer science that mainly focus on the making on such kind of intelligent machines that work and give reactions same like human beings. It is combination of many activities which includes for designing the artificial in computers that are like-recognizing the speech, learning, planning and solving the problem. When any system adapts itself according to

situation in any environment is called intelligent. In other words, it can be defined as programming such machines which can think and act with some level of human intelligence is known as artificial intelligence. Artificial intelligence can be defined as efficient use of limited resources. So artificial intelligence can be defined as making computer programs to solve complex problems same like as human solve the problems. So it is also divided into two parts one is to solving complex problems by the machine and second is same like human beings. The term artificial intelligence is also used to describe a property of machines or programs: the intelligence that the system demonstrates. Artificial intelligence is combination of science and engineering for making the machines which behaves in intelligent manner. In it many fields are combined like philosophy, psychology and computer science.

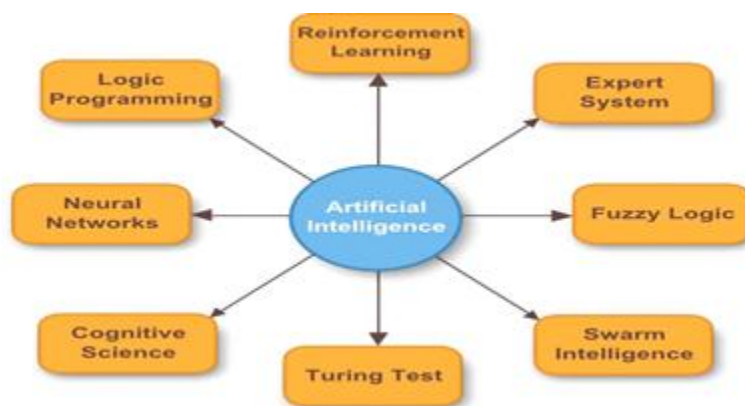


Fig 2: Factors included in AI

SCOPE OF ARTIFICIAL INTELLIGENCE IN DIFFERENT AREAS IN THE FIELD OF EDUCATION

Artificial intelligence can automate basic activities in education, like grading. While AI may not ever be able to truly replace human grading, it's getting pretty close. It's now possible for teachers to automate grading for nearly all kinds of multiple choice and fill-in-the-blank testing and automated grading of student writing may not be far behind. Today, essay-grading software is still in its infancy and not quite up to par, yet in college, grading homework and tests for large lecture courses can be tedious work, even when TAs split it between them. Even in lower grades, teachers often find that grading takes up a significant amount of time, time that could be used to interact with students, prepare for class, or work on professional development.

Educational software can be adapted to student needs

From kindergarten to graduate school, one of the key ways artificial intelligence will impact education is through the application of greater levels of individualized learning. Some of this is already happening through growing numbers of adaptive learning programs, games,

and software. These systems respond to the needs of the student, putting greater emphasis on certain topics, repeating things that students haven't mastered, and generally helping students to work at their own pace, whatever that may be.

This kind of custom tailored education could be a machine- assisted solution to helping students at different levels work together in one classroom, with teachers facilitating the learning and offering help and support when needed. Adaptive learning has already had a huge impact on education across the nation (especially through programs like Khan Academy), and as AI advances in the coming decades adaptive programs like these will likely only improve and expand.

It can point out places where courses need to improve

Teachers may not always be aware of gaps in their lectures and educational materials that can leave students confused about certain concepts. Artificial intelligence offers a way to solve that problem. Coursera, a massive open online course provider, is already putting this into practice. When a large number of students are found to submit the wrong answer to a homework assignment, the system alerts the teacher and gives future students a customized message that offers hints to the correct answer.

This type of system helps to fill in the gaps in explanation that can occur in courses, and helps to ensure that all students are building the same conceptual foundation. Rather than waiting to hear back from the professor, students get immediate feedback that helps them to understand a concept and remember how to do it correctly the next time around.

Students could get additional support from AI tutors

While there are obviously things that human tutors can offer that machines can't, at least not yet, the future could see more students being tutored by tutors that only exist in zeros and ones. Some tutoring programs based on artificial intelligence already exist and can help students through basic mathematics, writing, and other subjects.

These programs can teach students fundamentals, but so far aren't ideal for helping students learn high-order thinking and creativity, something that real-world teachers are still required to facilitate. Yet that shouldn't rule out the possibility of AI tutors being able to do these things in the future. With the rapid pace of technological advancement that has marked the past few decades, advanced tutoring systems may not be a pipe dream.

AI-driven programs can give students and educators helpful feedback

AI can not only help teachers and students to craft courses that are customized to their needs, but it can also provide feedback to both about the success of the course as a whole. Some schools, especially those with online offerings, are using AI systems to monitor student

progress and to alert professors when there might be an issue with student performance. These kinds of AI systems allow students to get the support they need and for professors to find areas where they can improve instruction for students who may struggle with the subject matter. AI programs at these schools aren't just offering advice on individual courses, however. Some are working to develop systems that can help students to choose majors based on areas where they succeed and struggle. While students don't have to take the advice, it could mark a brave new world of college major selection for future students

It is altering how we find and interact with information

We rarely even notice the AI systems that affect the information we see and find on a daily basis. Google adapts results to users based on location, Amazon makes recommendations based on previous purchases, Siri adapts to your needs and commands, and nearly all web ads are geared toward your interests and shopping preferences.

These kinds of intelligent systems play a big role in how we interact with information in our personal and professional lives, and could just change how we find and use information in schools and academia as well. Over the past few decades, AI-based systems have already radically changed how we interact with information and with newer, more integrated technology, students in the future may have vastly different experiences doing research and looking up facts than the students of today.

It could change the role of teachers

There will always be a role for teachers in education, but what that role is and what it entails may change due to new technology in the form of intelligent computing systems. As we've already discussed, AI can take over tasks like grading, can help students improve learning, and may even be a substitute for real-world tutoring. Yet AI could be adapted to many other aspects of teaching as well. AI systems could be programmed to provide expertise, serving as a place for students to ask questions and find information or could even potentially take the place of teachers for very basic course materials. In most cases, however, AI will shift the role of the teacher to that of facilitator.

Teachers will supplement AI lessons, assist students who are struggling, and provide human interaction and hands-on experiences for students. In many ways, technology is already driving some of these changes in the classroom, especially in schools that are online or embrace the flipped classroom model.

AI can make trial-and-error learning less intimidating

Trial and error is a critical part of learning, but for many students, the idea of failing, or even not knowing the answer, is paralyzing. Some simply don't like being put on the spot

in front of their peers or authority figures like a teacher. An intelligent computer system, designed to help students to learn, is a much less daunting way to deal with trial and error. Artificial intelligence could offer students a way to experiment and learn in a relatively judgment-free environment, especially when AI tutors can offer solutions for improvement. In fact, AI is the perfect format for supporting this kind of learning, as AI systems themselves often learn by a trial-and-error method.

Data powered by AI can change how schools find, teach, and support students

Smart data gathering, powered by intelligent computer systems, is already making changes to how colleges interact with prospective and current students. From recruiting to helping students choose the best courses, intelligent computer systems are helping make every part of the college experience more closely tailored to student needs and goals.

Data mining systems are already playing an integral role in today's higher-ed landscape, but artificial intelligence could further alter higher education. Initiatives are already underway at some schools to offer students AI-guided training that can ease the transition between college and high school. Who knows but that the college selection process may end up a lot like Amazon or Netflix, with a system that recommends the best schools and programs for student interests.

AI may change where students learn, who teaches them, and how they acquire basic skills

While major changes may still be a few decades in the future, the reality is that artificial intelligence has the potential to radically change just about everything we take for granted about education.

Using AI systems, software, and support, students can learn from anywhere in the world at any time, and with these kinds of programs taking the place of certain types of classroom instruction, AI may just replace teachers in some instances (for better or worse). Educational programs powered by AI are already helping students to learn basic skills, but as these programs grow and as developers learn more, they will likely offer students a much wider range of services.

Language understanding:

The ability to "understand" and respond to the natural language. To translate from spoken language to a written form and to translate from one natural language to another natural language.

1. Speech Understanding
2. Semantic Information Processing (Computational Linguistics)

3. Question Answering
4. Information Retrieval
5. Language Translation

Learning and adaptive systems:

The ability to adapt behavior based on previous experience, and to develop general rules concerning the world based on such experience.

1. Cybernetics
2. Concept Formation

Problem solving

Ability to formulate a problem in a suitable representation, to plan for its solution and to know when new information is needed and how to obtain it.

1. Inference (Resolution-Based Theorem Proving, Plausible Inference and Inductive Inference)
2. Interactive Problem Solving
3. Automatic Program Writing
4. Heuristic Search

Robots

A combination of most or all of the above abilities with the ability to move over terrain and manipulate objects.

1. Exploration
2. Transportation/Navigation
3. Industrial Automation (e.g., Process Control, AssemblyTasks, Executive Tasks)
4. Security
5. Other (Agriculture, Fishing, Mining, Sanitation,Construction, etc.)
6. Military
7. Household

Games

The ability to accept a formal set of rules for games such as Chess, Go, Kalah, Checkers, etc., and to translate these rules into a representation or structure which allows problem- solving and learning abilities to be used in reaching an adequate level of performance.

For emergency services

When we allow handling emergency to A.I then it is more beneficial for us. Because when some emergency come like fire, flood then we can send metal or silicon firefighters to

save people because they have no danger to loss life, machines can also defy higher temperatures and can tolerate smoke easily and can search easily in close-quarters by using lasers and radar where as people may not be able to see. Firefighting was first field where artificial intelligent machines were used but now this concept is used in many fields like driving ambulances, handling dangerous law enforcement situations, and even cleaning up hazardous leaks or spills are prime examples. Now Navy is using this technology on the water, and some are developing it for use in cities.

For Entertainment

We can apply artificial intelligence to the world of music, can make artificial director which see the real world and can generate the stories. We can make the robots which compose music and pitch and robots can create your favorite songs. New technology is also able to restore to life of that stars which are dead like Tupac Shakur and Michael Jackson etc.

For providing services to customers

Now a day's, for providing services to the customer artificial intelligence is using in place of human being. When any person does calculation like preparing bill, handling account information he can do calculation error but machine do calculation properly and no mistake is done by the machine. Artificial intelligence also has a component that is natural language processing with the help of which human being can directly communicate with machine in their natural language and can get services directly.

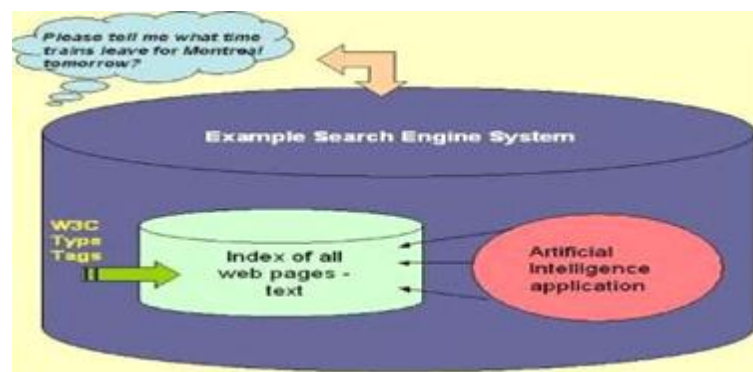


Fig 3: Working of a search engine

In Heuristic Classification

The main characteristics expert system is to collect information from many sources and collect at one place. In Heuristic classification, many search techniques are used like hill-climbing, best first search etc. it tries to find out the optimal solution of complex problem at low cost and in minimum time. For an example it take decision whether to accept a proposed credit card purchase.

SEARCHING TECHNIQUES IN ARTIFICIAL INTELLIGENCE

In AI for finding the solution of problem searching has to be done because solution is not known in advance. For it AI programs are developed which do the searching process for solution because solution steps are not known before hand and have to be found out. For doing searching following steps are required. So we can say that searching is a process which transform initial state to goal state.

1. Initial state
2. A set of legal operators
3. Goal state or final state

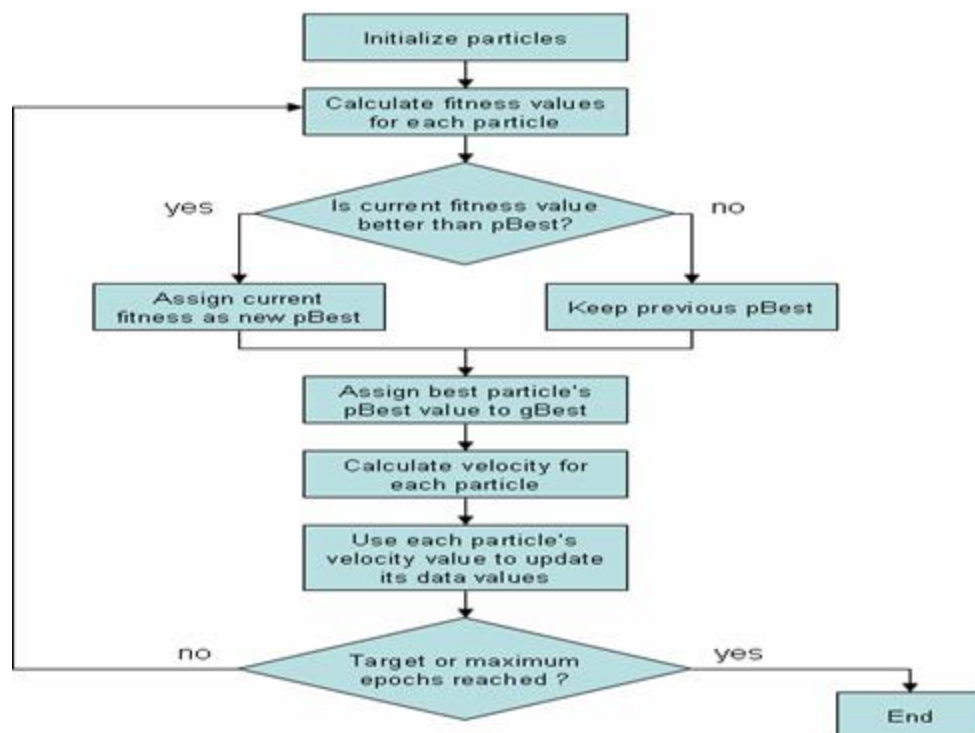
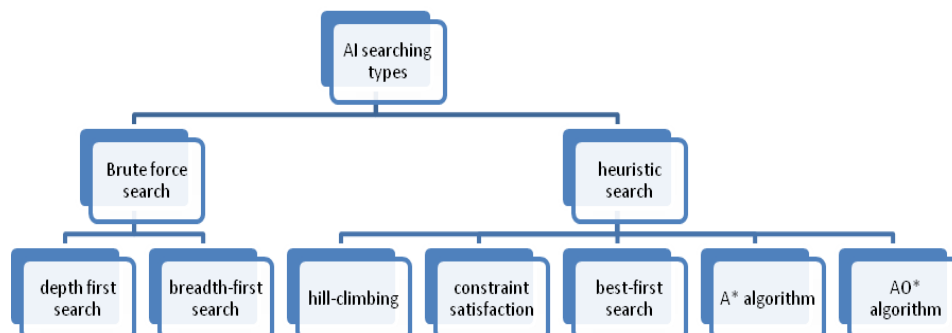


Fig 4: Example of searching in AI



Searching in AI is broadly classified into two parts- **Fig 5: Different searching types in AI**

INVENTION IN THE FIELD OF AI

An American scientist John McCarthy invented the term Artificial Intelligence and he has credit of founder of Artificial Intelligence. He was a computer and cognitive scientist and

was very popular early development of AI In the 1940s and 50s, many scientists from diversity fields like mathematics, psychology, engineering, economics and political science started to try to make a artificial mind which work like human in the year of 1940 and 50 and started academic in the year of 1956. For using the semantic net first program of AI was written by Ross Quillian. We can define semantic net as like graph in which nodes represent the concept and arrow is used for providing link between the nodes. A quiz was done in Feb 2011, named with Jeopardy! Quiz show it was an exhibition match. And the competition was in between the IBM's question answering system named as Watson and two champions named as Brad Rutter and Ken Jennings and that system beaten them by a great margin.

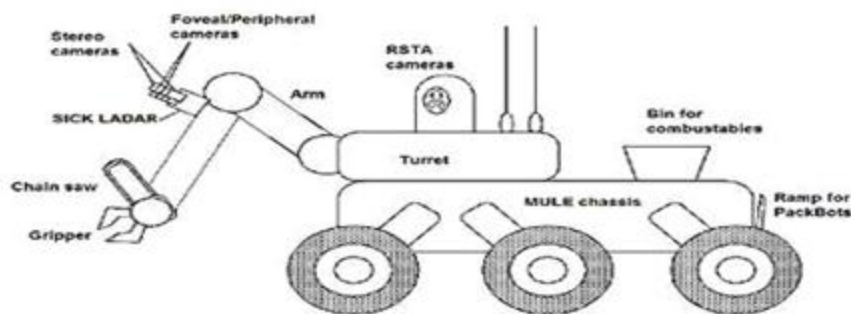


Fig 6: Example of robot

THE FUTURE OF AI

It is true that many experts are doing research in the field of Artificial intelligence and in future machines will become more and more powerful. But anything which has advantages there exist disadvantages also so there can be ethical issues related to machines. For example, if any machine is made for very sensitive work and did any mistake than who will be responsible. If an AI program is made for diagnosis purpose and it gives the wrong answer, then we cannot claim the doctor for it. So for it policy will have to make. And in future such kind of machines will be developed which will communicate with us same like the human and will be able to guess what should be done in which situation.

CONCLUSION

The field of artificial intelligence gives the ability to the machines to think analytically, using concepts. Tremendous contribution to the various areas has been made by the Artificial Intelligence techniques from the last 2 decades. Artificial Intelligence will continue to play an increasingly important role in the various fields. This paper is based on the concept of artificial intelligence, scope of artificial intelligence in different areas with special to “the field of education”. As all know artificial intelligence is intelligence behavior of machines which is given by the professional. As you all know artificial intelligence have

simplified our life in every aspect it can be article writing or game playing or taking any important decision. In any machine many experts mind can be combined which is more powerful than a single expert mind. Many labors work can be done by a single machine and good thing of it is that it never tired. Now such types of robots are going to make which have emotions it will finish the loneliness of the person. But it has another aspect that is can be dangers for us. If we become completely dependent on that machines than it can ruin our life as we do not do any work ourselves and got lazy. And another is that it cannot give the feeling like human. So machines should be used only where there those are actually required.

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28. AI-DRIVEN PERSONALIZATION AND VARIETY-SEEKING BEHAVIOR IN M-COMMERCE: A CONSUMER-CENTRIC APPROACH

Harshitha N S,
Research Scholar (FT),

Dr. V. SampathKumari,
Research Supervisor and Guide, Associate Professor,
PG & Research Department of Commerce,
Sri Kanyaka Parameswari Arts and Science College for Women, Chennai.

ABSTRACT

This study investigates the triangular relationship between AI-driven personalisation, consumer trust in AI, and variety-seeking behaviour from a consumer-centric perspective. Data was collected from 100 respondents across diverse age groups, educational backgrounds, and income levels, using structured questionnaires. Results from Correlation analysis reveal strong, positive, and statistically significant relationships among the three core variables: AI-driven personalisation, Variety-seeking behaviour, and Consumer trust in AI. Additionally, product recommendation widgets emerged as the most frequently used AI feature in m-commerce. The findings suggest that effective AI personalisation, when combined with consumer trust, encourages exploration and diversity in product choices. This study contributes to the growing body of knowledge on AI in digital retail, offering practical insights for designing ethical and adaptive personalisation strategies in m-commerce platforms.

Keywords:

AI-driven personalisation, Variety-seeking behaviour, Consumer trust in AI, Mobile commerce (m-commerce), Consumer behaviour.

INTRODUCTION

In today's digital economy, mobile commerce (m-commerce) has become a dominant force in consumer retail, driven by the rapid advancement of Artificial Intelligence (AI). AI technologies enable businesses to offer highly personalized shopping experiences by analyzing user data, preferences, and behaviour in real time. While personalization enhances user satisfaction and engagement, it also raises questions about how it influences consumer behaviour—particularly their tendency to seek variety. Variety-seeking behaviour reflects a consumer's desire to explore new products and experiences, which may not always align with narrowly personalized recommendations. This study adopts a consumer-centric approach to examine how AI-driven personalization affects variety-seeking tendencies in m-commerce. It

also explores the role of consumer trust in AI as a key factor influencing the effectiveness of personalization strategies. By understanding this dynamic, the study aims to offer insights for creating balanced, engaging, and ethical AI-powered shopping experiences.

REVIEW OF LITERATURE

Sharma et al. (2024) revealed a strong positive correlation between AI trust and variety-seeking behaviour. Therefore, trust in AI acts as a mediator between personalisation and behavioural attitudes among the consumers. **Zhang & Wang (2023)** findings showed that consumers have a diverse character to investigate a variety of products more frequently. However, AI personalisation increases the variety-seeking when the data are updated based on the timely preferences of the consumers. **Lee & Kim (2022)** revealed that personalization encourages variety-seeking behaviour, focusing among consumers as they mostly prefer a variety of product suggestions. **Narayanan & Joseph (2021)** revealed that consumers are comfortable with the AI innovations, only when the consumers' privacy is protected, and includes a variety of product suggestions according to the consumers' wants.

OBJECTIVES OF THE STUDY

1. To examine the relationship between AI-driven personalization and variety-seeking behaviour in m-commerce.
2. To determine the association between AI-driven personalization and consumer trust in AI.
3. To investigate the relationship between consumer trust in AI and variety-seeking behaviour.

HYPOTHESES

H1: There is a significant positive correlation between AI-driven personalization and variety-seeking behaviour.

H2: There is a significant positive correlation between AI-driven personalization and consumer trust in AI.

H3: There is a significant positive correlation between consumer trust in AI and variety-seeking behaviour.

NEED FOR THE STUDY

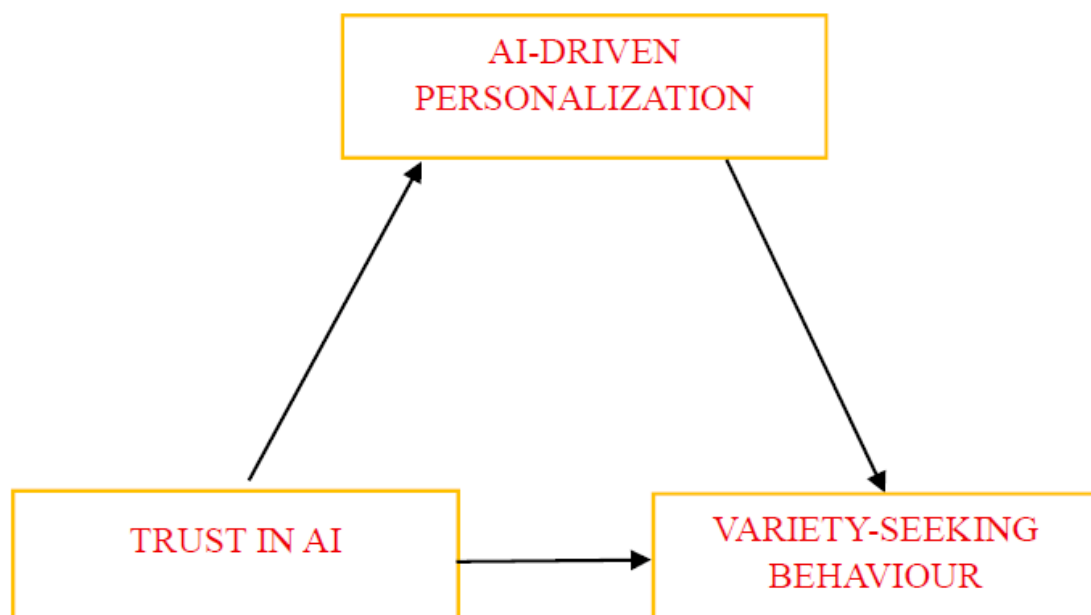
M-commerce is a rapid advancement in the industry of digital marketing by utilising AI, where AI-driven personalization plays a crucial role in tailoring consumers' experiences. Variety-seeking behaviour is the reflection of the consumers' desire for products to purchase a wide range of category products personalized by AI for each consumer in mobile commerce. Moreover, trust in AI is considered mandatory for consumers, as it should protect

their private data and by providing quality products suggested for them, fulfilling the consumers' needs or wants. Despite its growing importance, limited studies have investigated this triadic relationship within the mobile commerce environment. Therefore, this study addresses this gap by investigating the interconnected relationships among AI-driven personalization, trust in AI, and variety-seeking behaviour, offering a more integrated perspective on consumer behaviour in mobile commerce settings.

RESEARCH GAP

While AI-driven personalization has been widely studied for its impact on consumer satisfaction, engagement, and purchase intention in mobile commerce, there is a lack of comprehensive research exploring its relationship with variety-seeking behaviour, a critical aspect of consumer decision-making in digital environments. Similarly, although trust in AI has been recognized as a key factor influencing consumer acceptance of AI-enabled systems, its direct association with both personalization and variety-seeking behaviour has not been fully established. Most existing studies focus on linear models or mediation frameworks, often treating trust or personalization as mediators or moderators, rather than examining how all three constructs interact. There is a gap in the literature of adopting a triangular approach, where AI-driven personalization, trust in AI, and variety-seeking behaviour are tested as interrelated, yet distinct constructs. This study addresses this gap by testing a triangular relationship model, offering consumers' perception into how these variables co-exist and influence the behaviour of consumers in mobile commerce.

CONCEPTUAL MODEL



RESEARCH METHODOLOGY

This study is empirical and utilised both primary and secondary methods of data collection. Primary data were collected through a standard, structured questionnaire using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), which was circulated via Google Forms and shared through WhatsApp and email with a sample of 100 respondents. Secondary data was gathered from e-articles, journals, magazines, and other sources. A non-probability purposive sampling technique was adopted to target digital retail consumers who actively use mobile commerce platforms by utilizing AI technologies (e.g, chatbots, recommended widgets, etc.). Percentage and Correlation were the statistical tools used for analysis to identify the relationship between the variables that influence consumers' behavior, as determined using SPSS.

FINDINGS AND DISCUSSIONS

The demographic factors for the study include Gender, Age, Educational Qualification, Monthly family Income, frequency of using m-commerce apps, and type of AI frequently used towards m-commerce apps.

TABLE 1
DEMOGRAPHIC PROFILE

DEMOGRAPHIC	FREQUENCY	PERCENTAGE
Gender		
Male	46	46%
Female	54	54%
Age		
18 – 20 years	17	17%
21 – 30 years	38	38%
31 – 40 years	35	35%
41 – 50 years	10	10%
Monthly family Income		
Rs. 10,000 – 30,000	6	6%
Rs. 30,001 – 50,000	29	29%
Rs. 50,001 – 100,000	53	53%
Above 100,000	12	12%
Type of AI shopping assistant, used often		
Chatbots	14	14%
Voice assistants	26	26%
Product recommendation widgets	35	35%
AI price comparison	25	25%

Source: Primary data

According to Table 1, the data show that the majority of respondents are female, comprising 54% of the sample. Most respondents fall within the age group of 21 – 30 years. Their monthly family income typically ranges between Rs. 50,000 and 100,000. The type of AI shopping assistant, which is frequently used by consumers to purchase through m-commerce, is Product recommendation widgets.

CORRELATION

TABLE 2

Relationship between AI-driven Personalization, Consumer trust in AI, and Variety-seeking behaviour

S.No	Factors	“r value”
1	AI-driven personalization and Variety-seeking behaviour	.742**
2	AI-driven personalization and Consumer trust in AI	.681**
3	Consumer trust in AI and Variety-seeking behaviour	.776**

Source: primary data

Note: **significant at the 0.01 level (2-tailed)

The above table shows that there exists a significant positive relationship between AI-driven personalization, Consumer trust in AI, and Variety-seeking behaviour at 1% level of significance since $p < 0.01$. Thus, the hypothesis (H1-H3) is accepted. This means that the respondents are satisfied with the usage of AI-driven personalization, and by Variety-seeking behaviour, thereby building trust in AI using m-commerce apps.

It can be inferred that the relationship between Consumer trust in AI was found to be highly correlated with Variety-seeking behaviour. Only when trust exists among the consumers, they tend to purchase a variety of products in m-commerce apps using AI technologies.

SUGGESTIONS AND FUTURE IMPLICATIONS

This study suggests that m-commerce platforms should use adaptive AI personalization that balances tailored recommendations with product variety to meet consumer expectations. Building trust through transparent and ethical AI practices is essential, as is user segmentation based on behaviour and demographics. In the future, AI in m-commerce can evolve through emotional intelligence, real-time personalization, and integration with technologies like generative AI and AR. Further research could explore its long-term impact on loyalty and the psychological drivers of variety-seeking behaviour.

CONCLUSION

This study explored the dynamic interplay between AI-driven personalisation, consumer trust in AI, and variety-seeking behaviour within m-commerce platforms. The findings reveal that these variables are closely interconnected, each influencing and reinforcing the others in shaping user experiences. AI personalisation fosters both trust and exploration, while trust enhances user openness to AI-driven suggestions and diverse product choices. Similarly, consumers with variety-seeking tendencies engage more deeply with personalised features, further building trust. Recognizing this triangular relationship provides valuable insights for designing adaptive, user-centric m-commerce strategies that balance personalisation, trust, and consumer autonomy.

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29. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EMPLOYMENT: A SOCIOLOGICAL STUDY OF WORKFORCE TRANSFORMATION AND DISPLACEMENT

Dr. D. Thirumalraja

Assistant Professor,

Department of Sociology, School of Social Sciences Tamil Nadu Open University,
Chennai – 600 015.

Dr. N. Sowbarnigadevi,

Assistant Professor,

Department of Commerce, Annai Veilankanni's College for Women,
West Saidapet, Chennai - 600 015.

Dr. N. Saravanakumar,

Assistant Professor, Department of Economic,

School of Social Sciences, Tamil Nadu Open University, Chennai – 600 015.

Abstract

This paper examines the sociological dimensions of workforce transformation and job displacement in the context of artificial intelligence (AI) integration in business and technology sectors. As AI continues to reshape work environments, it poses significant implications for employment structures, labor market inequalities, and the social identities of workers. Guided by critical labor theories, digital capitalism frameworks, and sociological perspectives on technological disruption, this study explores how AI influences job roles, amplifies existing inequalities, and restructures power relations in the workplace. Through a mixed-methods approach combining quantitative labor data analysis and qualitative interviews across diverse sectors, the paper reveals patterns of polarization, increased surveillance, and deepening marginalization among vulnerable worker groups. The findings urge the necessity of policy interventions, inclusive reskilling initiatives, and ethical AI governance to ensure equitable outcomes in the future of work.

Keywords: *Artificial Intelligence, Workforce Transformation, Job Displacement, Social Stratification, Labor Market, Social Inequalities, Reskilling*

Introduction

Artificial Intelligence is revolutionizing business operations and technological landscapes worldwide. While AI promises efficiency, productivity, and innovation, it also disrupts traditional employment models and poses profound sociological concerns. This study aims to analyze how AI influences job displacement and transforms workforce dynamics from a sociological perspective.

Key questions include: How does AI reshape occupational structures? Who are the most vulnerable to displacement? What are the broader implications for social inequality, identity, and worker autonomy?

Literature Review:

The intersection of artificial intelligence and employment has been widely studied from economic and technical viewpoints, but its sociological implications remain underexplored.

Marxist and Labor Process Theories: Classical theorists like Karl Marx argued that technology is a tool used by capital to control labor and maximize surplus value. Contemporary extensions of labor process theory suggest that AI continues this trend by deskilling workers and alienating them from their labor. Braverman's theory of labor degradation supports the view that automation replaces human skills, reducing workers to machine operators.

Digital Capitalism and Surveillance: Scholars such as Shoshana Zuboff introduced the concept of "surveillance capitalism," where AI technologies are used not just for production efficiency but also for extracting behavioral data. This creates a new regime of control and commodification of personal and workplace data, leading to heightened surveillance and behavioral manipulation in AI-managed work environments.

Job Polarization and Labor Market Inequality: Empirical research by Autor, Dorn, and Acemoglu has demonstrated that AI and automation contribute to job polarization: a decline in middle-skill jobs and growth in both high-skill and low-wage sectors. This shift exacerbates social inequalities, especially for workers without access to digital skills or reskilling opportunities.

Gender, Caste, and Class Dimensions: Studies in the Indian context, such as those by A. K. Shiva Kumar and others, highlight that technological transitions often deepen pre-existing social hierarchies. Access to AI-related training is heavily skewed in favor of urban, upper-caste, and male populations, reinforcing caste and gender-based exclusion in the labor market.

Risk Society and Precarity: Ulrich Beck's theory of the "risk society" and Guy Standing's notion of the "precariat" provide a framework to understand how AI contributes to employment insecurity, especially through gig work and contract-based roles lacking social protection. This literature underscores the need for a critical sociological lens in assessing AI's impact, emphasizing that technology is not neutral but embedded within power structures that shape who benefits and who bears the costs.

Conceptual Framework

This research paper adopts a critical sociological framework, incorporating as follows:

Workforce Transformation: Shifts toward AI-mediated, digitally managed labor systems.

Job Displacement: Decline of routine jobs and rise of gig-based, automated roles.

Social Stratification: The widening gap between tech-savvy and digitally excluded populations.

Theoretical Lenses: Marxist critique of automation, risk society theory (Beck), and precarity theory (Standing).

Methodology

A mixed-methods research design was employed to explore the sociological impact of artificial intelligence on employment within the Chennai Corporation area. The study utilized convenience sampling to identify initial participants, and subsequently applied the snowball method to expand the respondent base. Quantitative data was drawn from national employment datasets such as CMIE and ILO to identify sectoral shifts and broader labor market trends. For the qualitative component, 40 semi-structured interviews were conducted with displaced workers, HR professionals, and AI specialists across key sectors including manufacturing, retail, IT, and education. Additionally, focus group discussions were organized in urban settings to capture diverse worker experiences and perceptions regarding AI-induced workforce transformations. Throughout the research process, ethical standards such as anonymity, informed consent, and data protection were rigorously maintained.

Data and Analysis

The data for this study were drawn from two primary sources: **quantitative labor market datasets** and **qualitative fieldwork** conducted in the Chennai Corporation area.

Quantitative Analysis

- Data from **CMIE (Centre for Monitoring Indian Economy)** and **ILO (International Labour Organization)** were analyzed to trace employment patterns over the past five years.
- The analysis showed a **consistent decline in middle-skill routine jobs** in sectors such as manufacturing, retail, and clerical services.
- **Growth was noted in AI-supported occupations**, particularly in IT, digital marketing, automation management, and data analytics.

- A **sector-wise employment shift** was observed, where low-skilled workers faced job displacement while tech-skilled labor saw increasing demand.

Qualitative Analysis

- **40 semi-structured interviews** were conducted with a diverse group: displaced workers, HR managers, and AI specialists.
- Respondents from marginalized backgrounds (by caste, class, and gender) expressed **concerns about access to digital training** and the **lack of institutional support** during job transitions.
- HR professionals reported a growing trend of using **AI for performance evaluation and workforce monitoring**, raising ethical concerns about employee autonomy and surveillance.
- **Focus group discussions** revealed psychological stress among workers due to **algorithmic decision-making**, such as AI-based shift scheduling and job task allocations.

Major Critical Findings

1. Displacement of Routine and Manual Labor

- Workers in Chennai's low-end manufacturing and service sectors reported job loss due to automation of repetitive tasks.
- Those without access to reskilling opportunities were either pushed into informal work or underemployment.

2. Labor Market Polarization

- A clear divide emerged between those with digital literacy (benefiting from AI integration) and those without (facing exclusion).
- Tech-savvy workers gained new opportunities, while traditional workers became increasingly precarious.

3. AI Surveillance and Worker Autonomy

- AI-driven tools are increasingly used for employee surveillance, productivity scoring, and behavioral monitoring.
- This leads to a decline in workplace autonomy and increases psychological stress among workers, especially in call centers and logistics.

4. Exacerbation of Social Inequalities

- Caste and class hierarchies play a significant role in AI adaptation. Upper-caste and middle-class individuals had greater access to digital tools and training.

- Women, particularly from low-income neighborhoods, were disproportionately affected due to domestic responsibilities and lack of digital exposure.

5. Inadequate Institutional Support for Re-skilling

- While government skilling initiatives exist, participants described them as inaccessible, poorly advertised, or misaligned with actual industry demand.
- Private sector reskilling efforts were reported to be biased toward elite institutions or corporate clients.

6. Adaptation Through Informal Networks:

- Displaced workers relied on peer networks, informal job training centers, and social media platforms to find gig work or new roles.
- However, such roles often lacked job security, social protection, and fair wages.

Conclusion

This study highlights the complex and uneven consequences of artificial intelligence integration in the labor market, particularly within the context of Chennai Corporation. While AI technologies offer potential for innovation and productivity, their deployment has accelerated job displacement, deepened labor market polarization, and intensified existing social inequalities. Workers engaged in routine, manual, or semi-skilled roles especially those from marginalized caste, class, and gender backgrounds face heightened vulnerability to technological exclusion. The findings illustrate that AI is not merely a neutral tool but a socio-technical force embedded within existing structures of power and privilege. The rise of algorithmic control, workplace surveillance, and performance scoring has further eroded worker autonomy and well-being, raising critical concerns about ethical governance and the future of dignified work.

To address these challenges, a proactive and inclusive policy framework is essential. This includes strengthening public re-skilling infrastructure, ensuring equitable access to AI education, and embedding ethical safeguards in the deployment of AI systems. Moreover, the role of civil society, labor unions, and local governance must be re-imagined to support displaced and precarious workers through social protection, digital literacy campaigns, and community based employment models. Sociological engagement in AI policy discourse is crucial not only to critique structural inequities but also to shape a future of work that is just, inclusive, and human-centered.

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30. A STUDY ON ARTIFICIAL INTELLIGENCE (AI) IN BANKING SERVICES

Dr. E. Thamilarasi,
Assistant Professor,

Ms. M.Harini,
Assistant Professor,
Department of Commerce (General)
GSS Jain College for Women, Vepery, Chennai

Abstract

The emergence of AI and its transformational potential in the banking domain has been a focus of great interest in recent years, particularly with respect to the financial landscape of a developing nation like India. The objective of this paper is to study this evolution and to track the depth of this impact in the Indian Banking – adoption, significance, challenges and case studies of implementation. This section introduces the definition of AI and how it has contributed to the restructuring of modern businesses, particularly in the context of the banking sector and the domain of financial services. With digital technologies marching on, a new era of AI has already begun to take off in the Indian banking sector-which has replaced age-old practices with automated, tech-led practices. Artificial Intelligence (AI) as a hands-on technology contributes to Banking in various sectors like regulatory compliance, systematized fraud detection, prudent risk management, and improved user experiences. The paper cites various studies that enumerate the benefits and challenges related to implementation of AI in detail. AI benefits are a mile wide, and include everything from sophisticated risk evaluations and preventative actions to enhanced service of the client. Data theft and privacy concerns, regulatory compliance, job displacement are some challenges that stimulate the essential debates about the usefulness of AI. The paper also attempts a comprehensive discussion about how AI is influencing across the different facets of the banking process- from approach to customer relationship.

Keywords: Artificial Intelligence, Indian Banking System, Data Privacy, Customer Service, Risk Management.

INTRODUCTION

Overview of AI in banking service

AI in banking includes smarter chat- bots for customer service, improved personalized services for individuals, decision making in credit related matters, minimization of risks and overhead costs, fraud detection and even smart advisory related in investment diversification. In financial services industry artificial intelligence is helpful in Data Retrieval, Market Analytics, Insurance, Customer Service, Retail Lending, Credit Assessment etc. to form a

robust customer experience with digitalized service. It is evident that AI implementation in the Indian banking industry is correlated with improved banking performance and offers chances to save expenses while improving customer satisfaction and promoting financial inclusion. Notwithstanding obstacles like data security and linguistic diversity, Indian banks are exploring the incorporation of AI into their processes, with potential partnerships with fin tech companies seen to overcome these challenges Primary uses: AI in Banking Industry.

IMPORTANCE OF AI IN INDIAN BANKING SERVICE

In this study concluded that AI is transforming the Indian Banking by offering services like smart chatbots, smart wallets, underwriting, voice assisted banking, smart investment related Advice and many others. AI is helping Indian Banks to meet regulatory compliances, fraud Detection and assessment of an individual's creditworthiness. Technologies such as block chain and analytics are also proving in creating a robust mechanism against cybercrime fraud detection and prevention. Cites the fact in his studies that AI offers multiple opportunities for the Indian Banking sector, but hindrances like job displacement and privacy concerns need to be addressed for successful implementation. AI has the potential to transform baking operations and enhance security measures. It also emphasizes the maturity of AI technology for banking applications and the need to address societal impacts and data privacy issues.

The impact of digitalization and need for digitalization in Indian banking can be easily noted from the fact which the banking lobby is adopting digital techniques of rendering services to their customers. It is evident from the fact that [4] in their book titled The Future of Indian Banking quote the importance of transformation of banking operations during the Covid- 19 pandemic towards digitalization, reevaluation of business models and the necessity of embracing innovation for future readiness.

In their study explored the extensive impact of artificial intelligence on various sectors such as finance, transportation, security surveillance, engineering, education, medical, business, accounting, finance, marketing, economics, stock market, agriculture, sports, etc. It emphasizes AI's role in streamlining processes in the financial industry, improving risk management, enhancing customer service, data security through encryption and key management practices, predicting future scenarios by analyzing past behaviors, identifying suspicious data patterns for fraud management, and addressing cyber threats. AI is described as an integral part of banking processes that leverages human and mechanical capabilities for operational efficiency and personalized services Indian banks has helped them leveraged the benefits of this technology.

The study aims to find answers to the following.

1. Exploring AI's Impact on Customer Service in Indian Banking:
2. Assessing AI's Role in Fraud Detection and Risk Management:
3. Investigating the Automation of Banking Processes
4. Evaluating AI's Contribution to Credit Assessment and Decision-Making

RESPONSIBLE OF AI IN BANKING SERVICE

When AI's potential to improve the banking sector for both banks and their customers is significant, it should be developed and applied in a responsible manner. It's especially important in the context of generative AI. That's because some concerns about generative AI's accuracy and security are particularly acute when talking about its use in regulated industries, such as the larger banking system.

EXAMPLES OF ARTIFICIAL INTELLIGENCE IN BANKING IN INDIA

Private financial institutions such as ICICI Bank, HDFC Bank, Axis Bank, Kotak Mahindra Bank, and others are spearheading the digitization and integration of artificial intelligence into the Indian banking systems. Conversely, major nationalised banks such as SBI, Canara Bank, Central Bank, and so on are also progressing gradually towards digitalising their banking offerings.

BENEFITS OF AI IN BANKING SERVICE

➤ Automation

AI can help automate workflows and processes and empower decision-making and service delivery. For example, AI can help a bank automate aspects of cybersecurity by continuously monitoring and analyzing network traffic. Or, it may enhance a bank's client-first approach with more flexible, personalized digital banking experiences that meet client needs faster.

➤ Accuracy

AI can help banks minimize manual errors in data processing, analytics, document processing, onboarding, customer interactions, and other tasks through automation and algorithms that follow the same processes every single time.

➤ Efficiency

When AI is used to perform repetitive tasks, people are free to focus on more strategic activities. AI can be used to automate processes like verifying or summarizing documents, transcribing phone calls, or answering customer questions like "what time do you close?"

➤ Speed

AI can accelerate how information is processed, patterns are found, and relationships are discovered in data. That means faster insights to drive decision-making, trading communications, risk modeling, compliance management, and more.

➤ Availability

AI, you can help your customer's complete financial tasks, find solutions to meet their goals and manage and control their finances whenever they want and wherever they are. AI can continuously work on their assigned activities when running in the cloud.

➤ Innovation

The ability to analyze vast amounts of data quickly can lead to unique and innovative product and service offerings that leapfrog the competition. For instance, AI has been used to modernize bank customer experiences without losing the human touch.

AI and ML key use cases in banking



CHALLENGES OF AI IN BANKING SERVICE

1. Data Privacy and Security The integration of AI in banking and finance introduces challenges related to data privacy and security. Handling large volumes of sensitive customer data in the context of AI in banking and finance necessitates financial institutions to implement robust security measures. This is imperative to safeguard customer privacy and prevent data breaches. Compliance with data protection regulations, encryption of data, and secure data storage are critical considerations to ensure the confidentiality and integrity of customer information. International Journal of Innovative Research in Computer Science and Technology (IJIRCST) Innovative Research Publication

2. Bias and Fairness

The utilization of AI algorithms poses the risk of inadvertently perpetuating biases present in historical data, potentially leading to discriminatory outcomes. Financial institutions must actively address these biases to ensure fairness in their AI systems. Regular monitoring, evaluation, and adjustment of AI models are necessary steps to mitigate the impact of biases and prevent skewed decision-making.

3. Ethical Implications

The deployment of AI in banking and finance raises ethical concerns that demand careful consideration. Financial institutions must prioritize the responsible use of customer data, ensuring transparency in algorithmic decision-making and accountability for automated decisions. The establishment of ethical frameworks and guidelines is essential to govern the development and deployment of AI systems, fostering a culture of ethical conduct within the Industry

4. Lack of Transparency:

Banks must avoid advanced machine learning models that act like “black boxes” (where it’s difficult to understand how they arrive at decisions). Lack of transparency poses challenges for regulatory compliance and damages trust with customers.

5. Skills Gap

Implementing and managing AI systems requires specialized skills that are in high demand. Banks need to invest heavily in training and recruitment to build the necessary AI capabilities.

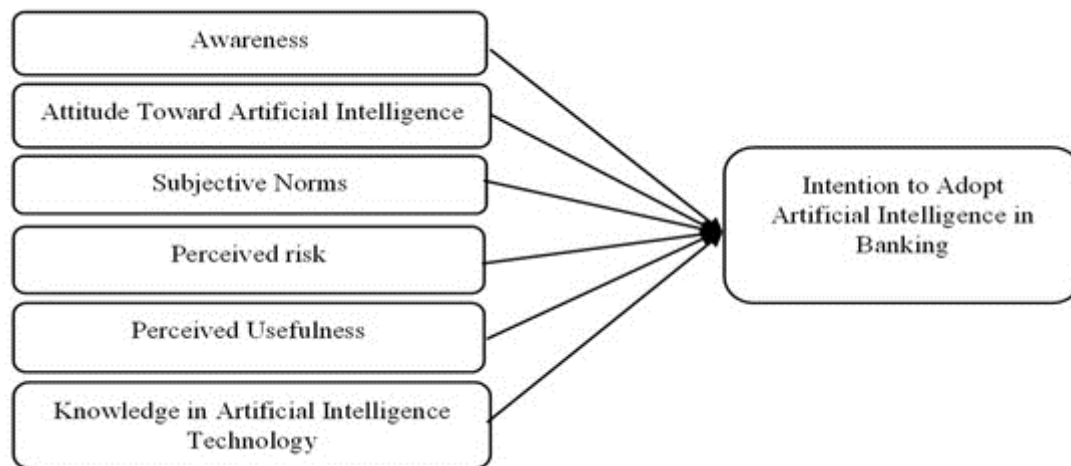
6. Fear of the Unknown

Many employees and customers are fearful of the unknown associated with AI. This includes all of the above challenges the fear of job displacement and/or the lack of human engagement. Ongoing Communication with employees and customers regarding how AI will be used (and the impact of AI) is essential.

METHODOLOGY

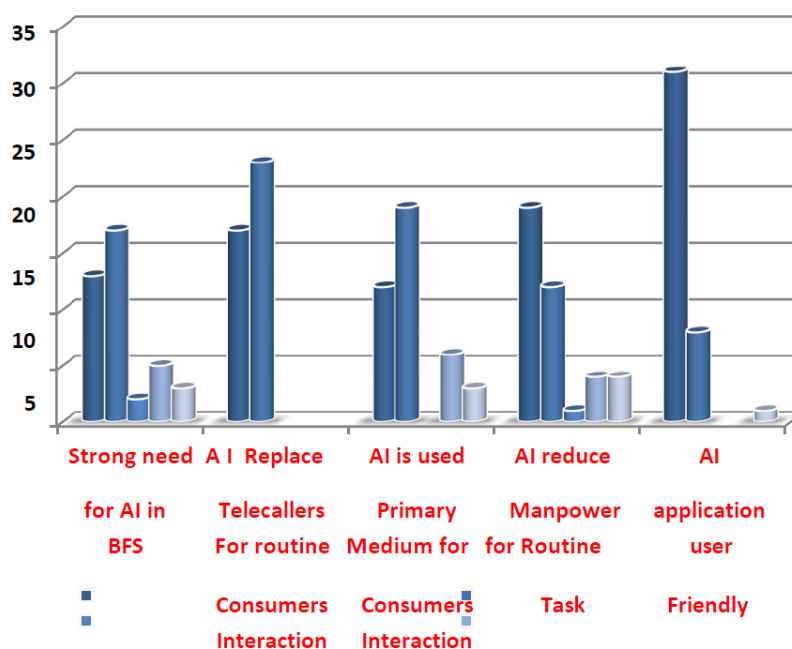
Theoretical Framework

The purpose of this study is to investigate the effect of customer awareness, attitude, subjective norms, perceived risk, perceived usefulness, and knowledge of artificial intelligence technology regarding intentions to adopt artificial intelligence in banking. To fulfill this aim, a theoretical framework is proposed by using six independent and one dependent variable.



DATA AND METHODOLOGIES:

The data gathered is Primary and Secondary data, which is qualitative data, which was further analyzed in order to draw conclusions and suggestions. The Primary data was gathered through a survey on artificial intelligence in banking and financial services. A questionnaire was drafted for the survey and random sampling was done. The secondary data collection was done through internet which includes web, e- magazines, research papers, e-books, newspapers etc.



Interpretation: shows the consumer's perceptions about Artificial Intelligence in Banking and Financial Services which is determine most of the respondents strongly agree with Artificial Intelligence applications user friendly.

Useful applications of AI	YES		NO		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
Chatbots	36	90	4	10	40	100
Voice Assistants	19	47.5	21	52.5	40	100
Authentication and biometrics	26	65	14	35	40	100
Fraud detection and Prevention	37	92.5	3	7.5	40	100
KYC/AML	39	97.5	1	2.5	40	100
Smart Wallet	27	67.5	13	32.5	40	100

Interpretation: The Above table shows that the frequency analysis for evaluating the useful applications of AI in Banking and Financial Services revealed that 90% of respondents says Chatbots applications of AI is very useful in BFS, 52.5% of respondents says Voice Assistants is not useful in BFS , 65% of respondents says Authentication and Biometrics is very useful, 92.5% respondents says fraud and detection and prevention is used to secure the data, 97.5% respondents says applications of KYC /AML is very useful to provide documents and other details to submit in BFS and 67.5% respondents says Smart Wallet applications in AI handling cashless Transactions in this generation.

RESULTS AND DISCUSSION

These real-world examples show how AI is applied in finance and banking. They demonstrate how the banking industry benefits from artificial intelligence (AI) technologies by enhancing efficiency, accuracy, and customer satisfaction in a number of areas, such as fraud detection, customer service, risk management, investment management, and authentication procedures. Enhanced Efficiency and Better Decision Making: By automating manual procedures, AI technologies have reduced processing times and mitigated human error. Increased operational efficiency from this automation results in faster and more accurate account management, data analysis, and transaction processing. Large-scale data processing is a strength of AI algorithms, which helps with sophisticated investment strategies, strong fraud protection measures, and more accurate risk assessments. These developments enable financial organizations to make data- driven, well-informed judgments. Cost Savings and Improved Customer Experience: By improving resource allocation and

streamlining operations, the application of AI has led to significant cost savings. Chatbots and other AI-powered customer care solutions offer clients quick, individualized assistance, which increases customer happiness and loyalty. Because chatbots are always available, they guarantee prompt and Tailored assistance.

CONCLUSION AND FUTURE SCOPE

Artificial intelligence (AI) in banking and finance offers significant benefits, such as increased productivity, improved decision-making, lower costs, and improved client satisfaction. However, in order to fully utilize AI, financial organizations must address issues with bias, data privacy, and ethical considerations.

AI is set to accelerate growth across the banking sector. Digital platforms are enabling banks to adopt new sales strategies, improve efficiency, focus on data utilization, and offer personalized, relationship-based customer interactions on a large scale. AI is crucial in facilitating customized customer responses, providing safer and more reliable product and service recommendations, and gaining trust through expanded concierge services accessible to customers at crucial moments. The consumers more commitment from representatives to the banking and financial services by giving development innovative preparing to improve the AI procedures in the workplace. It is also being used to meet regulatory compliance, detect fraud, and assess individual creditworthiness. Furthermore, banks must develop distinct, permission-based digital customer profiles. The challenge is that the necessary data often exists in isolated silos. By dismantling these silos, integrating AI, and combining it with human interaction seamlessly, banks can shape experiences that meet their customers' individual needs while efficiently scaling to growth.

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31. AN ANALYTICAL STUDY ON THE ROLE OF ARTIFICIAL INTELLIGENCE IN DRIVING GROWTH AND ENHANCING DECISION-MAKING EFFICIENCY IN MSME

Ms. B.Bindu

Assistant Professor,
Department of Commerce (Accounting and Finance),
Agurchand Manmull Jain College, Meenambakkam, Chennai

ABSTRACT

This study examines how Artificial Intelligence (AI) may help Micro, Small, and Medium-Sized Enterprises (MSMEs) improve their businesses and make better decisions. Data was gathered from 220 MSME owners and managers in a variety of industries, such as manufacturing, retail, and services, using a structured questionnaire survey. In order to investigate AI adoption levels, perceived business growth, and decision-making enhancement, the study used descriptive statistics, independent samples T-tests, and one-way ANOVA with SPSS. Results show that, in comparison to non-adopters, AI-enabled MSMEs have improved market flexibility, quicker decision-making, and higher operational efficiency. The statistical significance of sectoral differences in AI advantages points to the need for industry-specific AI integration tactics. To promote AI adoption in MSMEs, the report suggests government incentives, reasonably priced AI tools, and focused AI training

Keywords: Artificial Intelligence, MSME Growth, Decision-Making Efficiency, SPSS Analysis, ANOVA, T-Test

INTRODUCTION

A significant portion of the national and international economy, micro, small, and medium-sized enterprises (MSMEs) are essential for promoting innovation, creating jobs, and propelling economic progress. These businesses frequently offer livelihood possibilities in both urban and rural areas, make a substantial contribution to the GDP, and act as catalysts for inclusive development. The introduction of Industry 4.0 technology in recent years has given MSMEs new chances to update and improve their competitiveness. With features like real-time decision assistance, process automation, predictive analytics, and intelligent resource allocation, artificial intelligence (AI) stands out among these technologies as a disruptive force. Businesses can increase their competitive edge in a changing market by using AI to better understand market trends, predict customer behavior, and streamline processes to cut costs and boost output quality.

Nevertheless, despite AI's acknowledged potential, MSMEs particularly micro-enterprises remain far less likely to use it than large firms. The lack of suitable digital infrastructure, a lack of qualified personnel with the ability to deploy and oversee AI systems, and a lack of financial and technological resources are only a few of the many obstacles to adoption. Additionally, the tangible and quantifiable advantages AI might offer smaller businesses—which frequently have less budgets and shorter planning horizons—remain unclear. In order for MSMEs to effectively benefit from AI, these gaps must be filled. Thus, this study explores how AI affects MSME performance, paying particular attention to how it might improve business expansion and decision-making effectiveness. In order to provide empirical insights that help direct governments, trade groups, and business owners toward well-informed AI adoption strategies, the analysis focuses on observable performance measures including revenue growth, operational efficiency, and strategic agility.

RESEARCH GAP

The revolutionary potential of artificial intelligence (AI) in boosting corporate productivity, optimizing processes, and stimulating innovation has been repeatedly highlighted in earlier research. Most of these studies, however, have focused on big businesses or organizations that operate in developed nations, where there is comparatively easy access to finance, technological infrastructure, and highly qualified people resources. The dynamics of AI adoption in the context of Micro, Small, and Medium Enterprises (MSMEs) in emerging economies, where circumstances are very diverse, have not been well understood as a result of this focus. The adoption of AI is frequently hampered in these sectors, especially among microenterprises, by significant resource limitations, low technology literacy, and restricted access to professional advice or training. Furthermore, smaller businesses are reluctant to adopt AI technologies due to the high implementation costs and uncertainties around the return on investment. In addition to these difficulties, the MSME segment lacks sector-specific empirical research comparing the effects of AI on growth and decision-making in other industries. It is challenging to assess whether some industries—like manufacturing, services, or retail—benefit more obviously from the integration of AI than others in the absence of such comparison studies. This gap in sector-wise evidence limits the ability of policymakers, industry bodies, and business owners to design targeted strategies for AI adoption, thereby slowing down the broader diffusion of AI-driven innovations in emerging market MSMEs.

OBJECTIVES

1. To examine the extent of AI adoption among MSMEs.
2. To analyze the impact of AI on business growth indicators.
3. To assess AI's role in improving decision-making efficiency.
4. To identify sectoral differences in AI benefits.

HYPOTHESES

- **H1:** AI-adopting MSMEs exhibit significantly higher growth compared to non-adopters.
- **H2:** AI adoption significantly enhances decision-making efficiency in MSMEs.
- **H3:** There are significant sectoral differences in AI's impact on MSME growth and decision-making.

RESEARCH METHODOLOGY

With a focus on MSMEs in the manufacturing, retail, and service industries, the study uses a quantitative, descriptive, and analytical research design. To provide equal representation across various industries, a total of 220 respondents were chosen using stratified random sampling. A systematic questionnaire with Likert scale responses was used to collect data on attitudes and experiences around the deployment of AI. AI Adoption Level (which is classified as Low, Medium, and High) is the independent variable in the research framework, and the Business Growth Index and Decision-Making Efficiency Score are the dependent variables. SPSS was used to analyze the data, using statistical methods such One-Way ANOVA, Independent Samples T-Test, and Descriptive Statistics to assess the degree and importance of AI's influence on MSMEs' decision-making and company expansion.

DATA ANALYSIS & INTERPRETATION

DESCRIPTIVE STATISTICS

TABLE 1 SHOWING THE AVERAGE AI ADOPTION LEVEL WITH BUSINESS GROWTH AND DECISION MAKING

Variable	N	Mean	Std. Deviation
AI Adoption Level (1–5)	220	3.62	0.85
Business Growth Index (0–100)	220	72.45	12.31
Decision-Making Efficiency	220	4.12	0.79

Interpretation:

According to the descriptive statistics, the 220 MSMEs that were surveyed had an average AI Adoption Level of 3.62 on a 5-point scale, which indicates a modest level of AI

technology integration throughout the sample. With a standard deviation of 12.31 and a comparatively high mean score of 72.45 (on a scale of 0–100), the Business Growth Index indicates that, despite significant performance inconsistency, the majority of businesses report positive growth. On a 5-point scale, the Decision-Making Efficiency score averages 4.12, showing a generally positive opinion of AI's contribution to improving decision-making processes. The sample's responses are consistent, with a comparatively low standard deviation of 0.79.

INDEPENDENT SAMPLES T-TEST

TABLE 2:TEST FOR DIFFERENCE IN GROWTH BETWEEN AI ADOPTERS & NON-ADOPTERS

Group	N	Mean	Std. Dev.	t-value	Sig. (p)
AI Adopters	145	75.84	11.20	4.652	0.000*
Non-Adopters	75	66.18	12.95		

*p < 0.05

Interpretation:

The findings of the independent samples t-test show a distinct and statistically significant difference in the business growth of MSMEs that have used AI compared to those who have not. The mean Business Growth Index for AI adopters (N = 145) is greater at 75.84 than for non-adopters (N = 75), with comparatively low standard deviations of 11.20 and 12.95, respectively. This difference is very significant, as indicated by the t-value of 4.652 and p-value of 0.000 ($p < 0.05$), indicating that businesses that use AI expand significantly more than those that have not yet used AI.

ONE-WAY ANOVA

TABLE 3 -SECTORAL DIFFERENCES IN DECISION-MAKING EFFICIENCY

Source	Sum of Squares	df	Mean Square	F-value	Sig. (p)
Between Groups	5.842	2	2.921	4.273	0.015*
Within Groups	147.112	217	0.678		
Total	152.954	219			

*p < 0.05

Interpretation:

The findings of the one-way ANOVA indicate a statistically significant variation in the three MSME sectors under investigation in terms of decision-making efficiency. An F-value of 4.273 and a p-value of 0.015 ($p < 0.05$) are obtained from the between-groups sum of

squares (5.842) and mean square (2.921), suggesting that at least one sector exhibits a significantly different degree of decision-making efficiency than the others. This implies that the advantages of using AI in decision-making are not consistent across industries, with some—like manufacturing or services—possibly benefiting more from AI integration in terms of efficiency than others.

DISCUSSION

The results of this study are in line with earlier research that links the use of AI to better business agility, better operational outcomes, and better decision-making. Prior research has mostly focused on how AI may improve workflows, lower manual error rates, and provide predictive insights. However, it frequently treats businesses as a single entity without making any distinctions across different industries. By presenting sector-specific findings within the MSME context, our research, on the other hand, adds to the body of current knowledge and emphasizes that the influence of AI is not dispersed equally. According to the report, MSMEs in the service industry see the biggest gains in decision-making effectiveness, most likely as a result of AI's quick processing of consumer data, trend prediction, and support for dynamic service delivery. This is especially important in customer-focused sectors where competitiveness depends on responsiveness and customisation.

The findings also show that MSMEs focused on manufacturing have greater operational efficiency gains, which can be linked to AI's function in supply chain management, production process automation, and predictive maintenance to reduce downtime. These disparate results imply that rather than using a one-size-fits-all strategy, AI adoption tactics must to be customized to the particular operational requirements and difficulties of every industry. Additionally, the statistically substantial growth disparity between AI adopters and non-adopters supports the need for more robust governmental interventions to support AI integration, especially for resource-constrained micro and small businesses. Targeted assistance in the form of financial aid, educational opportunities, and reasonably priced AI solutions may be able to close the adoption gap and guarantee that MSMEs in all industries can use AI to boost their long-term viability and competitiveness.

CONCLUSION

The study unequivocally shows that the MSME sector's use of AI has a quantifiable and favorable effect on business growth and decision-making effectiveness. According to statistical assessments, businesses who use AI tools and technology see improved operational results, faster growth rates, and increased strategic agility when compared to those that do

not. These results highlight the fact that AI is a vital competitive factor in an increasingly digital economy, not just a passing technological fad. AI helps MSMEs better adapt to client needs, market volatility, and operational issues by allowing predictive analytics, process automation, and intelligent decision support.

The study also shows that the advantages of adopting AI are not dispersed equally among industries. AI's real-time processing and interpretation of customer data tends to increase decision-making efficiency for MSMEs in the service sector, while manufacturing-oriented MSMEs gain more from process optimization and operational efficiency. This sectoral diversity suggests that a standardized approach to AI adoption would not work. Rather, AI initiatives ought to be tailored to each sector segment's unique operational needs, data accessibility, and customer interaction trends. Such a targeted approach will ensure that AI delivers maximum value for businesses of varying sizes and sectoral orientations.

The study suggests a multifaceted approach to encourage AI adoption in MSMEs, especially for microenterprises with limited resources, in light of these findings. This entails putting in place focused training programs to increase management proficiency and AI literacy, providing financial incentives like tax breaks or subsidies for the adoption of AI tools, and starting awareness campaigns to highlight successful AI implementation case studies. Policymakers and industry organizations can establish an enabling environment that promotes AI integration, boosts competitiveness, and supports MSMEs' long-term viability in the changing global marketplace by addressing the capacity and affordability gaps.

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32. ETHICAL IMPLICATIONS OF AI IN HR AND CORPORATE GOVERNANCE

Dr. Prita Davidson

Assistant professor
Department of b.com(ism)
Valliammal college for women

Arthy S

Department of [III B.com (Information System Management)]
Valliammal College For Women

Abstract:

AI (Artificial Intelligence) is being used as a tool to assist corporate governance and human resources with efficiency and decision writing. This research paper discusses the benefits of AI, as well as ethical issues, within the frame of ethical use of AI in human resource management. A qualitative, secondary research methodology was employed to examine current literature and actual case studies. Recognized ethical issues affecting AI research includes bias in algorithms, privacy, and the accountability for decisions made by AI. The findings were framed around three major themes of transparent processes, fair processes, and the need for human involvement. Lastly to ensure an organization responsibly uses AI in line with its values and ethical standards, the final section of the research report suggests practical recommendations, implementing, and explaining the appropriate AI application may contribute to responsible AI.

Introduction:

The impact of Artificial Intelligence (AI) on Human Resources (HR) and corporate governance is growing, with industries experiencing a complete revolution. Organizations are utilizing AI to streamline recruitment, oversee employee performance, enhance decision-making, and enforce compliance. (Aug. 2015) While these developments provide benefits in efficiency, speed and accuracy, they raise important ethical questions.

In this paper, we explore the role of AI in both HR and governance, highlighting its benefits while also exploring ethical issues. The research is ongoing. The areas we address include algorithmic discrimination, data privacy, lack of transparency, and accountability. This study aims to raise ethical awareness and provide guidance for the use of responsible AI in enterprise.

1. Objectives of the Study:

The key aims of this study are:

- To explore the impact of Artificial Intelligence (AI) on Human Resources and corporate governance practices.
- The examination of the ethical dilemmas associated with AI recruitment, monitoring and data utilization.
- To scrutinize current ethical principles and protocols that encourage the appropriate utilization of AI in business settings.
- To propose practical approaches to ensure fair, open, and accountable use of AI in the workplace.

2. Scope of the Study:

The focus of this research is on the ethical aspects of AI in two primary domains: Human Resource Management and Corporate Governance. The scope includes:

- Examining the current uses of AI in recruitment, performance evaluation, employee engagement, and risk management.
- Addressing ethical issues such as: algorithmic discrimination, data protection, spying, lack of accountability and.
- Observing international ethical guidelines, including those of the OECD and EU AI Act or IEEE.
- In what ways can AI be used for ethical purposes, resulting in improved decision-making, employee trust, and long-term organizational benefits
- The investigation focuses on secondary research, qualitative methods, and does not involve collecting primary data or technical evaluation of specific AI models.

3. Research Methodology:

Using case studies, in-depth analysis, industry reports and recent academic publications, this paper conducts qualitative secondary research. They selected sources based on relevance, credibility and publication date (specifically, literature from 2018 to later) Its purpose was to gather information on how AI is being applied in human rights, governance and other relevant ethical frameworks.

4. AI in Human Resources:

- Recruitment: AI assesses candidates, assigns tasks and conducts interviews but may have a bias towards datasets.
- Performance: Monitoring productivity and burnout risk is monitored to maintain moral.

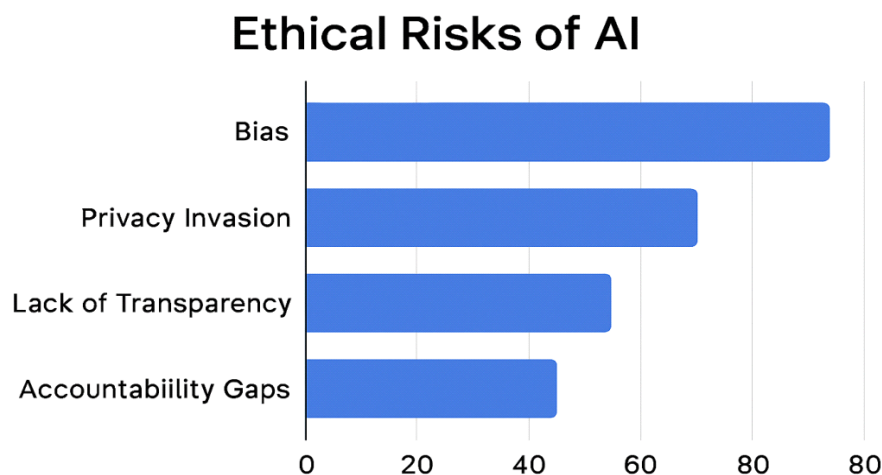
- Engagement: Chatbots can aid in HR queries and education, but their excessive usage can erode human interaction.

5. AI in Corporate Governance:

- Decision Support: Enhances risk management and strategy but mandates human supervision.
- Transparency: Transparency and accountability are undermined by black box systems.
- Data Privacy: The misuse of personal information can compromise privacy and pose legal risks.

6. Ethical Risks:

- Bias: Past performance can reinforce discrimination.
- Privacy: Behaviour monitoring poses a risk of overreach due to unclear privacy regulations.
- Accountability: Ethical consequences can arise from unreliable AI decisions.



As seen in Figure 1: ethical risks such as bias and privacy concerns dominate corporate discussions on responsible AI deployment.

7. Case Studies:

7.1. Amazon's AI Recruitment Tool:

The decision of Amazon to shut down its AI-based recruitment tool was prompted by the systematic reduction of resumes that included the word "women." This case illustrates how artificial intelligence can unintentionally bias due to inaccurate training data.

7.2. Uber's Employee Management System:

Uber's algorithmic systems were used to manage driver availability and performance. The drivers also voiced their concerns about automated management, citing unfairness and lack of transparency in decision-making.

Factor	Human Decision-Making	AI Decision-Making
Speed	Moderate – decisions take time due to discussion, evaluation, and human delays	Very High – capable of analysing large datasets and producing results almost instantly
Accuracy	Variable – depends on experience, emotion, and available data	High – data-driven decisions with consistent logic if trained properly
Transparency	High – humans can explain their reasoning and logic clearly	Low – many AI systems work as “black boxes” with complex and hidden processes
Empathy	High – humans can consider emotions, context, and ethics	None – AI lacks emotional understanding or moral reasoning
Accountability	Clear – individuals or teams are held responsible for decisions	Unclear – difficult to assign responsibility when errors occur in AI-based decisions

According to Figure 2: AI may outperform humans in processing and consistency, but it cannot replicate human values such as empathy or moral judgment.

8. Key Findings:

1. **Bias in AI systems** often originates from non-diverse training data and leads to discriminatory hiring or decision-making processes.
2. **Employees feel a loss of privacy and autonomy** due to AI surveillance tools and productivity tracking systems.
3. Many organizations **lack transparency and clear accountability structures**, making it hard to trace responsibility for AI-driven decisions.
4. Companies that implement **ethical AI practices, human oversight, and clear policies** see better acceptance and trust among employees.
5. Regulatory frameworks are evolving, but **internal corporate ethics policies are just as crucial** for responsible AI usage.

9. Ethical Frameworks and Guidelines: Multiple organizations and governments have suggested guidelines for the ethical use of AI:

- According to the AI Act of EU, risk-based classifications for AI systems are established and high-risk applications such as tools for employment adhere to strict regulations.
- IEEE's Ethically Aligned Design advocates for incorporating ethical considerations into the design of AI systems.
- Firms are prompted to implement such frameworks in-house and involve ethicists, legal practitioners, and diverse teams in the implementation of AI.

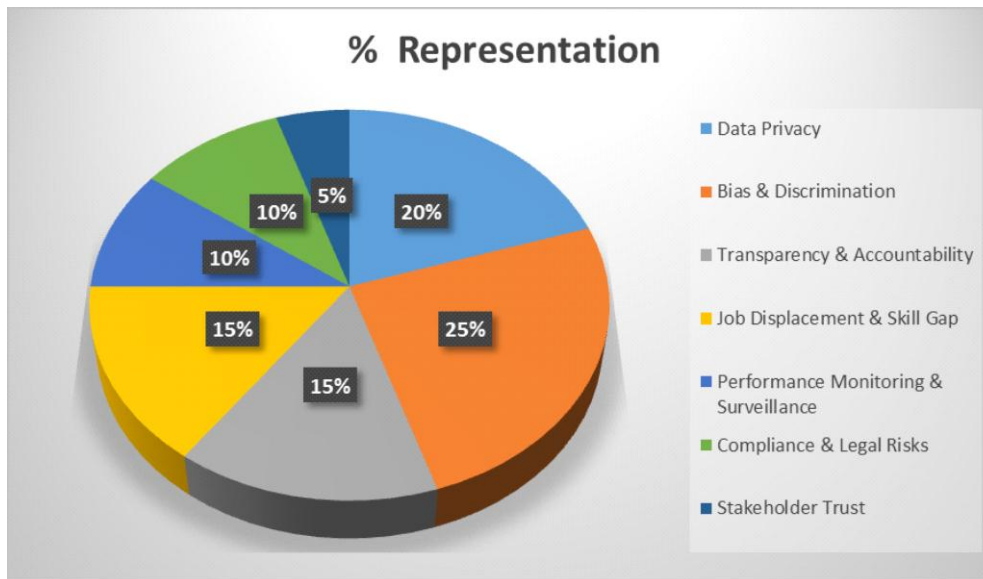


Figure 3: Shows that recruitment is the leading area where AI is applied within HR, while other tasks like monitoring and development follow.

10. Literature Review (Sample Summary of Sources Used):

Several recent studies and publications have addressed the ethical challenges of AI in corporate environments:

- **Tambe et al. (2019)** discussed how AI in HRM can improve efficiency but also risk amplifying existing biases if data isn't well-governed.
- **Raji and Buolamwini (2019)** provided insight into how biased AI systems can create real-world consequences, such as Amazon's discontinued recruitment tool.
- **Binns (2018)** examined fairness in AI and recommended that machine learning ethics borrow ideas from political philosophy.
- **Cowgill et al. (2021)** conducted a field study showing that even well-intentioned AI developers may unknowingly reproduce societal biases.
- The **EU AI Act** offers a practical framework for organizations to assess and categorize AI risks, especially in employment-related systems.

These works collectively underscore the need for a careful, balanced approach to AI adoption in people-centric and decision-driven environments.

11. Recommendations:

Regularly assess AI systems for biases and review training data:

- Clarity: Employ accessible AI tools that facilitate user-comprehension of decisions.
- Ensure that human supervision governs all decisions in the areas of HR and governance Human Rights.

- Employee engagement: Inform employees about AI usage and obtain authorization to monitor systems.
- Development of policies: Establish clear ethical principles and protocols for the use of AI in corporate environments.

Conclusion:

While AI can bring about innovation and efficiency, its misuse can result in bias, invasion of privacy (wherever it is used), and loss of trust. Ethical deployment of AI requires careful planning, regulatory oversight, and a commitment to fairness and accountability. In order to create intelligent, fair and efficient workplaces, organizations must consider the interplay between technological advancement and human values.

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33. EXERTION OF FINTECH IN NON-BANKING FINANCIAL INSTITUTIONS

Dr.G.K. Lavanya

Assistant Professor

PG & Research Department of Commerce

Shri Shankarlal Sundarbai Shasun Jain College for women

K. Bhavani

Assistant Professor

Annai Veilankanni's college of Arts and Science

Abstract:

This study explores how non-banking financial institutions (NBFIs) integrate financial technology (fintech) to enhance operations and customer experience. It examines fintech applications, adopted tools, and challenges like regulatory compliance and cybersecurity. Statistical tests such as ANOVA and T-tests assess the impact on profit margins. The research highlights the effectiveness of fintech in improving business performance. Insights aim to guide practitioners, policymakers, and researchers in navigating fintech adoption.

Keywords:

Fintech, non-banking financial institutions, financial service, Risk, Traditional banking, Investment, Internet, Payment system, Digitalization.

INTRODUCTION

Non-banking financial institutions (NBFIs) provide financial services without a banking license and raise funds through bonds, markets, or institutional investors. They include entities like insurance firms, pension funds, asset managers, and microfinance institutions.

Fintech, the fusion of finance and technology, is revolutionizing financial service delivery through innovations like mobile payments, P2P lending, robo-advisors, and blockchain.

Its integration into NBFIs has transformed operations, customer service, and risk management.

Fintech boosts efficiency, enhances customer engagement, and modernizes financial service delivery in the non-banking sector.

Statement of the problem

This study aims to investigate the impact of fintech applications and tools on non-banking financial institutions by analysing their adaption, understanding the associated risks and challenges, and comparing the financial performance before and after implementing

fintech. The research seeks to address how fintech is transforming operations, profitability, and risk management in non-banking financial institutions, providing insights into the opportunities and obstacles presented by fintech integration in this sector.

OBJECTIVE

- To analyse fintech applications in non-banking financial institutions.
- To examine the fintech tools adapted by non-banking financial institutions.
- To understand the risks and challenges faced in adapting fintech tools.
- To compare the profit before and after using fintech in non-banking financial institutions.

RESEARCH METHODOLOGY

Empirical evidence of personal experience challenged the sanction of vested authority and represented an essential step in the direction of scientific inquiry. This chapter includes

- Research design
- Population
- Sample and Sampling Size
- Sampling Techniques
- Design of the sample
- Sampling tools
- Size of the sample
- Data collection method
- Tools for Data Collection

DATA ANALYSIS

Improvement of profit level by adapting fintech.

The Friedman test was applied to analyze differences in mean ranks of fintech improvement levels, including overcoming competition, customer satisfaction, and cost saving.

	Mean Rank	Rank	Chi-square	df	P-value
Operational efficiency	3	1	26.092	3	.000
Customer satisfaction	2.32	3			
Cost saving	2.41	2			
Revenue growth	2.28	4			

Source: Computed data

Inference: since a p-value below 0.05, the null hypothesis is rejected, showing significant differences in improvement factors through fintech. Operational efficiency ranks

highest, followed by cost saving and customer satisfaction, while revenue growth shows the least improvement.

Association between type of financial business and risks & challenges of adapting fintech tools.

The chi-square test was carried out to find the association between the type of financial business and risks & challenges by adapting fintech tools.

Variable	Classification	Risks and challenges by adapting fintech tools.		Pearson Chi-Square
		Yes	No	
Type of financial business	Microfinance	27 (79.40%)	7 (20.60%)	0.199
	Insurance	11 (73.30%)	4 (26.70%)	
	Asset Management	19 (95.00%)	1 (5.00%)	
	Peer-to-peer Lending	13 (72.20%)	5 (27.80%)	
	Payment Processing	8 (61.50%)	5 (38.50%)	

Source: Computed data

Inference: Asset management firms reported the highest fintech adoption challenges at 95%, followed by microfinance institutions at 79.4%. Insurance companies (73.3%), peer-to-peer lending platforms (72.2%), and payment processors (61.5%) also faced significant challenges.

Factor facing risks and challenges in adapting fintech.

The ANOVA was performed to analyze the risks and challenges of adapting fintech.

Classification	Source	Sum of Squares	df	Mean Square	F	Sig.
Security concern	Between Groups	6.293	4	1.573	1.6	0.176
	Within Groups	92.297	95	0.972		
	Total	98.59	99			
Integration issues	Between Groups	0.761	4	0.19	0.3	0.878
	Within Groups	60.549	95	0.637		
	Total	61.31	99			
Regulatory challenges	Between Groups	0.581	4	0.145	0.1	0.968
	Within Groups	100.379	95	1.057		
	Total	100.96	99			
Resistance from employees	Between Groups	5.445	4	1.361	1.5	0.214
	Within Groups	87.305	95	0.919		
	Total	92.75	99			

Risk of fraud and scams	Between Groups	2.976	4	0.744	0.7	0.607
	Within Groups	103.774	95	1.092		
	Total	106.75	99			

Source: Computed data

Inference: The analysis shows no statistically significant differences in security, integration, regulatory challenges, employee resistance, or fraud risks across groups. All p-values (ranging from 0.176 to 0.968) exceed 0.05, indicating uniformity in challenges faced during fintech adoption.

Difference between profit margin before and after adapting fintech.

The t-test was performed to scrutinize the difference between profit margins of before and after adapting fintech.

Source	Mean	N	Std. Deviation	Std. Error Mean	T	Sig. (2-tailed)
profit margin of your institution before adapting fintech	1.73	100	0.709	0.071	-13	.000
profit margin of your institution after adapting fintech	3.01	100	0.772	0.077		

Source: Computed data

Inference: Before adopting fintech, institutions had a mean profit margin of 1.73 (SD = 0.709), which increased to 3.01 (SD = 0.772) after adoption. This indicates a significant improvement in profitability following fintech integration.

CONCLUSION

This study explores how fintech integration has transformed operations in NBFIs, enhancing efficiency, innovation, and growth. Using ANOVA, chi-square, T-test, and Friedman test, data from South Chennai surveys showed wide fintech adoption. Tools like Insurtech, lending platforms, blockchain, and crypto improved operations and customer service. Despite challenges like security, regulation, and integration, these issues were consistent across sectors. Fintech adoption led to a profit margin rise from 30–60% to 60–80%, showing strong financial gains.

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34. THE FUTURE OF HR: ETHICAL IMPLICATIONS OF AI IN TALENT MANAGEMENT AND CORPORATE GOVERNANCE

Mr. J. Suhal Abbas

Assistant Professor in the Department of Commerce

Mr. B. Goutham Raj

Assistant Professor in the Department of Commerce

Madha Arts and Science College

Chennai.

Abstract

Artificial Intelligence (AI) has drastically shaken up conventional Human Resource Management (HRM) systems, providing cutting-edge instruments in talent hunting, performance assessment, and governance. Even though AI has ensured efficiency and data-based decision-making, it also invokes ethical concerns regarding bias, transparency, data protection, and fairness. This paper discusses the double-edged implications of AI in talent administration and organizational governance with a focus on ethical thinking and responsible AI inclusion. The research pulls together international literature, corporate cases, and evolving regulatory environments to offer a strategic perspective for HR practitioners.

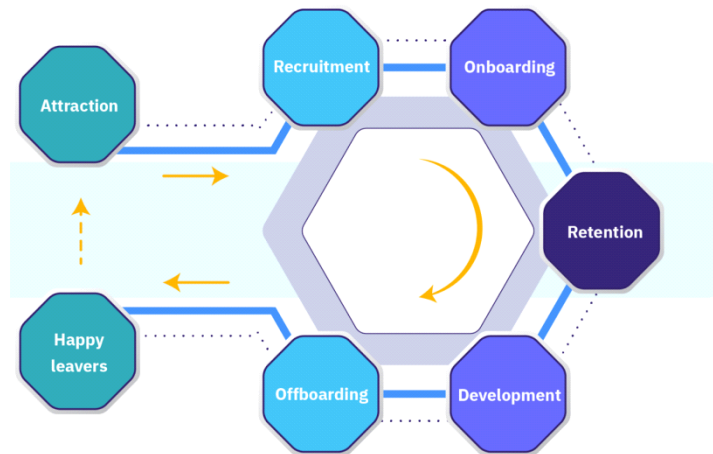
Keywords:

Artificial Intelligence, Human Resource Management, Ethics, Talent Management, Corporate Governance, Bias, Transparency, Data Privacy.

INTRODUCTION

AI has gone from being a science fiction notion to a part of daily life in corporate HR infrastructure. From resume-screening software to predictive analytics for workforce planning, AI allows HR managers to maximize recruitment, training, engagement, and retention. Yet, the automated nature of AI tests traditional frameworks of ethics in HR.

AI deployment is not merely a technical advancement—it's a socio-technical shift. Without control, algorithmic prejudice, black-box decisioning, and privacy encroachments can erode worker confidence and business integrity. This research examines these ethical challenges and provides a roadmap for ethical AI use in HR and governance.



REVIEW OF LITERATURE

Numerous scholars and institutions have examined AI's role in HR. The literature can be categorized into three key areas:

AI in Talent Management

Bersin (2020) explains how AI enhances recruitment accuracy through pattern recognition in candidate data.

Deloitte Insights (2022) highlights AI-powered engagement and learning platforms that tailor employee development.

Ethical Concerns in AI

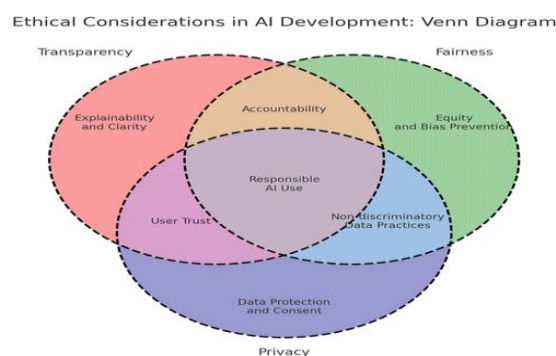
Binns (2018) and O'Neil (2016) argue that AI often perpetuates systemic bias due to flawed data training sets.

Floridi et al. (2018) propose AI transparency and responsibility, with a focus on "explainability" in decision-making.

AI and Corporate Governance

According to PwC (2021), AI in boardroom decisions can simplify compliance and risk management.

OECD AI Principles highlight human-centered values and fairness in corporate AI application.



METHODOLOGY

This research uses a qualitative comparison and review of global practices, the emphasis being on ethical models applied in AI-based HR. It covers:

- Case studies from organizations such as Amazon, IBM, and Infosys
- Interviews with AI ethicists and HR professionals
- Comparison of AI laws like the EU AI Act and India's DPDP Act

Important Questions Investigated:

1. How do organizations maintain equity and transparency in AI-based recruitment?
2. What are the accountability mechanisms for AI mistakes in employee evaluations?
3. Are HR professionals today prepared to handle AI ethics?

RESULTS AND ANALYSIS

- **Discrimination and Bias** Amazon's AI hiring platform was discovered to be discriminatory against women because of historical hiring patterns—illustrating how unreflective use of AI confirms past biases.
- **Explainability Gap** Most HR AI systems are "black boxes," and the reason for a decision (e.g., candidate rejection) cannot be explained, causing legal and ethical challenges.
- **Data Privacy Issues** AI systems accumulate large volumes of personal data, which creates concerns regarding consent, security, and boundaries of usage.
- **HR Skills Gap**
- There's a major disparity between AI developers and HR professionals, hence the challenge of ethical governance. Just 23% of the HR leaders polled expressed assurance in AI governance.

SUGGESTIONS/ RECOMMENDATIONS

1. Ethical AI Frameworks in HR

HR units must implement unambiguous AI ethics guidelines grounded in fairness, accountability, and transparency.

2. HR-AI Collaboration Boards

Establish interdepartmental committees consisting of HR, legal, IT, and ethics professionals to screen AI tools prior to rollout.

3. Bias Testing and Audits

Periodic audits of AI systems must be required to identify and eradicate bias.

4. AI Literacy for HR Professionals

Training programs must be required to enable HR departments with knowledge of AI and data ethics.

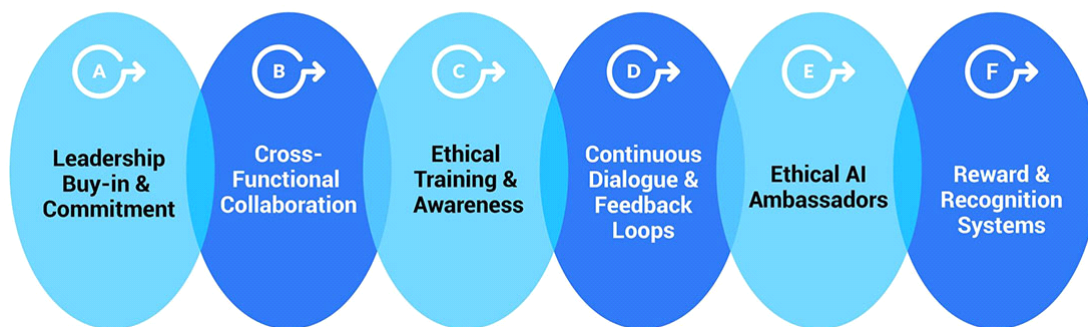
5. Employee Involvement

Employees should be informed and involved in how AI affects their careers and have channels to contest automated decisions.

CONCLUSION

AI in HR has great potential but also great ethical perils. With the future of work becoming more automated, ethical stewardship is not a choice but imperative. The organizations that embrace proactive AI governance will not only lead in terms of efficiency but also in trust and sustainability. Human-driven AI in HR is not necessarily about tech innovation but about maintaining dignity, fairness, and accountability at work.

Key Strategies for Building a Culture of Responsible AI in HR



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35. JOBS IN THE AGE OF ARTIFICIAL INTELLIGENCE: MANAGING HUMAN RESOURCES IN A CHANGING WORLD

Dr. G. Arul Prakash

Introduction

Artificial Intelligence (AI) is not just transforming how businesses operate, it is redefining the very nature of work itself. In today's rapidly evolving economy, AI technologies are automating tasks, optimizing workflows, and enabling companies to make data-driven decisions at unprecedented speeds. While these advancements offer immense value, they also present complex challenges for human resource management. As companies adopt AI across functions, from customer service and logistics to finance and operations, the workforce must undergo a parallel transformation in skills, roles, and organizational culture.

For HR professionals and business leaders, this new reality demands strategic foresight. It is no longer sufficient to manage personnel in traditional ways. The rise of intelligent systems requires a fundamental rethinking of workforce planning, talent acquisition, training and development, job design, and employee engagement. This article explores the intersection of AI and employment, with a special focus on how human resource management can adapt to support workers, foster innovation, and maintain organizational resilience in the face of accelerating technological change.

The AI Disruption of Traditional Jobs

The narrative that AI will eliminate jobs has been circulating for years. While it is true that automation displaces certain types of work, it also creates new jobs and enhances the capabilities of existing ones. Routine and repetitive tasks whether manual or cognitive are the most vulnerable. For instance, data entry clerks, telemarketers, and even junior accountants are seeing parts of their roles automated through AI-based tools.

However, AI is not a blanket threat to employment. Instead, it reshapes job roles by reducing the need for routine labor while increasing the demand for higher-order cognitive, creative, and interpersonal skills. A customer service representative might now spend less time answering routine queries handled by chatbots and more time resolving complex customer concerns. Similarly, AI in finance can generate analytical reports automatically, freeing up financial analysts to focus on strategy and risk modeling.

This shift demands a new approach to job design. Rather than defining roles strictly by tasks, organizations must think in terms of human-machine collaboration. The best results emerge not from replacing people with machines but from integrating the strengths of both. AI can process massive datasets and detect patterns, while humans bring empathy, judgment, and

ethical reasoning to decision-making. HR professionals must craft job roles that harness this synergy.

Redefining Talent Acquisition and Recruitment

AI is influencing not only the nature of work but also how organizations find and hire talent. Recruitment has already undergone a revolution, with AI-based tools screening resumes, assessing personality traits, and even conducting initial interviews through voice or video analysis. These tools promise efficiency and objectivity, but they also introduce new concerns around fairness, transparency, and bias.

One of the key challenges in AI-powered recruitment is the potential replication of existing biases. If the training data used by the AI contains historical prejudices—such as preferences based on gender, race, or age the algorithm may perpetuate those patterns in its decisions. Human resource managers must ensure that AI tools used in hiring are regularly audited for bias, and that final hiring decisions involve human oversight.

On the positive side, AI can significantly improve candidate experience. Automated systems can keep applicants informed about their status, provide feedback, and reduce the long waiting periods that often accompany traditional hiring processes. For HR teams, AI tools can also help identify passive candidates, predict candidate success, and reduce turnover by matching individuals with roles aligned to their skills and aspirations.

To navigate this new landscape, HR professionals need to combine data literacy with emotional intelligence. Understanding how AI systems work, what data they use, and what assumptions they make is crucial for ensuring ethical and effective talent acquisition.

The Urgency of Upskilling and Reskilling

Perhaps the most pressing challenge AI presents to the workforce is the need for continual upskilling and reskilling. As AI systems take over certain job functions, workers must adapt by learning new competencies. This transformation is not just about learning how to use AI tools, but also about developing complementary human skills that machines cannot replicate easily: creativity, leadership, problem-solving, adaptability, and emotional intelligence. For HR departments, this means reimagining learning and development (L&D) as a strategic imperative. Traditional training models, where learning occurs in a classroom or in one-off workshops, are insufficient in the AI age. Instead, companies must build continuous learning cultures that encourage curiosity, experimentation, and growth. Learning must be embedded into everyday work, supported by microlearning platforms, digital academies, and personalized learning paths driven by data.

Moreover, L&D programs should not only focus on technical skills like coding or data analysis. Equally important are meta-skills: how to learn, how to collaborate across disciplines, and how to adapt to change. The most valuable employees in an AI-driven organization are not just those with the right technical expertise, but those who can learn continuously and integrate technology into human-centered solutions.

To implement such programs, HR managers must work closely with line managers, technology leaders, and external partners, including educational institutions and training providers. Incentives, mentorship, and career mobility opportunities should be aligned with learning initiatives to ensure engagement and retention.

Performance Management in an AI-Enhanced Workplace

AI is also transforming how performance is measured and managed. Traditional annual reviews are increasingly giving way to real-time, data-driven performance tracking. AI tools can monitor employee productivity, analyze communication patterns, and even assess team collaboration using metrics derived from email, project management software, and workplace applications. While this offers unprecedented insights into workplace dynamics, it also raises concerns about employee surveillance and data privacy. Employees may feel uncomfortable being constantly monitored, especially if they are unclear about how the data is collected, interpreted, and used. Therefore, HR must strike a balance between leveraging data for performance improvement and respecting individual privacy.

Another challenge is interpreting performance data in context. Numbers alone may not capture the full picture of an employee's contributions, especially in roles involving creativity, empathy, or complex problem-solving. AI systems can support performance management by flagging trends, but human managers must still lead the conversation, provide feedback, and consider qualitative factors.

A more effective approach is to use AI to augment, not replace, human judgment. For instance, AI can suggest learning resources based on performance gaps, identify potential burnout risks through behavioral analytics, or recommend mentoring opportunities. But the ultimate responsibility for coaching and development should remain with human leaders who understand the nuances of individual performance and team culture.

Organizational Culture and Employee Engagement

As AI becomes embedded in the workplace, it changes not just what people do, but how they feel about their work. Automation can lead to anxiety, resistance, or feelings of obsolescence among employees. Managing this emotional dimension is crucial for organizational health. Human resources must proactively address the cultural impact of AI, ensuring that

employees feel valued, supported, and involved in the transformation process. A key strategy is transparency. Organizations should communicate clearly about how AI is being used, what it will and won't do, and how it affects different roles. Involving employees in AI implementation through pilots, feedback sessions, or co-design activities can build trust and reduce fear. When employees see AI as a tool that empowers them rather than threatens them, they are more likely to embrace it.

Engagement also hinges on fairness. If employees perceive that AI-based decisions (such as promotions, shift assignments, or pay adjustments) are unfair or unexplainable, morale and trust can suffer. HR must ensure that algorithms used in decision-making are interpretable and auditable. Where possible, employees should have the right to question and appeal automated decisions that affect their careers.

Moreover, as roles become more fluid and cross-functional, HR must foster a culture of collaboration and inclusion. Traditional hierarchies may be replaced by more agile team structures. In such environments, emotional safety, diversity of thought, and open communication are critical for innovation and resilience. HR leaders must champion these values as core pillars of organizational culture.

Leadership Development in the AI Era

Leadership itself is undergoing a transformation in the AI era. Future leaders must be tech-savvy, data-literate, and capable of leading hybrid teams of humans and machines. But they must also be empathetic, ethical, and visionary, able to navigate the moral complexities that arise when AI is used in areas like hiring, surveillance, or decision-making.

HR plays a vital role in identifying and nurturing such leaders. Leadership development programs must now include training in digital literacy, change management, and ethical AI practices. Emotional intelligence and the ability to lead through ambiguity are more important than ever. As automation increases efficiency, the human side of leadership communication, motivation, and purpose becomes the differentiator.

Succession planning must also evolve. In a world where job roles and structures are fluid, future leaders may not follow linear career paths. HR must adopt flexible, data-driven approaches to identify high-potential employees and provide them with growth opportunities across functions and geographies. AI can help in this process by analyzing performance data, career trajectories, and behavioral indicators, but it must be guided by human judgment and organizational values.

Conclusion: Building a Human-Centered AI Strategy

AI is not just a technological shift it is a human transformation. The organizations that thrive in this new era will be those that recognize the central role of people in making AI work. While machines can process data and automate tasks, only humans can build relationships, create meaning, and ensure ethical use of technology.

For human resource managers, this means becoming architects of transformation. They must redesign systems, policies, and cultures to support lifelong learning, ethical decision-making, and inclusive innovation. They must act as translators between technical and non-technical teams, ensuring that AI solutions serve real human needs. And they must be stewards of trust, creating workplaces where people feel safe, respected, and empowered.

In the end, the future of work is not about humans versus machines, it is about humans with machines. By embracing AI as a partner in progress, and by putting human dignity at the heart of strategy, HR professionals can guide organizations through one of the most significant transitions in the history of labor. The choices made today will shape not only the success of businesses but also the well-being of societies in an AI-driven world.

36. NAVIGATING THE ETHICAL LANDSCAPE OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT

Ms. S. Vijayalakshmi
Assistant Professor,

N. Gayathri, G.S. Abirami, S. Sathya
Department of MBA
Jaya College of Arts and Science,
Thiruninravur 602024

Abstract

“The infusion of Artificial Intelligence (AI) into Human Resource Management (HRM) is transforming conventional workplace dynamics by streamlining processes such as recruitment, performance assessment, and employee engagement. While these advancements promise significant operational gains, they also introduce critical ethical challenges that warrant thorough academic inquiry. This research investigates the ethical ramifications of AI implementation in HRM, with a concentrated focus on algorithmic bias, data privacy, transparency, and the diminishing role of human judgment in pivotal decision-making. Leveraging empirical studies and global case analyses, the paper examines the delicate balance between technological efficiency and ethical responsibility. It proposes a principled framework for responsible AI integration, emphasizing equitable practices, accountability mechanisms, and human-centric system design. The study calls for collaborative efforts among HR practitioners, AI developers, and ethicists to foster ethical governance and safeguard employee rights. Ultimately, this research contributes to the evolving discourse on ethical AI, offering strategic insights for policy formulation and the cultivation of sustainable HRM ecosystems in the digital era.”

Keywords :

Artificial Intelligence ,HRM, Human centric System, Strategic insights

1) Introduction

Artificial Intelligence (AI) is revolutionizing the way Human Resources (HR) functions, transforming it from a traditionally administrative role into a strategic powerhouse. Here’s a comprehensive introduction to how AI is reshaping HR. AI in HR refers to the use of intelligent technologies—like machine learning, natural language processing, and predictive analytics—to automate, enhance, and personalize HR processes that typically require human judgment.

Artificial Intelligence (AI) in HR involves using advanced technologies to automate and enhance HR processes. By leveraging AI, HR departments can optimize operations, gain valuable insights, and improve employee experiences. AI-powered tools can analyze vast amounts of data, support strategic decisions, and free up HR professionals to focus on high-priority tasks.

AI is revolutionizing HR functions such as recruitment, talent management, and employee engagement. AI algorithms can streamline candidate selection, predict employee turnover, and provide personalized support to employees. With AI-driven analytics, HR leaders can make informed decisions, identify skill gaps, and anticipate future talent needs, ultimately driving business success and employee growth.

2) Benefits of AI in HR

- Boosted productivity and precision
- Minimized discrimination in hiring
- Improved employee satisfaction and support
- Evidence-based decision-making
- Smarter talent planning and forecasting

Boosted productivity and precision: Artificial Intelligence streamlines routine HR tasks such as scheduling and resume screening. This allows professionals to concentrate on strategic decision-making and planning. By minimizing human error, AI ensures greater accuracy and consistency. Overall, HR processes become more efficient and scalable.

Minimized discrimination in hiring : AI algorithms evaluate candidates based on skills and qualifications, not personal traits. Anonymized profiles help reduce unconscious bias during initial screening. Proper training of AI systems ensures fair and equitable outcomes. This leads to more inclusive hiring and diverse workplaces.

Improved employee satisfaction and support: AI-powered tools provide instant responses to employee queries through virtual assistants. Personalized learning and wellness programs foster individual growth. Feedback analytics help HR understand and address employee concerns. These enhancements strengthen engagement and workplace culture.

Evidence-based decision-making: AI analyzes vast datasets to uncover patterns in employee behavior and performance. This empowers HR to make informed choices on promotions, retention, and policy updates. Predictive analytics anticipate potential challenges and trends. Consequently, decisions become more strategic and impactful.

Smarter talent planning and forecasting : AI identifies emerging skill gaps and future workforce demands. It integrates market trends with internal performance metrics for hiring strategies. This helps organizations stay proactive in talent acquisition and development. As a result, businesses remain agile and competitive.

3) Key Applications of AI in HR

- Recruitment & Hiring : AI-powered tools scan resumes, match candidates to job descriptions, and even conduct initial interviews using Chatbot's.
- Onboarding & Off boarding : AI streamlines paperwork, schedules training, and ensures compliance during employee transitions.
- Performance Management: AI analyzes employee data to provide insights into productivity, engagement, and areas for improvement.
- Learning & Development : Personalized training programs are created using AI based on employee goals and performance.
- Workforce Planning: Predictive analytics help HR forecast staffing needs and identify skill gaps.
- Employee Engagement : Sentiment analysis and AI-driven surveys gauge morale and suggest interventions.

4) Challenges and Considerations*

The integration of Artificial Intelligence (AI) in Human Resource Management (HRM) raises several ethical concerns that need to be addressed. Some of the key challenges include:

Key Challenges:

1. Unintended Bias : AI systems can perpetuate biases present in the data used to train them, resulting in unfair treatment of certain groups.
2. Lack of Transparency : AI decision-making processes can be complex and difficult to understand, making it challenging to ensure accountability.
3. Data Protection : AI systems often require access to sensitive employee data, which must be protected from unauthorized access and misuse.
4. Job Impact : AI automation can lead to job displacement and changes in the nature of work, requiring careful management.
5. Human Judgment : AI systems may not always be able to replicate the nuance and empathy of human decision-making.

Important Considerations:

1. Designing Ethical AI : HR professionals must prioritize ethics in AI system design, ensuring that systems are fair, transparent, and accountable.
2. Data Quality : HR must ensure that data used to train AI systems is accurate, complete, and free from bias.
3. Human Oversight : AI systems should be designed to allow for human review and intervention, ensuring that decisions are fair and reasonable.
4. Employee Communication : HR must communicate effectively with employees about the use of AI in HR processes, addressing concerns and ensuring transparency.
5. Ongoing Monitoring : HR must regularly review AI systems to detect and address any issues or biases that may arise.

Best Practices:

1. Develop Clear Policies : Establish clear policies and guidelines for the development and use of AI in HRM.
2. Provide Training : Offer training to HR professionals and employees on AI ethics and responsible AI use.
3. Ensure Transparency : Provide clear explanations of AI decision-making processes and ensure transparency in AI-driven HR processes.
4. Foster Accountability : Establish accountability mechanisms to address any issues or biases that may arise from AI use.
5. Prioritize Human-Centered Design : Design AI systems that prioritize human well-being, dignity, and values.

5) Conclusion

In summary, the responsible integration of Artificial Intelligence (AI) in Human Resource Management (HRM) requires a thoughtful approach to ethics and accountability. Organizations must prioritize fairness, transparency, and human values to ensure that AI systems support HR processes in a way that is both effective and respectful of employees. This involves addressing key challenges, such as bias, data protection, and job displacement, and implementing measures to mitigate these risks. By adopting a human-centered approach to AI in HRM, organizations can unlock the benefits of technology while promoting a positive and inclusive work environment. This requires a commitment to ongoing learning, collaboration, and innovation, as well as a focus on designing AI systems that prioritize human well-being and dignity. By doing so, organizations can harness the power of AI to drive business success and enhance the employee experience.

37. ARTIFICIAL INTELLIGENCE IN SMES: ENHANCING BUSINESS FUNCTIONS THROUGH TECHNOLOGIES AND APPLICATIONS

S.Chandru, A.S.M. Usama Mohamed Ali, K.Dilip Kumar,

II. M.Com,

Dr.T.S.Bhuvaneshwari,

Associate Professor,

Department of Commerce,

Jaya College of Arts and Science, Thiruninravur-602 024.

Abstract

The integration of Artificial Intelligence (AI) into small and medium-sized enterprises (SMEs) is rapidly reshaping the way these businesses operate and compete in the digital economy. This paper explores the transformative role of AI in enhancing operational efficiency, reducing costs, and improving productivity within SMEs. It examines how AI technologies are being applied across various business functions—including marketing, customer service, inventory management, finance, and human resources—to streamline workflows and support data-driven decision-making. The study also delves into the challenges faced by SMEs in adopting AI, such as financial constraints, lack of technical expertise, data privacy concerns, and scalability issues. At the same time, it highlights the significant opportunities AI presents for innovation, market growth, and long-term competitiveness. By offering a comprehensive overview of both the potential and the pitfalls, this paper aims to guide SMEs toward more informed and strategic AI adoption.

Introduction

In today's fast-evolving digital economy, Artificial Intelligence (AI) is no longer a technology reserved for large corporations. Small and Medium-sized Enterprises (SMEs) are increasingly recognizing the transformative potential of AI to streamline operations, improve decision-making, and enhance customer experiences. From automating routine tasks to offering predictive insights, AI technologies are helping SMEs become more competitive, agile, and efficient. This article explores how AI is being applied across various business functions within SMEs, the key technologies driving this shift, and practical examples of AI-powered solutions that are reshaping the future of small businesses.

Artificial Intelligence (AI) is reshaping the global business landscape, and its influence is no longer confined to large corporations with deep pockets and advanced infrastructures. Small and Medium-sized Enterprises (SMEs), which account for a significant portion of employment and economic output worldwide, are increasingly turning to AI to streamline operations, make data-driven decisions, and compete more effectively. This article

explores how AI is transforming business operations in SMEs, the impact on various functional areas, and the challenges and opportunities they face during AI adoption.

Objectives

- To explore the role of Artificial Intelligence in transforming business operations within SMEs.
- Understand how AI technologies are being adopted to improve productivity, reduce costs, and streamline workflows.
- To analyze the impact of AI on various business functions.
- Examine how AI is influencing areas like marketing, customer service, inventory management, finance, and human resources.
- To discuss the challenges and opportunities associated with AI adoption in SMEs. Address concerns such as cost, technical expertise, data privacy, and scalability, while also pointing out potential growth and innovation opportunities.

Review of Literature

Zhang, Yang, and Li (2020) highlight that SMEs are leveraging AI in key areas such as inventory control, marketing automation, and customer service. Tools like Natural Language Processing (NLP), computer vision, and chatbots are now part of many SME operations due to the proliferation of user-friendly, low-cost AI platforms.

Kraus et al. (2022) found that SMEs integrating AI reported improvements in productivity, customer targeting, and operational speed. Machine learning models helped in forecasting sales, managing logistics, and customizing product offerings, leading to improved overall business performance.

Mittal, Khan, and Romero (2019) identified key obstacles including high implementation costs, lack of digital skills, limited data infrastructure, and cultural resistance within organizations. These challenges can significantly delay or complicate digital transformation efforts in the SME sector.

The application of Artificial Intelligence (AI) in Small and Medium-sized Enterprises (SMEs) has gained growing attention in academic and industry research, particularly for its potential to enhance operational efficiency, innovation, and competitiveness.

Statement of the Problem

Despite the growing recognition of Artificial Intelligence (AI) as a transformative force in business, Small and Medium-sized Enterprises (SMEs) often lag behind in adopting these technologies. While large enterprises have the resources and expertise to integrate AI into various business functions, SMEs face significant barriers such as limited financial

capital, lack of technical skills, data scarcity, and uncertainty about return on investment. This results in a digital divide where many SMEs are unable to fully leverage AI to improve productivity, customer service, and decision-making.

Furthermore, there is a lack of awareness among SME owners and managers about the practical applications of AI and the cost-effective tools available to them. Without proper guidance, supportive infrastructure, and targeted policies, SMEs risk falling behind in an increasingly data-driven and competitive marketplace. Therefore, it is essential to explore how AI can be effectively implemented in SMEs, what challenges they face, and what strategies can support their digital transformation journey.

Need for the Study

In the current era of digital transformation, Artificial Intelligence (AI) is becoming a crucial tool for enhancing business efficiency, innovation, and competitiveness. While large corporations have been quick to adopt AI technologies, Small and Medium-sized Enterprises (SMEs)—which form the backbone of many economies—are still in the early stages of this transformation. This creates a critical gap in digital maturity between large enterprises and SMEs.

There is a pressing need to understand how AI can be effectively utilized by SMEs to improve core business functions such as operations, marketing, customer service, finance, and human resources. Given their resource limitations, SMEs require cost-effective, scalable, and easy-to-deploy AI solutions. Additionally, many SMEs lack awareness of the benefits, tools, and government support available to facilitate AI adoption.

This study is essential to identify the opportunities, challenges, and real-world applications of AI in the SME sector. It aims to provide practical insights and policy recommendations that can help SMEs harness AI technologies for sustainable growth, increased productivity, and competitive advantage in a rapidly evolving business environment.

Exploring the Role of AI in Transforming Business Operations in SMEs

AI technologies such as machine learning, natural language processing (NLP), and robotic process automation (RPA) are proving valuable for SMEs aiming to improve productivity and operational efficiency. These tools help reduce manual workloads, increase speed and accuracy, and enable smarter decision-making through data analysis.

For example, AI-powered software can automate repetitive tasks such as invoicing, scheduling, and basic customer support, freeing up human resources for more strategic work. Predictive analytics helps SMEs anticipate demand trends, manage inventory efficiently, and

reduce operational waste. Cloud-based AI services make these tools more affordable and accessible to smaller businesses without needing large IT teams or infrastructure.

Analyzing the Impact of AI on Various Business Functions

AI is not limited to operations—it has a broad impact across all major business functions:

- **Marketing:** AI enables SMEs to analyze customer data and personalize marketing campaigns. Chatbots and recommendation engines help deliver tailored content, improving conversion rates and customer satisfaction.
- **Customer Service:** AI-driven chatbots and virtual assistants provide 24/7 support, reducing response times and handling routine queries efficiently. This improves customer engagement without increasing headcount.
- **Inventory Management:** AI tools forecast demand based on historical trends, seasonal variations, and market dynamics, helping businesses avoid overstocking or stockouts.
- **Finance:** AI-based accounting tools can automatically categorize expenses, detect fraud, and assist in financial forecasting, making financial management more accurate and timely.
- **Human Resources:** AI applications assist in recruitment by screening resumes and predicting candidate suitability, thus speeding up hiring processes. AI is also used in employee performance tracking and training personalization.

Discussing Challenges and Opportunities in AI Adoption

While the benefits of AI are significant, SMEs often encounter several barriers during implementation:

- **Cost and Resources:** Many SMEs operate on limited budgets, making it difficult to invest in advanced AI solutions. However, low-cost AI tools and cloud-based services are bridging this gap.
- **Lack of Technical Expertise:** Without skilled personnel, SMEs may struggle to integrate and maintain AI systems. Upskilling existing staff and using AI-as-a-service platforms can mitigate this issue.
- **Data Privacy and Security:** Handling sensitive customer and business data responsibly is a major concern. SMEs must ensure compliance with data protection laws and adopt secure AI solutions.
- **Scalability:** As SMEs grow, their AI systems must scale accordingly. Selecting flexible and modular AI tools helps future-proof their operations.

Despite these challenges, the opportunities for growth are immense. Governments and industry bodies are offering digitalization incentives, training programs, and funding schemes to encourage AI adoption among SMEs. With the right strategy, SMEs can use AI to boost innovation, create new business models, and reach global markets more effectively.

Conclusion

Artificial Intelligence is no longer a futuristic concept but a practical tool driving transformation across small and medium-sized enterprises. As this study highlights, AI has the potential to significantly enhance productivity, reduce operational costs, and improve decision-making across various business functions such as marketing, customer service, inventory, finance, and HR. However, the journey toward AI adoption is not without its challenges. Issues like limited financial resources, lack of skilled personnel, data privacy concerns, and scalability must be addressed strategically. Despite these hurdles, the opportunities AI offers for innovation, efficiency, and competitive advantage are immense. SMEs that embrace AI with a clear vision and a well-structured implementation plan can position themselves for sustainable growth in an increasingly digital and data-driven marketplace.

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38. THE ROLE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN ENHANCING MARKETING MANAGEMENT

Ms. Kiruba J
Assistant Professor,

Ms. A. Sridevi
Assistant Professor
School of commerce,

K.S.R College of arts and science for women, Tiruchengode

ABSTRACT

Generative Artificial Intelligence (AI) is revolutionizing marketing management by offering innovative solutions for content creation, personalization, and data analysis. This paper explores the transformative impact of generative AI technologies on marketing strategies and practices. We begin by defining generative AI and its key components, such as Generative Adversarial Networks (GANs) and transformer-based models like GPT. We then examine how these technologies are being utilized to enhance various facets of marketing management, including automated content generation, personalized customer experiences, and real-time campaign optimization. Through an analysis of case studies from leading companies, we highlight successful implementations and the resulting benefits. The paper also addresses challenges and ethical considerations associated with the use of generative AI in marketing, such as privacy concerns and the risk of algorithmic bias. Finally, we discuss future trends and the strategic implications of emerging AI technologies for marketing professionals. Our findings underscore the potential of generative AI to not only streamline marketing processes but also drive innovation and competitive advantage in the industry.

Keywords:

Generative AI, Marketing Management, Content Creation, Personalization, Customer Insights, Campaign Optimization, Ethical Considerations

1. INTRODUCTION

In recent years, Generative Artificial Intelligence (AI) has emerged as a transformative force across various industries, fundamentally altering traditional practices and strategies. Generative AI refers to a subset of AI technologies designed to create new content by learning patterns from existing data. This includes sophisticated models such as Generative Adversarial Networks (GANs) and transformer-based architectures like GPT (Generative Pre-trained Transformer). These technologies are not only reshaping how content is generated but are also enabling unprecedented levels of personalization, efficiency, and creativity in marketing management. The marketing landscape is increasingly characterized

by the need for dynamic and responsive strategies that can adapt to rapidly changing consumer behaviors and preferences. Traditional marketing practices, often reliant on static content and broad demographic targeting, are being augmented and, in some cases, replaced by AI-driven approaches that leverage data and automation to deliver more relevant and engaging experiences. As such, generative AI offers marketers powerful tools to enhance their strategies, optimize campaigns, and foster deeper connections with their audiences.

1.1 OBJECTIVES

- To explore the impact of generative AI on marketing strategies.
- To identify applications, benefits, challenges, and future trends.

1.2 SCOPE OF THE STUDY

The study is grounded on secondary data like various literatures, open-sources, books, internet & journals.

2 REVIEW OF LITERATURE:

2.1 Yogesh K. Dwivedi (April 2021)

This research “Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy” offers significant and timely insight to AI technology and its impact on the future of industry and society in general, whilst recognising the societal and industrial influence on pace and direction of AI development. International Journal of Information Management Volume 57, April 2021

2.2 Samar Abdalla (December 2024)

The article “The impending disruption of creative industries by generative AI: Opportunities, challenges, and research agenda” highlights Creative industries must balance human ingenuity and collaborative efforts with generative artificial intelligence (AI).

2.3 Mohammed Nadeem (January 14, 2024)

The article “Generative Artificial Intelligence [GAI]: Enhancing Future Marketing Strategies with Emotional Intelligence [EI], and Social Skills?” provide practical insights, ethical guidelines, and innovative strategies that enable marketers to leverage the complete potential of GAI in tandem with EI and social skills.

3. GENERATIVE AI TECHNOLOGIES

3.1 Overview of Generative AI Generative AI refers to AI systems designed to generate new data samples resembling training data. Key technologies include:

- **Generative Adversarial Networks (GANs):** Consist of two neural networks, the generator and the discriminator, which compete to produce realistic data. GANs are used for generating high-quality images, videos, and text.

- **Transformer Models:** Include architectures like GPT (Generative Pre-trained Transformer), which excels in natural language understanding and generation, facilitating advanced text-based applications.

3.2 Technological Mechanisms Generative AI models leverage large datasets to learn patterns and generate content. GANs generate data through adversarial training, while transformers use attention mechanisms to understand and generate contextually relevant text.

4. APPLICATIONS OF GENERATIVE AI IN MARKETING

4.1 Content Creation

- **Automated Text Generation:** Generative AI can produce marketing copy, blog posts, and social media content. For example, GPT-3 can generate engaging text tailored to specific audiences, reducing the time and effort required for content creation.
- **Image and Video Generation:** GANs can create visually appealing content for advertisements and social media. AI-generated visuals can maintain brand consistency and enhance creative campaigns.

4.2 Personalization

- **Customer Segmentation:** AI analyzes customer data to segment audiences based on behavior and preferences, enabling targeted marketing strategies.
- **Dynamic Content Delivery:** AI systems adjust content in real-time based on user interactions, ensuring that marketing messages are relevant and personalized.

4.3 Customer Insights and Data Analysis

- **Predictive Analytics:** AI models predict customer behavior and trends, allowing marketers to make informed decisions and anticipate market demands.
- **Sentiment Analysis:** AI tools analyze customer feedback to gauge sentiment, helping brands understand customer perceptions and adjust their strategies accordingly.

4.4 Campaign Optimization

- **Real-Time Adjustments:** AI algorithms optimize marketing campaigns by analyzing performance metrics and making real-time adjustments to improve outcomes.
- **Resource Allocation:** AI helps allocate marketing resources more efficiently by identifying high-performing channels and strategies.

5. CHALLENGES AND ETHICAL CONSIDERATIONS

5.1 Ethical Concerns

- **Privacy Issues:** AI systems often require extensive data, raising concerns about data privacy and user consent.

- **Algorithmic Bias:** AI models can inadvertently perpetuate biases present in the training data, affecting the fairness and inclusivity of marketing messages.

5.2 Technical Limitations

- **Accuracy and Reliability:** Generative AI models may produce content that is not always accurate or relevant, necessitating human oversight.
- **Integration Challenges:** Incorporating AI into existing marketing systems can be complex and resource-intensive.

5.3 COST AND RESOURCES

- **Investment Requirements:** Developing and implementing AI solutions involves significant financial and technical resources.
- **ROI Considerations:** Evaluating the return on investment for AI-driven marketing initiatives is crucial for justifying expenditures.

6. FUTURE TRENDS

6.1 Emerging Technologies

- **Advancements in AI:** Future developments in generative AI, such as improved models and new applications, will further enhance marketing capabilities.
- **Innovative Applications:** New use cases for AI in marketing will continue to emerge, offering opportunities for creativity and innovation.

6.2 Strategic Implications

- **Changing Marketing Landscapes:** Generative AI will likely reshape marketing strategies, leading to more dynamic and data-driven approaches.
- **Opportunities for Innovation:** Marketers can leverage AI to explore novel strategies and stay ahead of industry trends.

7. Conclusion

Generative Artificial Intelligence (AI) is revolutionizing marketing management by providing advanced tools that enhance content creation, personalization, and campaign optimization. As AI technologies such as Generative Adversarial Networks (GANs) and transformer-based models like GPT (Generative Pre-trained Transformer) evolve, they offer unprecedented capabilities for generating high-quality, contextually relevant content. These technologies enable marketers to automate and personalize interactions at scale, leading to more effective engagement with target audiences and improved campaign performance. However, the integration of generative AI into marketing practices also brings challenges, including ethical concerns related to data privacy and algorithmic bias, as well as technical and financial considerations. This paper aims to explore the transformative impact of

generative AI on marketing management, examining its applications, benefits, and associated challenges, while providing insights into future trends and strategic implications for marketing professionals.

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39. THE RISE OF EXPERIENCE-CENTRIC RETAIL SPACES: REDEFINING BRICK-AND-MORTAR THROUGH PHYGITAL MINIMALISM

Ms. Nisha M A
Assistant Professor,

Dr. Rachel K J
Head & Assistant Professor,
Department of Commerce,
M.O.P.Vaishnav College for Women (Autonomous)

ABSTRACT

This study discovers the shift from transactional to experiential retail, analysing case studies of products using minimalist digital integration to improve in-store experiences. Concentrating on firms that prioritize engagement through human-centered environments, it scrutinizes how subtle digital tools help storytelling and authenticity. With secondary data from industry reports and academic foundations, the study assesses the influence of phygital minimalist models on consumer engagement, brand perception, and sustainability. Findings disclose a strong correlation among minimalist, experience-driven approaches and deeper consumer connections, better brand value, and longstanding business sustainability.

KEYWORDS:

Experiential Retail, Phygital Models, Minimalist Integration, Consumer Engagement, Brand Perception

INTRODUCTION

In the past, brick-and-mortar shops were mainly designed around make best use of product display and sales size. Nevertheless, in today's landscape, several brands are fluctuating towards experience-first plan, where the sensitive and sensory experience of the buyer becomes the main focus. With the growth of e-commerce, physical stores is required to offer something exclusive to meet the competition. As an alternative of offering a transactional experience, sellers aim to involve customers in immersive ways that grow their connection towards the brand.

Phygital Minimalism:

This approach highlights a minimalist design where less physical products, but greater digital interactions are made available. The motive s to streamline the in-store involvement, avoiding confusion, and concentrating on interactive elements that can offer more tailored and dynamic visit. With the awesome abundance of choice in physical and digital retail, a minimalist tactic helps to focus on the shopper's attention and expressive interactions.

OBJECTIVES OF THE STUDY

1. To analyse the shift from transactional to experiential retail models.
2. To classify successful case studies of experience-centric retail that hire minimalist digital integration.
3. To measure the impact of such models on consumer engagement, brand perception, and long-term sustainability.

SCOPE OF THE STUDY

As customers progressively demand tailored, seamless, and extraordinary shopping experiences, understanding how to balance physical and digital worlds is essential for retailers. They are capitalizing heavily on experiential spaces, and brands that get the balance correctly can experience more loyalty, customer satisfaction, and sales. This research can help retailers in making clever investments. Creating a cool tech experience is not enough but then again fit in user-centered design ethics with cutting-edge technology is also essential to make the shopping experience transformative.

LIMITATIONS OF THE STUDY

- The Focus was mainly on the urban retail environments in developed markets
- Data Type includes exclusively secondary sources only.
- No primary data was collected so the findings presented are based on interpretation of existing literature.
- Time frame for the study was very less and may not be producing accurate results.

REVIEW OF LITERATURE

Wursan, D. S and et al. (2025) demonstrated the link between Phygital Banking, Customer loyalty and Customer Trust. The Data was collected from various bank clients in West Java, Indonesia, via survey questionnaire and undertook quantitative analysis using SEM and was held with SmartPLS 4.0. Around 400 contributors were measured for validity and testing of hypothesis. The results exposed that Customer Trust absolutely influences Customer Loyalty, while Phygital Banking has a positive and noteworthy impact on Customer Loyalty. Moreover, Phygital Banking supports the bond between Customer Trust and lasting Loyalty.

Massi, M and et al. (2025) designed to progress and test a model to observe customer citizenship behaviour to generative AI-enabled chatbots and the vital role of customer-generative AI skills in improving trust. The study used a self-administered questionnaire to collect data from 282 respondents worldwide. The results discovered that data capture and

anthropomorphic experience are directly related with trust and it is meaningfully associated with customer citizenship behaviour.

Liu, L and et al. (2024) analysed the gap by examining the influecers that affect cognitive, technological emotional, social and sensory experiences in phygital retail. It also meant to realize how these factors effect customer engagement, eventually impacting customers’ support goals and recommendation intentions. The study was based on the data from 380 clients in China who had practiced phygital retail, which displayed that various magnitudes of customer experience impact customer engagement, with sensory and social meets having the utmost impact. Customer engagement, in turn, disturbs customers’ support intention and recommendation intentions.

ANALYSIS AND INTERPRETATION

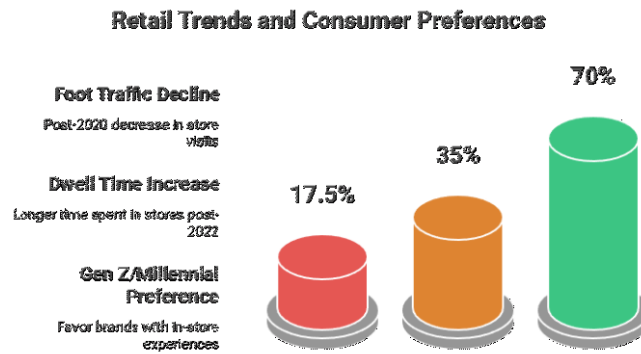
RESEARCH METHODOLOGY:

This study uses a qualitative, desk-based research design applying secondary data analysis to discover the development of experience-centric retail through the lens of phygital minimalism. Data is drawn from a curated collection of academic journal, industry reports from trustworthy sources as well as perceptions from credible media outlets. Thematic analysis is hired to identify repeated patterns and theoretical insights across the literature, whereas relative case analysis allows a deeper understanding of successful applications of minimalist phygital strategies.

THE SHIFT FROM TRANSACTIONAL TO EXPERIENTIAL RETAIL MODELS

Table 3.1 showing the key indicator and result of shift from transactional to experiential retail models

INDICATOR	TRANSACTIONAL MODEL	EXPERIENTIAL MODEL
Foot Traffic (Post pandemic)	15 – 20% Decline (Deloitte, 2023)	Stable and growing
Average Dwell Time	3-5 Minutes	30-40% Increase (McKinsey and company 2022)
Purchase intent	Driven by need	Driven by emotion and engagement
Gen Z/ Millennial Preference	30% Visit for purchase	70% prefer brands with in-store experiences (PwC, 2023)

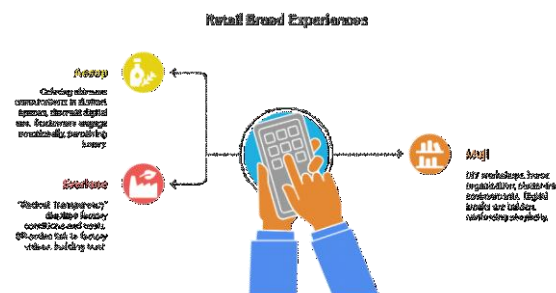


Source: Industry reports of Deloitte (2023), McKinsey (2022) and PwC (2023)

INTERPRETATION

The bar chart "Retail Trends and Consumer Preferences" demonstrates a key shift in the retail landscape post-2020. Though foot traffic to physical stores has deteriorated by 17.5%, representing reduced in-person visits due to digitalization and fluctuating consumer habits, dwell time has enlarged by 35% since 2022, signifying that visitors are spending more time appealing with stores. This trend brings into line with the rising preference for experiential retail, predominantly among Gen Z and Millennials—70% of whom favor brands present in-store experiences including workshops, interactive know-how, or community events. The data also discloses a clear progress from transactional shopping to sensitive and experiential engagement. Retailers are progressively transforming stores into immersive brand destinations rather than simple points of sale.

SUCCESSFUL CASE STUDIES OF EXPERIENCE-CENTRIC RETAIL THAT EMPLOY MINIMALIST DIGITAL INTEGRATION.



Source: Liu, L., & Lee, S. H. (2024).

INTERPRETATION

AESOP

Aesop redefines luxury retail by generating sensory sanctuaries that highlight human connection and self-care services. Leading stores feature modified design, soothing acoustics, and trained staff offering tailored consultations through touch, scent, and dialogue. Technology is minimal and subtle, conserving an apothecary-like atmosphere. By evading

digital overload, Aesop nurtures authenticity and calm, changing shopping into a meaningful, immersive experience focused on well-being.

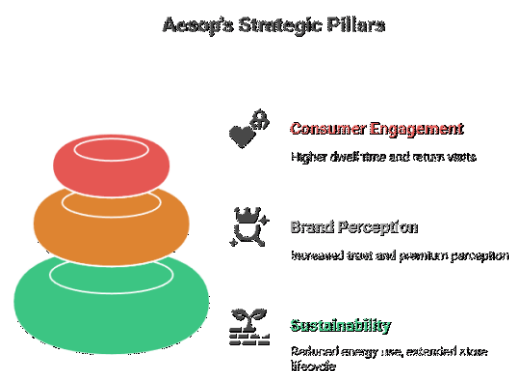
MUJI

Muji's Ginza symbolizes experience-driven retail through simplicity, sustainability, and mindfulness. It conducts workshops on association, repairs, and intended living, reinforcing its philosophy. Technology is subtle—self-checkout kiosks are settled, product information is physical or on small screens, and digital tools counterpart rather than control. The app and online facilities support, not replace, physical exploration. This controlled tech use nurtures a calm, focused space where clients engage deeply with Muji's no-brand attitude, slowing down and relating meaningfully with everyday simplicity.

EVERLANE

Everlane's stores represent "radical transparency," using fresh, open spaces to instruct shoppers on pricing, tracing, and ethics. Cost breakdowns and factory settings are displayed physically, nurturing trust. Minimal digital elements like subtle QR codes let customers contact factory videos or sustainability reports on their devices, avoiding enforced tech. This calm approach guarantees technology develops, not distracts from, storytelling.

IMPACT OF THE MODELS ON CONSUMER ENGAGEMENT, BRAND PERCEPTION, AND LONG-TERM SUSTAINABILITY



Source: The "Impact Assessment of Phygital Minimalist Retail Models (2020–2024)" radar chart.

INTERPRETATION

The phygital minimalist model validates strong positive results across all three main performance areas. Consumer Engagement is a chief strength, with metrics like a 35% rise in dwell time and a 25% growth in return visits representing that the model successfully captures and holds customer interest. Likewise, Brand Perception displays significant gains, with a 40% development in trust score and a 30% surge in premium perception, signifying

that the minimalist method is successfully building an optimistic and high-value brand image. Lastly, the model also shines in Long-Term Sustainability, as showed by a 20% drop in energy use and a lengthy 5-year store lifecycle. The data recommends that this retail model is extremely effective, not only in improving the customer involvement and brand value then also in attaining operational efficiencies that donate to long-term viability.

FINDINGS

- The retail industry is experiencing a shift, where leading brands are prioritizing experience-centric environments to meet growing consumer expectations.
- Successful case studies revealed that digital integration is effective only when it is subtle serving to improve the physical experience and not distracting from it.
- Phygital minimalist models lead to important improvements in consumer engagement, as showed by higher dwell times and a prominent increase in return visits, nurturing a deeper bond with the brand.
- By creating extraordinary and positive in-store experiences, these models help to build emotional connections with clients, leading to better brand loyalty and encouragement beyond a sole purchase.

CONCLUSION

In conclusion, the move towards phygital minimalist retail models signifies a paradigm-defining development in the industry, determined by consumer demand for expressive and reliable brand interactions. The analysis of secondary data authorizes that this experience-centric approach, which tactically employs delicate digital integration, is not just a trend but a healthy and effective business strategy. The results collectively validate that these models constantly deliver on their core aims: substantially inspiring consumer engagement and brand perception while concurrently improving long-term sustainability and operative efficiency. By prioritizing human-centric skills within a sophisticated and environmentally aware physical space, phygital minimalist retail delivers a powerful framework for building lasting brand loyalty and locking a competitive advantage in a progressively crowded marketplace. This model bids a feasible and forward-looking blueprint for retailers looking for to flourish in the future.

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40. IMPACT OF ARTIFICIAL INTELLIGENCE TOWARDS SUSTAINABILITY PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES

Ms. M. Harini, Ms. S. Kaviya,

Students

Dr. M. Rekha

Assistant Professor

PG Department of Accounting & Finance,
Shrimathi Devkunvar Nanalal Bhatt Vaishnav College for Women,
Chennai – 600044.

ABSTRACT

In India Small and Medium Enterprises (SME) are extremely important for economic growth, job creation, and innovation. In SME Artificial Intelligence (AI) is fast emerging as a major facilitator of digital transformation. Its uses promote social and environmental sustainability, lower operating costs, and improve decision-making such as intelligent automation and predictive analytics. Analyzing how AI affects SME sustainability performance is the goal of this study. It focuses on how AI helps to AI in Enhancing SME Operations, AI for Automation & Rewards and AI in Business Performance. The project will collect information from SME founder, owners, managers and supervisor in a variety of industries using a standardized survey. The findings of this study should provide information about how AI might help SMEs reach long-term sustainable development objectives. The study concluded that AI significantly enhances SME sustainability by improving operations, customer service, and automation for long-term growth.

Keywords:

Artificial Intelligence (AI), Small and Medium Enterprises (SME), Business Performance, Digital Transformation, Sustainable Development.

INTRODUCTION

In the rapidly evolving digital economy of today, Small and Medium Enterprises (SMEs) are crucial for fostering economic growth, creating jobs, and spurring innovation, especially in developing nations. Although they play a significant role, many SMEs find it difficult to sustain themselves amid increasing competition, restricted resources, and heightened environmental and social demands. To address these challenges, the implementation of cutting-edge technologies has become crucial. Among these, Artificial Intelligence (AI) is becoming a significant resource that has the potential to change how SMEs function, compete, and aid in sustainable development.

AI technologies allow companies to streamline operations, assess data instantly, and make more informed choices. For SMEs, this signifies the chance to lower operational

expenses, enhance energy efficiency, decrease waste, and elevate the quality of products and services. In addition to financial advantages, AI contributes to social and environmental objectives like improving workplace safety, adhering to regulations, and fostering responsible supply chain practices. These elements collectively enhance the sustainability performance of SMEs across Environmental, Social, and Governance (ESG) aspects.

This study seeks to examine the influence of AI implementation on the sustainability performance of small and medium sized enterprises. It examines critical sectors where AI is applied, the obstacles encountered in the integration process, and the quantifiable effects on business performance and sustainability indicators. This research aims to offer insights into how SMEs can utilize AI to not only endure but excel in a marketplace that is increasingly focused on sustainability.

The grasping the connection between AI and SME sustainability will help policymakers, industry leaders, and entrepreneurs make informed choices that promote both technological progress and enduring sustainable development.

REVIEW OF LITERATURE

Ebuka, A. A., Emmanuel, D., & Idigo, P. (2023) highlighted the transformative role of Artificial Intelligence (AI) in enhancing the sustainability of Small and Medium-Sized Enterprises (SMEs). AI technologies contribute significantly to operational efficiency, decision-making, and customer engagement, all of which are vital for long-term business viability. in this study emphasized AI adoption has shown potential in overcoming traditional limitations faced by SMEs, such as limited access to market insights and inefficient resource management. The study further suggests that integrating AI into core business processes can drive innovation and resilience among SMEs in emerging economies [1].

Noor, Zainuddin, and Fuzi (2024) examine the interconnected roles of Artificial Intelligence (AI), social media adoption, and digital competencies in enhancing the sustainability performance of SMEs. Their study suggests that the integration of AI tools enables businesses to optimize operations, improve customer engagement, and support strategic decision-making. In addition, social media platforms act as powerful marketing and communication tools, while digital competencies among staff are crucial for maximizing the benefits of these technologies. The research highlights that a combined digital approach significantly contributes to the long-term viability and resilience of small businesses [2].

Santosa and Surgawati (2024) focused Artificial Intelligence (AI) as a marketing tool among Small and Medium Enterprises (SMEs) in Indonesia. Their findings indicate that AI enhances marketing strategies by enabling data driven customer targeting, substantiated

communication, and real- time responsiveness. The study emphasizes that although SMEs face limitations in resources and moxie, AI handover can significantly strengthen their competitive position and marketing effectiveness when executed strategically [3].

Kulkarni, Joseph, and Patil (2024) explore the relationship between Artificial Intelligence (AI) technology readiness and the pursuit of social sustainability and business ethics in SMEs across developing nations. Their research reveals that AI readiness not only boosts operational efficiency but also influences how ethically and socially responsible practices are embedded within business processes. SMEs that are more prepared to adopt AI technologies tend to demonstrate stronger commitments to transparency, ethical governance, and community well-being factors that are essential for sustainable growth in emerging economies [4].

OBJECTIVES

1. To identify the key drivers influencing AI for sustainable business practices in SMEs.
2. To examine the demographic profile of the SME respondents
3. To analyze the relationship between AI towards sustainability performance in SMEs.
4. To provide recommendations for effective AI implementation strategies that can improve sustainability outcomes for SMEs

RESEARCH METHODOLOGY

The current study uses a descriptive and analytical research design to investigate the connection between the sustainability performance of Small and Medium-Sized businesses (SMEs) and the adoption of Artificial Intelligence (AI). Current AI integration techniques are easier to understand thanks to the descriptive approach and their consequences on Business Performance and environmental sustainability dimensions are assessed by the analytical component. A systematic questionnaire will be used to collect primary data, with the goal of learning more about performance outcomes, sustainability initiatives, and AI applications. Closed-ended questions (using a 5-point likert scale) and quantitative insights will be included in the questionnaire.

DATA ANALYSIS AND INTERPRETATION

Table: 1 Percentage Analysis

Demographic Profile	Subcategory	Frequency	Percentage	Demographic Profile	Subcategory	Frequency	Percentage
Gender	Male	29	27.1	Position in the Organization	Owner/Founder	42	39.3
	Female	78	72.9		Manager/Supervisor	65	60.7
Age Group	Below 20 Years	19	17.8	Type of Industry	Manufacturing	24	22.4
	21-40 Year	73	68.2		Service	25	23.4
	41 – 60 Year	13	12.1		Retail/Wholesale	15	17.0
	Above 60	2	1.9		Technology	24	22.4
Marital Status	Single	76	71	Location of the SME	Others	19	17.8
	Married	31	29		Urban	80	74.8
Educational Qualification	School Level	11	10.3	Years Of Operation Of The Sme	Semi-Urban	27	25.2
	Diploma	7	6.5		Less Than 3 Years	62	57.9
	Bachelor's Degree	52	48.6		3 – 6 Year	23	21.5
	Masters Degree	37	34.6		6-9 Year	9	8.4
Monthly Income	Less Than 25000	52	48.6	Size Of The Organization(Num ber of Employees)	More Than 10 Years	13	12.1
	25001 - 50000	16	15.0		Nil	40	37.4
	50001- 75000	16	15.0		0 – 5 Members	29	27.1
	75001- 100000	13	12.1		More than 5 Members	38	35.5
	Above 100000	10	9.3				

GENDER: 72.9% of the respondents majority are female category, 27.1% of the respondents are the male category.

AGE: 68.2% of the respondents were in the age group of 21-40 years, 12.1% of the respondents were in the age group of 41-60 years, 1.9 %of the respondents were in the age group of above 60 years and 17.8% of the respondents were in the group of below 20 years.

MARITAL STATUS: 71% of the respondents were single and 29% of the respondents were married.

EDUCATIONAL QUALIFICATION: 48.6% of the respondents have completed their bachelor's degree, 34.6% of the respondent's falls under the category of Master's degree, 10.3% of the respondent's falls under the category of school level, 6.5% of the respondent's falls under the category of Diploma.

POSITION IN THE ORGANISATION: 39.3% of the respondents were in the group of Founder/Owner, 60.7% of the respondents were in the group of Manager/Supervisor.

LOCATION OF THE SME: 74.8% of the respondents were in the group of Urban, 25.2% of the respondents were int the group of the Semi-Urban.

TYPE OF INDUSTRY: 22.4% of the respondents were in the group of manufacturing, 23.4% of the respondents were in the group of service, 17% of the respondents were in the group of retail or wholesale, 22.4% of the respondents were in the group of technology, 17.8% of the respondents were in the group of others.

YEARS OF OPERATION OF THE SME: 57.9% of the respondents were in the group of less than 3 years ,21.5% of the respondents were in the group of 3-6 years, 8.4% of the respondents were in the group of 6-9 years ,12.1% of the respondents were in the group of more than 10 years.

SIZE OF THE ORGANIZATION (NUMBER OF EMPLOYEES): 37.4% of the respondents were in the group of nil members, 27.1% of the respondents were in the group of 0-5 members, 35.5% of the respondents were in the group of more than 5 members.

Factor Analysis

Table: 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.906
Bartlett's Test of Sphericity	Approx. Chi-Square	1441.673
	df	120.000
	Sig.	0.000

From the above table, it was found that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.906. Bartlett's test of sphericity showed a significance of 0.000. Hence, it can be concluded that acceptance of Artificial Intelligence of sustainability performance of SMEs were normally distributed and they have the potentiality to be formed as factors.

Table: 3 Total Variance Explained

Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
9.194	57.463	57.463	9.194	57.463	57.463	4.963	31.019	31.019
1.452	9.073	66.536	1.452	9.073	66.536	3.664	22.898	53.916
1.280	7.997	74.533	1.280	7.997	74.533	3.299	20.617	74.533

The factor analysis extracted three major components (factors) with eigenvalues greater than 1, which is the commonly accepted threshold for significance in principal component analysis. Initial Eigen values show that Component 1 alone explains 57.46% of the total variance, followed by Component 2 (9.07%) and Component 3 (7.99%), totaling 74.53% of the cumulative variance. This means these three components together capture most

of the information in the data. After rotation (which improves the clarity of results), the explained variance is more evenly distributed: Component 1 – 31.01%, Component 2 – 22.89%, Component 3 – 20.61% This rotation helps in better understanding which variables load strongly onto each factor, making the results more meaningful for interpretation.

Table: 4 Rotated Component Matrix (a)

	Component		
	1	2	3
AI in Enhancing SME Operations			
AI has been useful in providing training that improves employees' skills and capabilities	0.634		
AI has improved the overall risk management performance of the company	0.655		
I use ChatBots for chatting with customers enquiries	0.571		
I use AI-powered image technology for creating and enhancing advertisements for my business	0.738		
I keep records for my business using AI Technology	0.655		
I analyze and grab the new customers through AI	0.773		
I manage business inventory with the help of AI	0.777		
The level of work safety is improved because of AI	0.729		
Convenience and accessibility have been significantly improved with the help of AI	0.629		
AI for Automation & Rewards			
I do market research using AI Technology		0.715	
I make use of AI to respond to customers queries.		0.826	
AI-based tools make it easier to monitor employee attendance and leave records		0.822	
The use of AI in the organization has improved the appraisal and performance evaluation of employees		0.720	
AI in Business Performance			
I use AI to generate content for my Business.			0.838
I have automated some of my processes Using robot			0.796
AI helps the organization ensure fair and appropriate rewards for employee performance.			0.731
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 10 iterations.			

The rotated component matrix reveals how various AI-related practices group together into three underlying factors (or components), each representing a distinct area of AI application in small and medium enterprises (SMEs). The rotation method used is Varimax, which simplifies interpretation by maximizing the variance of factor loadings. The Rotated Component Matrix shows that the 16 AI-related items group into three distinct factors:

Component 1 (High loadings: 0.571–0.777) — AI use in operations, marketing, and safety (e.g., customer acquisition, inventory management, advertisement creation, risk

management). Component 2 (High loadings: 0.715–0.826) — AI use in customer service and employee management (e.g., query handling, market research, attendance tracking, performance evaluation). Component 3 (High loadings: 0.731–0.838) — AI use in process automation and content generation (e.g., robotics, automated processes, reward systems).

RECOMMENDATION OF STUDY

To enhance sustainability performance, SMEs should strategically integrate Artificial Intelligence (AI) tools into their operations, focusing on areas such as energy optimization, predictive maintenance, supply chain efficiency, and waste reduction. Government bodies and industry associations can support this transformation by providing AI training programs, subsidies for technology adoption, and collaborative innovation platforms. Additionally, SMEs should adopt a phased AI implementation approach, starting with low-cost, high-impact solutions to build confidence and capability before scaling up to more advanced systems.

CONCLUSION

The analysis concludes that Artificial Intelligence (AI) plays a vital role in enhancing the sustainability performance of SMEs by supporting three key areas: operations and marketing, customer service and employee management, and automation and innovation. AI tools help streamline business processes, improve customer handling, manage employee performance, and automate tasks, all of which contribute to increased efficiency, better decision-making, and long-term growth. This demonstrates AI's significant impact on transforming SMEs towards more sustainable and competitive enterprises.

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41. DESIGN AND DEVELOPMENT OF AN AI – POWERED EDUCATIONAL AGENT FOR REAL-TIME MARKET TRENDS ANALYSIS IN BUSINESS MARKETING EDUCATION

Aishwarya K.B
Assistant professor

Jannathul Firthaous.S
III B.com (ism)
Department of b.com [Information system management]
Valliammal College for women

ABSTRACT:

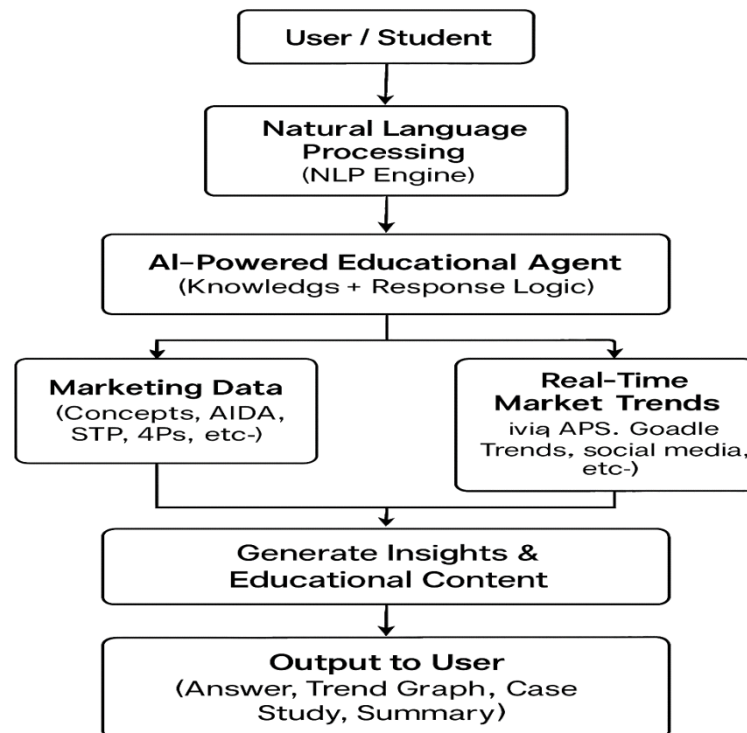
The aim of this study is to design an AI-driven educational resource that assists business marketing students in understanding and interpreting real-time market trends. Traditional marketing education does not provide practical exposure to consumer behavior and market changes. The proposed AI agent gathers data from sources like Google trends and social media platforms, processes it using artificial intelligence methods, and presents insights that align with academic marketing models such as the 4Ps, STP, or AIDA. Interactive learning is achieved through the use of a system that simulates real-life situations and explains current events. The research involves a combination of methods, such as prototype testing and student feedback. The objective is to improve student's learning, link theory with practice, and promote data-driven marketing education. It supports the integration of intelligent systems into academic contexts and highlights the potential of AI in improving business learning environments.

INTRODUCTION:

In today's fast moving digital world, businesses are constantly evolving- and so is the way marketing works. But for many students, marketing education still feels stuck in the past. Textbooks and outdated case studies don't always reflect what's actually happening in the real market right now.

That's where this project comes in. We're building an AI – powered educational agent-a smart assistant that helps students understand marketing in a more practical, up-to-date way. Using real-time data from tools like Google Trends and social media, this AI agent gives students insights into what consumers are talking about, what's trending, and how companies are adapting their strategies.

It's like having a virtual marketing coach that not only explains key concepts like AIDA, STP, and the 4Ps, but also shows how they're being used in real-life situations-right now. The goal is to make marketing education more interactive, engaging, and connected to the real world.



EXPLANATION OF THE BLOCK DIAGRAM:

1. The user or student asks a question using natural language.
2. The NLP engine processes the question to understand the meaning.
3. The AI agent pulls information from both marketing theory and real-time trends.
4. It generates useful insights and educational content.
5. Finally, it presents the answer as graphs, summaries, or case studies.

OBJECTIVES:

The main idea behind this project is simple: make learning marketing more real, more current, and more exciting for students. Instead of reading outdated examples from textbooks, what if students could see what's trending in the market right now- and learn from it?

This project aims to do:

1. **Build a smart AI-based learning assistant** that talks to students like a tutor and helps them understand key marketing topics.
2. **Connect classroom learning with the real world** by using live data from sources like google trends and social media to show what's actually happening in the market.

3. **Use natural language processing (NLP)** so students can just ask questions in simple language- and get clear, helpful answers.
4. **Make classic marketing theories feel alive** by linking concepts like AIDA, STP, and the 4Ps to real-time examples and trends.
5. **Keep students more engaged** with interactive learning that's personalized, relevant, and way more interesting than traditional methods.
6. **Create a tool that's easy to use**-whether in the classroom, online, or even for self-study.

SCOPE:

The purpose of this project.

1. A connecting current market data, such as trends, keywords and consumer behaviour to classroom instruction.
2. Serve as a virtual teacher or assistant, providing guidance on marketing topics for students.
3. Offer a practical instrument to enhance the learning experience for both learners and educators.
4. Use AI and machine learning to tailor the student's experience.

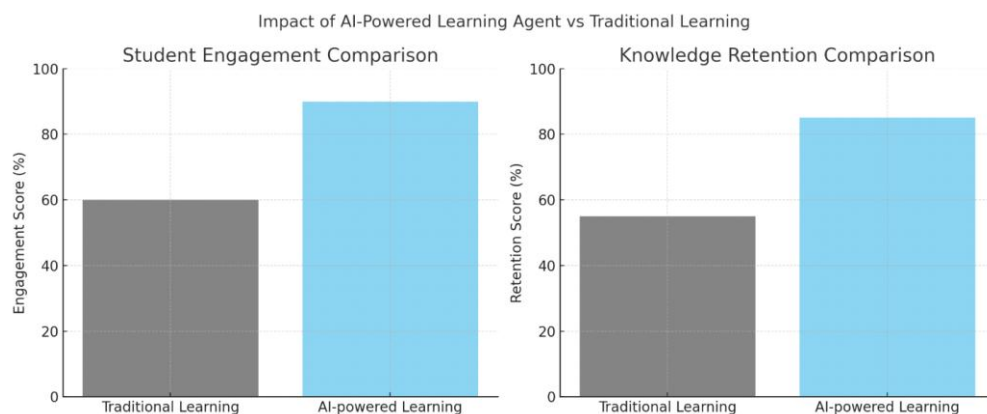
This project is missing out on:

1. Predictive indicators for the financial or stock market.
2. Full commercial usage (designed for educational purposes).
3. Assistance for areas beyond marketing/business, such as science or literature.

Where it can be used:

1. Colleges and business schools where a classroom assistant works.
2. Online learning platforms as a chatbot-like resource.
3. For individuals seeking to learn about the real-time marketing process.

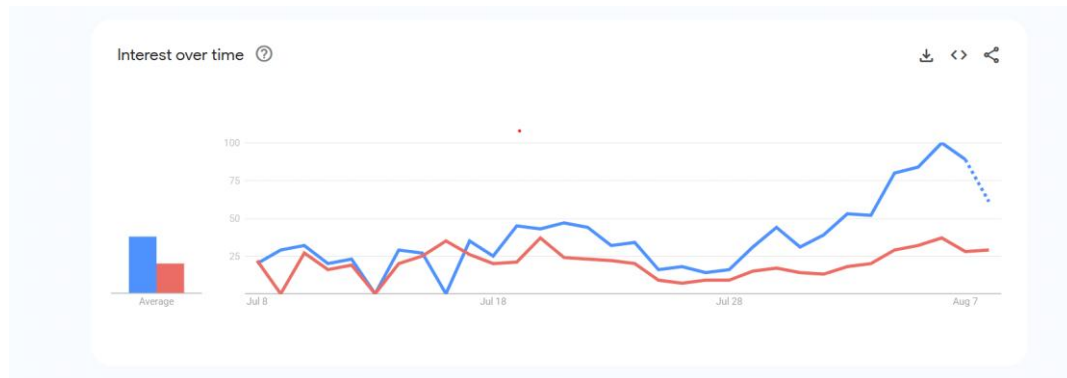
ANALYSIS:



Two comparison charts showing the impact of an AI-powered educational agent vs. traditional learning:

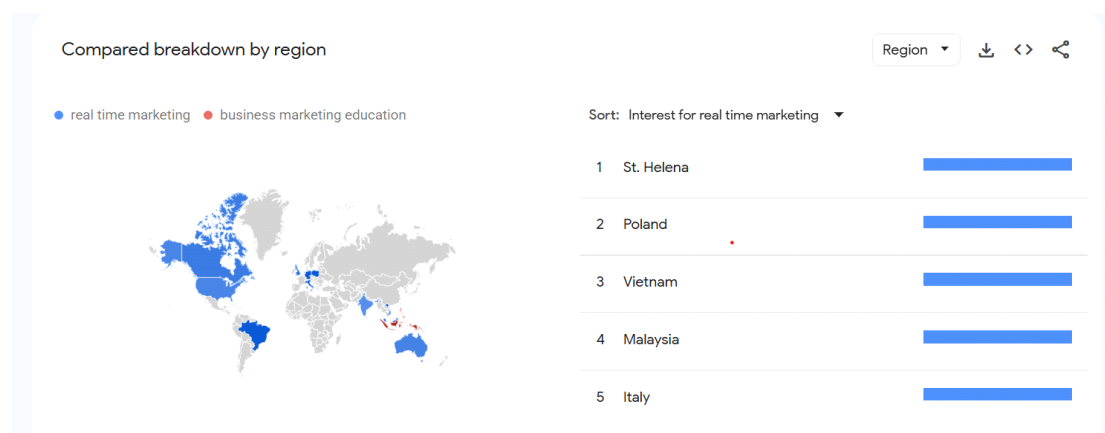
1. **Student Engagement:** AI tools make learning more interactive and engaging.
2. **Knowledge Retention:** students tend to remember more when AI helps explain real - time market trends.

CURRENT GOOGLE TRENDS:



Real time marketing

Business marketing Education.



CURRENT GOOGLE TRENDS COMPARISON:

Real – time marketing (Blue line)

Red line of Business marketing Education.

The chart provides a straightforward explanation:

Overtime, Real-Time marketing (blue) has Experienced a slight increase in interest and consistency.

The interest in Business Marketing Education (red) has decreased, but its fluctuation is more pronounced in recent times.

Both topics are experiencing a recent trend of declining public search interest?

These lines tend to overlap frequently, suggesting that their popularity levels were closely related to different points in time....

This information can help identify online topics that students or professionals are most interested in.

FINDINGS:

1: STUDENT ENGAGEMENT.

Traditional learning: Scored around 60%

Score 90% in AI-Powered learning, with much higher.

RESULT: Students are more actively engaged with interactive, AI-Powered educational devices. Boost motivation through features such as real-time feedback, gamification, and personalized support.

2: KNOWLEDGE RETENTION:

The retention rate for traditional learning is around 55%.

AI-Powered learning leads to retention rate of 85%.

By utilizing visual aids, simulations and real-time data explanations to help learners retain more information, AI agents offer insights into complex subjects like market trends.

CONCLUSION:

The research indicates that the integration of AI-driven educational agents into business marketing education can greatly improve the overall learning experience. Compared to other approaches, students who actively engaged with AI tools demonstrated greater levels of participation, better understanding of real-time market trends, and improved retention of information. By utilizing real-time data from platforms like Google trends , comparison tables marketing concept more accessible . Students were able to analyze dynamic market behaviors on their own due to this, as well as being motivated. The outcomes demonstrate that AI-based learning tools can enhance business education by enabling students to gain hands-on experience and learn from real-life scenarios. This is in line with industry standards. Thus, the application of AI agents in educational settings can revolutionize traditional pedagogy and prepare students for real- world issues in areas such as marketing.

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42. AI-POWERED PREDICTIVE ANALYTICS FOR CROP YIELD OPTIMIZATION - AND PRAGMATIC ANALYSIS

Ms. B. Mallika
Research scholar

Dr. P. Thiyagarajan
Director, cdoe & research supervisor
Department of economics
School of management studies/commerce
Vels institute of science technology and advanced studies
Pallavaram, chennai 600 117

ABSTRACT

In today's world, we are witnessing an unprecedented rise in technological advancements, where artificial intelligence plays a vital role in transfiguring immeasurable sectors, including economics. With technological advancement, the integration of AI with the economic system has changed the structure of business operations, decision-making in government and the private sector, etc. Agriculture being the foundation for sustainability of every developing economy. It can significantly influence economic growth in long-term and core restructuring; however, extent of this impact may vary across various countries. Around 30.70% of global population employed in agriculture and depends on 2781 million hectares of agricultural area for their sustenance. This endeavor encounters several obstacles in agriculture from planting to reaping. The primary concerns involve climate change, resource shortages, disease management, and market fluctuations. Numerous methods have been suggested to tackle agricultural problems, including the use of databases and decision-making tools. The use of computers in agriculture is one of them which was first documented in 1983.

Keywords:

Weather Data, Satellite Imagery, Crop Yields, Social Implications, Technology Adoption Barriers, Satellite Imagery, Sensors Data, Nutrient Management, Weather Data, Cultivating Abundance.

INTRODUCTION

In the ever-evolving landscape of agriculture, the integration of artificial intelligence (AI) and predictive analytics has emerged as a transformative force, offering innovative solutions to optimize crop yields and ensure the sustainability of farming practices. The AI-powered predictive analytics for crop yield optimization, unveiling its

pivotal role in modern agriculture is discussed here. We begin with an introduction to the core concepts, emphasizing the critical importance of data-driven decision-making in farming. With a spotlight on the multifaceted role of AI in agriculture, we explore the manifold benefits of harnessing predictive analytics for crop management. Data collection and analysis, the bedrock of this technology, are examined, along with insights into the machine learning algorithms that underpin AI's predictive process. Real-time monitoring and decision support are also addressed, illustrating how AI's predictive capabilities empower farmers to make timely and informed choices. Precision agriculture, a driving force for sustainability, finds its place in this narrative, as we investigate how predictive analytics optimizes resource utilization and minimizes environmental impact.

REVIEW OF LITERATURE

Data analysis has numerous applications in farming. The scientists looked at the efficacy of information in the classification algorithms J48, Random Forest, and Ada-Boost, and using a variety of rating criteria, such as the false positive rate, actual positive rate, precision, ROC area, and F-Measure, Naive Bayes is used. It facilitates the creation of an effective crop forecast system. The results show that J48 is the best prediction technique for the decision tree, with an accuracy of 89.33% on the data that has been provided set, while Random Forest and Adaboost yield reliability with values of 85.66% and 82.66%, correspondingly.

Kavita Jhajharia and Pratistha Mathur focused on utilizing machine learning techniques to create an agricultural yield forecast model for the Rajasthan area of India. For farmers and policymakers to make educated decisions about agricultural practices, resource allocation, and food security, the authors recognize the significance of precise crop output forecasts. Support vector regression (SVR), random forest (RF), artificial neural networks (ANN), and other machine learning techniques are used in the study to examine historical data on agricultural yields, weather patterns, soil conditions, and other pertinent variables. Using the data at hand, these algorithms are utilized to create prediction models that project crop yields. The authors emphasized how important feature selection and data pretreatment methods are to raise the prediction models' accuracy.

OBJECTIVES OF THE STUDY

Analyzing the **techniques and methods used in crop yield management aided with AI** involves understanding how AI enhances decision-making, prediction, and precision in agriculture.

ANALYSIS AND DISCUSSION

1. Enhanced Crop Yields and Resource Optimization:

Precision Farming:

AI analyzes data from sensors, satellites, and drones to optimize planting, irrigation, and fertilization, leading to increased yields.

Disease and Pest Detection:

AI algorithms can detect crop diseases and pest infestations early, enabling timely interventions to minimize yield loss, according to Farmonaut.

Automated Processes:

AI automates tasks like weeding, harvesting, and sorting, reducing labor costs and improving efficiency.

Optimized Resource Allocation:

AI helps farmers allocate resources like water, fertilizers, and pesticides more efficiently, reducing waste and maximizing productivity, says Farmonaut.

2. Improved Demand Forecasting and Dynamic Pricing:

Dynamic Pricing:

AI algorithms analyze market data to adjust prices in real-time, maximizing revenue and occupancy rates.

Demand Forecasting:

AI predicts future demand accurately, enabling businesses to optimize inventory and pricing strategies, according to Super AGI.

Personalized Strategies:

AI helps understand customer preferences and tailor offers and promotions, leading to increased customer satisfaction and loyalty, according to Super AGI.

3. Reduced Costs and Increased Profitability:

Optimized Resource Use:

AI minimizes waste of resources like water, fertilizers, and energy, reducing operational costs.

Reduced Labor Costs:

Automation of tasks reduces reliance on manual labor, leading to cost savings.

Increased Revenue:

AI-driven strategies maximize revenue by optimizing pricing and inventory management.

4. Enhanced Sustainability:

Reduced Water Usage:

Smart irrigation systems powered by AI optimize water consumption, conserving this vital resource.

Reduced Chemical Usage:

AI-driven pest and disease detection minimizes the need for pesticides and other chemicals.

Sustainable Farming Practices:

AI supports sustainable farming practices like crop rotation and cover cropping, promoting soil health.

5. Improved Decision-Making:

Data-Driven Insights:

AI provides real-time data and insights, enabling informed decisions based on accurate information.

Risk Mitigation:

AI identifies potential risks like disease outbreaks and market fluctuations, allowing for proactive measures.

Predictive Analytics:

AI predicts future trends and outcomes, helping businesses make strategic decisions. In essence, AI in yield management offers a powerful combination of increased efficiency, reduced costs, enhanced sustainability, and improved decision-making, ultimately leading to greater profitability and success in various industries.

CONCLUSION

The use of Artificial Intelligence in agriculture is a novel approach that promises many benefits. Notable is the emphasis by nations of the world to end hunger by 2030 as enshrined in Sustainable Development Goal number. To end world hunger, the fundamental ways of doing things in and around the agricultural space will have to change by adopting much more sustainable models and relooking at the supply chain system with the space. For example, it is noted that more food goes to waste through spoilage than is required to feed all the hungry on earth. While in other parts of the globe, the food supply would be sufficient were it not for the stock that spoils due to pests and diseases.

It the goal of this paper to provide a possible solution for the second scenario on spoilage due to pests and diseases by adopting Artificial Intelligence approaches such as Machine Learning and tweaking existing methods by improving the overall prediction score.

We provide areas of interest that may be considered and show that further research in the subject may yield positive results in the field of Predictive Analysis as concerns the field of agriculture. A Systematic Review is done on over 20 pieces of literature around the field of Predictive analysis and notable gaps are highlighted while areas of possible improvement are also indicated. It is then against this backdrop that the highlighted areas of improvement may later be tested in subsequent work.

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43. ETHICAL CONSIDERATION IN HUMAN RESOURCE PRACTICES AND ADVERSE REPERCUSSIONS OF ARTIFICIAL INTELLIGENCE

Dr. J. Renee Arathi

Assistant Professor of Social Work,
Tamil Nadu Open University, Chennai-15

ABSTRACT

The rapid integration of Artificial Intelligence (AI) into Human Resource (HR) practices has brought forth both transformative potential and significant ethical challenges. This abstract explores critical ethical considerations that arise from AI adoption in HR, alongside its adverse repercussions on traditional functions. While AI offers efficiencies in areas like talent acquisition, performance management, and training, it is highly susceptible to biases inherent in its training data, leading to skewed outcomes such as inaccurate candidate assessments, unfair performance scoring, and misidentified training needs. Such algorithmic biases can disproportionately impact underrepresented groups and severely damage organizational reputation by eroding candidate trust and perceptions of fairness. Consequently, this paper emphasizes the paramount need for robust ethical frameworks and continuous human oversight within AI-driven HR processes to ensure transparency, accountability, and the preservation of human-centric values.

Key Words:

Artificial Intelligence, Human Resource Practices, AI Bias, Ethical, Human Oversight.

INTRODUCTION

The alteration of “Artificial Intelligence does not replace human resources professional completely, however it will remodel the field by automating tasks and enhance human capabilities” is a debatable fact for the HR professionals especially working in corporate and business. There are several studies which provide evidences of algorithmic bias, data privacy, ethical considerations and potential displacement of human workers when AI performs HR functions. The History of HR practices throughout the Pre-Industrial era, Industrial revolution and period aftermath brought enormous changes in HR practices including well structured personnel management which was later replaced as Human Resource management. HRM is aligned with organizational goals, focusing on talent management, employee development, and creating a positive work environment. All these transformation were grounded on the wholesome development of the organization as well as the employee. This era of technology and AI which rules the world has positive as well as

negative repercussions on the well being of the employees especially when the HR functions are performed by AI, as there's a growing need for flexible human resources functions to manage the challenges of working with people. This concept paper examines the possible threats due to HR practices by the AI based on evidences from the various studies available in the recent researches.

ETHICAL LANDSCAPE OF HR

Human resource department stands as the central body that should lead in inculcating ethical principles in an organization. For an organization to adhere to ethical standards it depends more on cooperation of its employees. These include meeting the public expectations on ethics and adhering to ethical regulations set by the government and other private bodies. However, this practice must begin by handling employees ethically and introducing the ethical principles at the time of recruitment and all through the period the employee will be engaged to the organization. Therefore, ethics should be part of the HRM functions (Köster, 2007) The ethics of human resource management (HRM) covers those ethical issues arising around the employer-employee relationship, such as the rights and duties owed between employer and employee. HRM Ethics is “the affirmative moral obligations of the employer (business) towards the employees to maintain equality and equity justice”. Do not treat people (employees) simply as a means for our own purposes without their full and free consent, because they are ends in themselves. (Olanipekun, 2022)

Ethics in Human Resource Management (HRM) refers to the set of moral principles, values, and standards that guide HR professionals in their interactions with employees, stakeholders, and the organization as a whole. It involves making decisions and conducting HR practices in a manner that upholds integrity, fairness, respect for individual rights, and ethical conduct. Ethics in HRM recognizes the multifaceted nature of its application, as it extends beyond compliance with laws and regulations to encompass broader considerations of employee well-being, organizational culture, social responsibility, and the impact on the wider society. (Goyal 2022)

In the realm of ethics in Human Resource Management (HRM), theoretical frameworks play a crucial role in guiding HR professionals in navigating complex ethical dilemmas. These frameworks provide systematic approaches to ethical decision-making, helping HR practitioners analyze moral quandaries and arrive at principled and responsible solutions. One of the notable ethical decision-making models frequently explored in HRM is the Rest's Four Component Model.

Rest's Four-Component Model: Developed by psychologist James Rest, this model presents a comprehensive framework for understanding ethical decision-making. The four components of Rest's model are:

- **Moral Sensitivity:** The HR professional recognizes that an ethical issue or dilemma exists and is attuned to the moral implications of the situation. This involves identifying potential conflicts between different values and stakeholders' interests.
- **Moral Judgment:** HR professionals evaluate the situation and the potential courses of action based on ethical principles, norms, and values. They consider the rights and wellbeing of all involved parties and determine the morally appropriate course of action.
- **Moral Motivation:** This component addresses the internal motivation of the HR professional to act ethically. It involves the willingness to prioritize ethical considerations over personal or organizational interests, even when facing potential challenges or consequences.
- **Moral Character:** The final component relates to the HR professional's moral character and integrity. It reflects the consistency between one's ethical beliefs and behavior, emphasizing the importance of acting in accordance with one's moral convictions

In view of the ethical landscape of HR functions as described in the theoretical model, requires Human Oversight and agility while dealing with human beings. A question may arise at this point, Why not use AI? Accountability and adaptability and fair judgements are derived from Human oversight and there are fair chances of errors and bias created by AI.

ADVERSE REPERCUSSIONS OF ARTIFICIAL INTELLIGENCE

The swift progress of technology, particularly the use of AI in HR, has dramatically changed how HR operates. As companies digitize their HR functions, it's essential to grasp how AI impacts various areas, including employee productivity, health and safety, payroll processing, employee comfort, and understanding these effects can also provide insight into how organizations can use AI to improve their overall efficiency and design. AI can enhance efficiency, accuracy, and decision-making in recruitment, talent management, learning and development, performance management, and workplace safety. However, it is essential to address concerns around bias and job displacement to ensure that the benefits of AI are realized without compromising ethical and social considerations (Umashankar 2023).

Training datasets used to develop AI applications can contain biases, which in turn leads to biased algorithms. This can happen when a dataset isn't accurate or doesn't properly represent the target population. For example, if a dataset used to train an AI hiring tool overrepresents a

certain demographic, the AI might unintentionally discriminate against qualified candidates from underrepresented groups. This type of sample selection bias, where the data doesn't reflect the full diversity of the population, reinforces flawed AI decisions.(Lee 2018).

Tuffaha(2023) explored by conducting a systematic literature review for 598 papers from Scopes and Emerald insight databases of which 34 articles were selected after implementing the PRISMA tool and quality evaluation stage. Results generated revealed that biased AI applications are negatively affecting performance management, compensation, staffing and training and development. His study had found that [Biased Outcomes in Recruiting and Selection](#)

AI can lead to biased and inaccurate hiring decisions. For example, AI-driven video interviews may give incorrect performance scores due to biases in the algorithm. Additionally, AI systems might underestimate qualified candidates, overlooking their potential and future training needs. This can be particularly harmful to underrepresented groups, as biases in the training data can encode discrimination based on gender, ethnicity, or culture.

- **Flawed Candidate Prioritization:** AI can mistakenly prioritize candidates with less potential, causing recruiting teams to waste valuable time and resources.
- **Inaccurate Assessments:** AI-driven tests, video interviews, and selection processes can produce negative or incorrect results, leading to poor hiring decisions.
- **Brand Damage:** Candidates may perceive a lack of fairness and control in AI-led processes, leading to concerns about privacy and less acceptance of these tools. This can cause irreparable brand damage and affect a company's reputation.

The Root of AI Bias

The negative impacts often stem from the sources of AI bias. There are three main types:

1. **Training Data Bias:** This occurs when the data used to train the AI doesn't accurately represent the target population, leading to what's known as sample selection bias. The AI learns from and reinforces these flawed patterns.
2. **Method Bias:** This relates to the specific algorithms and methods used by the AI, which can unintentionally create or amplify biases.
3. **Societal Bias:** AI can reflect and perpetuate existing societal biases that are present in the data it is trained on.

AI-powered solutions can significantly improve training and development by helping with competency assessments and customizing training and career plans based on individual employee needs. However, a major obstacle to adopting this technology is biased AI decisions.

Biased AI can have several negative consequences for training and development:

1. **Flawed Personalized Feedback:** AI might provide skewed or unfair personalized feedback and self-evaluations.
2. **Incorrect Training Needs Analysis:** The system might incorrectly define training needs by using irrelevant data to connect performance ratings with trainee characteristics, such as learning style, personality, and experience.

The AI could make mistakes in identifying a learner's preferred method and style of learning, which would lead to ineffective training.(Maity,2019;Keyser,et al.,2012 as cited by Tuffaha(2023). Acikgoz et al. (2020) noted that AI-based interviews are perceived as less fair, both procedurally and interactionally, compared to traditional human-conducted interviews. However, applicants have reported more issues with automated job interviews than with automated screening procedures.

IMPORTANCE OF HUMAN OVERSIGHT IN HR FUNCTIONS

Human oversight is essential in HR functions to mitigate the negative impacts of AI, ensuring fairness, ethics, and legal compliance. While AI can automate tasks and process large datasets, it lacks the human capacity for empathy, contextual understanding, and moral judgment. AI algorithms are only as good as the data they're trained on. If historical data contains biases (e.g., favoring a certain gender or ethnicity in hiring), the AI will learn and perpetuate those biases. Human oversight is needed to audit for bias, ensure diverse training data, and maintain fairness by applying a human "moral compass" to ensure decisions, even those suggested by AI, align with ethical principles and company values.

HR is a high-risk area for legal issues related to discrimination, privacy, and employment law. AI can inadvertently lead to non-compliance if not carefully monitored. Human oversight is necessary for human experts to correctly interpret complex and evolving employment laws, which AI cannot do on its own. Humans must also manage data privacy to ensure AI systems handle sensitive employee data in compliance with regulations like GDPR. Finally, humans must be accountable for the decisions made, especially in cases where an AI's output leads to a harmful or illegal outcome.

Many HR functions require a level of emotional intelligence and contextual understanding that AI simply cannot replicate. The irreplaceable human touch is crucial for

handling sensitive employee relations, such as disciplinary actions or grievances, which require empathy and rapport. Evaluating a candidate's soft skills, cultural fit, or potential for growth requires human judgment and intuition. An AI might reject a candidate with a non-traditional career path, while a human could recognize their valuable, transferable skills. Over-reliance on "black box" AI systems can erode trust and make people feel they are being treated as data points rather than individuals. Therefore, human oversight is vital for fostering trust with employees and candidates.

CONCLUSION

The HR field requires more empirical inquiries to support the adoption of AI in Hr functions and though AI can be considered as a powerful tool for achieving organizational goals, the ethical consideration based on human empathy and intelligence are very much essential for decision making especially when it comes to HR practices.

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44. A STUDY ON BUILDING CUSTOMER RELATIONSHIPS THROUGH SOCIAL MEDIA

Krishna Priya K K
Ph.D Research Scholar,

Dr. M. Thaiyalnayagi
Professor & Research Supervisor
Department Of Commerce VISTAS, Pallavaram Chennai.

ABSTRACT

Social media's introduction has completely changed how companies interact with their clientele by giving them a forum for instant communication and criticism. With a focus on two main goals—understanding the effect of these interactions on customer satisfaction and examining their influence on product development—this study examines the complex role that social media interactions play in establishing and preserving client connections.

In order to accomplish these goals, we carried out a thorough analysis of the literature and carried out empirical research using surveys and case studies of different businesses that actively use social media platforms. The study examined the opinions and satisfaction levels of a broad sample of customers that interact with brands on social media on a frequent basis. We also looked at case studies of businesses that have effectively included social media feedback.

Our research shows that social media interactions—which facilitate direct connection, build a feeling of community, and allow for quick customer service—significantly increase customer happiness. Consumers value the personalization and immediateness that social media platforms provide, which boosts brand loyalty and trust. Moreover, social media's ability to promote transparency and openness results in a more genuine and interesting consumer experience.

Social media is an invaluable resource for obtaining client insights and feedback when it comes to product development. Businesses may make educated judgments about their product development cycles by keeping an eye on trends, preferences, and possible problems in social media interactions. This proactive strategy improves the items' quality and relevance, but it also accelerates innovation process.

The study emphasizes how crucial it is for organizations to invest in strong social media analytics tools and how important it is to handle social media strategically. Businesses who do this will be able to fully utilize social media interactions and turn them into a competitive advantage. The research's findings imply that companies should consider

social media as an essential part of their overall customer relationship management and product development strategy, rather than only as a marketing tool.

To sum up, interactions on social media are vital for improving consumer happiness and providing information for new product development. Companies that successfully take advantage of these connections can increase consumer loyalty and stimulate innovation, which will eventually result in long-term competitive success.

KEY WORDS:

Customer relationship, Social media.

INTRODUCTION

Social media has permeated every aspect of daily life in the digital age, having a significant impact on how people communicate, share information, and make decisions about what to buy. Enterprises have acknowledged the revolutionary force of social media and its capacity to cultivate more profound and significant connections with clients. Customer relationship management (CRM) has seen a major paradigm shift as a result of this, with dynamic, interactive social media platforms gradually replacing or supplementing traditional ways.

This study explores how social media interactions contribute to the formation of customer relationships, with two primary goals in mind: figuring out how social media affects customer happiness and assessing how it affects product development.

Customer relationship management has traditionally placed a strong emphasis on in-person meetings, phone calls, and email correspondence. Even while these techniques are still useful, people frequently perceive them as less engaging and instantaneous than social media. Platforms like Facebook, Twitter, Instagram, LinkedIn, and more recent additions like TikTok and Snapchat have opened up new avenues for businesses to communicate with clients in real time. These platforms provide two-way communication, enabling companies to interact and listen to their audience in addition to sharing information.

Customer happiness influences word-of-mouth recommendations, brand loyalty, and repeat business, all of which are important factors in determining a company's success. Social media has become an indispensable instrument for augmenting consumer satisfaction as it offers a prompt and direct line of communication between companies and their clientele. Businesses can use social media to quickly address client questions, find solutions to problems quickly, and obtain insightful input. Customers feel heard and appreciated because of this immediacy, which fosters connection and confidence. Social media platforms also help businesses build a community among their clientele, which encourages recurring business and

customer loyalty. Social media interactions not only increase client happiness but also have a big impact on product development. Product development has always depended on market research techniques including focus groups, surveys, and sales data analysis. Although these techniques yield insightful results, they can be laborious and can not necessarily reflect the most recent trends and preferences of the consumer. Conversely, social media offers a never-ending supply of real-time comments and analysis from a large number of users. Businesses can keep an eye on social media discussions to spot new trends, solicit ideas, and find any problems with current goods. Due to this real-time feedback loop, businesses are able to respond more swiftly to the demands and preferences of their customers.

This study aims to accomplish two main goals. Its primary goal is to comprehend how social media interactions affect client happiness. Through an analysis of consumers' perceptions and reactions to brand interactions on social media, we can evaluate how well these platforms contribute to increased customer satisfaction. The study also aims to examine how social media interactions affect the process of developing new products. We can assess social media's potential as a tool for innovation and better products by looking at how businesses use feedback from social media to guide their product development procedures.

Businesses hoping to succeed in a cutthroat market must comprehend the twin effects of social media interactions on consumer happiness and product development. Businesses may enhance consumer happiness, spur innovation, and keep a competitive edge by leveraging social media platforms efficiently. For companies trying to improve their customer relationship management procedures and maximize their social media tactics, this study offers insightful information.

In summary, social media interactions are an essential part of contemporary product development and CRM. Through an examination of their effects on customer happiness and product innovation, this research seeks to offer a thorough grasp of the advantages and difficulties of utilizing social media in a company setting.

Businesses must traverse certain noteworthy hurdles and considerations while employing social media for customer relationship management and product development, despite the significant benefits. The vast amount of data created on social media sites presents a huge challenge because it can be difficult to manage and evaluate. To efficiently sort through and analyze this data and turn it into insights that can be put into practice, businesses require strong analytics tools and knowledgeable staff members. Additionally, strategic planning and ongoing work are needed to maintain a positive and consistent brand

presence across a variety of social media channels. Social media's quick-changing nature can cause rapid fluctuations in public opinion, so companies need to be ready to react responsibly and quickly to crises and unfavorable comments.

Data security and privacy issues are equally important since companies need to make sure they follow the law and safeguard client information. Finally, constant learning and adaptability are required due to the dynamic and ever-changing nature of social media. To be relevant and successful, businesses need to keep up with platform modifications, new trends, and shifts in user behavior. Notwithstanding these difficulties, social media strategy provides unmatched chances to boost client happiness and spur new product development, making it a crucial component of contemporary commercial operations.

OBJECTIVES OF STUDY

- To understand the impact of social media interactions on customer satisfaction.
- To analyse the impact of social media interactions on product development.

HYPOTHESIS OF STUDY

- There is significant positive relationship between social media interactions on customer satisfaction.
- There is significant positive relationship between social media interactions on product development.

REVIEW OF LITERATURE

- ❖ Haenlein, M., and A. M. Kaplan (2010). "Users everywhere, band together! Social media's opportunities and difficulties." *Horizons of Business*. The many social media platforms and their effects on businesses are covered in this basic essay. It offers a thorough rundown of social media platforms, user behavior, and business application possibilities, laying the groundwork for comprehension of social media's strategic application in customer engagement.
- ❖ Wiertz, C., Liu-Thompkins, Y., Gensler, S., and Völckner, F. (2013). *International Journal of Interactive Marketing*, "Managing Brands in the Social Media Environment." The purpose of this study is to investigate the best practices for brand management in social media settings. It looks at how social media interactions affect how consumers see brands and their connections with them, offering advice on how to use social media to improve brand awareness.
- ❖ Walsh, G., Gremler, D. D., Hennig-Thurau, T., and Gwinner, K. P. (2004). "Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to

articulate themselves on the Internet?" The Interactive Marketing Journal. The purpose of this study is to look into why customers participate in online reviews and discussions. Businesses must comprehend these incentives in order to promote positive electronic word-of-mouth and increase client loyalty and pleasure.

- ❖ Wege, E., Haenlein, M., Zhang, M., Malthouse, E. C., & Skiera, B. (2013). "Managing Customer Relationships in the Social Media Era: Introducing the Social CRM House." The Interactive Marketing Journal. The notion of Social CRM is presented in this article, with a focus on how social media can be integrated with conventional CRM procedures. It offers a framework for comprehending how companies might use social media data to better manage their interactions with customers.
- ❖ In 2009, Mangold and Faulds published a book. "Social media: The new hybrid element of the promotion mix." Horizons of Business. This essay explores social media's function as a hybrid component of the promotional mix, fusing contemporary interactive marketing strategies with conventional marketing methods. It draws attention to the ways in which social media can improve consumer satisfaction and communication.
- ❖ Trainor, K. J., Rapp, A., & Agnihotri, R. (2014); Andzulis, J. M. "Social media technology usage and customer relationship performance: A capabilities-based examination of social CRM." The Business Research Journal. This study looks at the connection between customer relationship performance and social media technology use. Empirical evidence is presented regarding the ways in which social CRM features can improve business performance and customer happiness.
- ❖ Fountain, S. J., and Constantinides, E. (2008). "Web 2.0: Conceptual foundations and marketing issues." Practices in Direct, Data, and Digital Marketing Journal. The philosophical underpinnings of Web 2.0 and its marketing ramifications are presented in this study. It talks about how Web 2.0 technologies, including social media, are interactive and how they can change how customers interact with brands.
- ❖ Plangger, K., Pitt, L. F., Berthon, P. R., & Shapiro, D. (2012). "Marketing meets Web 2.0, social media, and creative consumers: Implications for international marketing strategy.
- ❖ " Horizons of Business. The relationship between social media, marketing, and consumer inventiveness is examined in this article. It provides information on how companies can improve their marketing plans and product development procedures by utilizing user-generated content and social media interactions.

- ❖ Dabrowski, D., and B. Schivinski (2016). "The effect of social media communication on consumer perceptions of brands." *The Marketing Communications Journal*. This study looks into how consumer opinions of brands are impacted by social media communication. It offers factual data on the effects of social media interactions—both good and bad—on consumer satisfaction and brand perception.
- ❖ Fischer, E., & Reuber, A. R. (2011). "Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior?" *Journal of Business Venturing*. This research examines the impact of social media interactions on entrepreneurial thinking and behavior, with a focus on Twitter. It provides insights into how businesses can use social media to gather feedback, foster innovation, and enhance product development.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The goal of employing a correlational research strategy is to improve study results and outcomes. This specific study is being carried out with fifty recently founded Kochi business owners that use social media marketing. In this case, a convenience sampling method—a non-probability sampling technique—was applied to choose a sample size of fifty social media entrepreneurs.

DATA COLLECTION

Both primary and secondary sources of data were consulted for this investigation. The 50 start-up entrepreneurs chosen for the study were given questionnaires to complete, which were created using Likert's five-point rating system, in order to gather primary data, or first-hand knowledge. The secondary data for this study came from a variety of websites, text books, etc. and offered a solid theoretical framework.

DATA ANALYSIS AND INTERPRETATION

An IBM statistical program called SPSS (Statistical Package For Social Science) is used to evaluate the gathered data. It is a popular technique for analyzing data from social science research studies. In this case, descriptive data analysis is done using SPSS. Karl Pearson's organization conducted research to examine the impact of social media on customer interactions and product development. Correlation efficiency is relevant in this situation. Analyzing the correlation between two or more variables is one of the most significant quantitative approaches. The correlation coefficient is often expressed as a number between -1 and +1.

CORRELATION ANALYSIS

Correlations

SOCIAL MEDIA INTERACTION	Pearson Correlation	1	.785**
	Sig. (2-tailed)		<.001
	N	50	50
CUSTOMER SATISFACTION	Pearson Correlation	.785**	1
	Sig. (2-tailed)	<.001	
	N	50	50

SOCIAL MEDIA INTERACTION

CUSTOMER SATISFACTION

** . Correlation is significant at the 0.01 level (2-tailed).

INTERPRETATIONS

The information above shows a statistically significant positive correlation between social media interactions and customer satisfaction. With a correlation value of .785, Karl Pearson's coefficient of correlation demonstrates the strong and positive relationship that exists between social media interactions and customer satisfaction.

Correlations

SOCIAL MEDIA INTERACTION	Pearson Correlation	1	.704**
	Sig. (2-tailed)		<.001
	N	50	50
PRODUCT DEVELOPMENT	Pearson Correlation	.704**	1
	Sig. (2-tailed)	<.001	
	N	50	50

SOCIAL MEDIA INTERACTION

PRODUCT DEVELOPMENT

** . Correlation is significant at the 0.01 level (2-tailed).

INTERPRETATIONS

The information above shows a statistically significant positive correlation between social media interactions and product development. With a correlation value of .704, Karl Pearson's coefficient of correlation demonstrates the strong and positive relationship that exists between social media interactions and product development.

FINDINGS

- Enhanced Customer Engagement: A Comprehensive Overview: Social networking sites like Facebook, Instagram, and Twitter provide businesses with a plethora of options to interact with their customers, including surveys, live videos, stories, and

direct messaging. With the use of these tools, companies may provide interactive content that invites users to join in discussions, offer comments, and express their thoughts. Because these encounters are rapid and individualized, clients feel heard and valued, leading to enhanced engagement. Companies can cultivate a devoted clientele by continuously producing engaging and relevant content for their audience.

□ Enhanced Contentment with Clients

Detailed Explanation: Sustaining high levels of customer satisfaction on social media requires the capacity to react swiftly to complaints and questions from customers.

Consumers frequently use social media to get prompt assistance and problem solving. Companies that put a high priority on prompt and helpful responses can stop minor problems from turning into serious complaints. Public responses to consumer complaints also show accountability and transparency, which raises customer satisfaction even further. Customers can receive correct and timely support by managing and streamlining these interactions with the use of tools like chatbots and AI-driven customer service solutions.

□ Enhanced Brand Adherence

Detailed Explanation: By enabling users to communicate with brands and one another, social media promotes a feeling of community. An emotional bond with the brand may be strengthened in this group setting. For instance, companies can foster a feeling of loyalty and belonging among their clientele by establishing private communities or groups. These relationships are further strengthened by regular activities including answering messages and comments, holding live Q&A sessions, and showcasing user-generated material. Consumers who associate a brand with themselves are more inclined to stick with it and recommend it to others.

□ Instantaneous Input and Analysis

Detailed Explanation: Social media platforms give companies instant access to feedback and attitudes from their customers. Businesses may keep an eye on mentions of their products, brands, and industry-related subjects by utilizing social listening technologies. Businesses are able to comprehend client wants, spot new trends, and address problems as they come up thanks to this real-time feedback. For instance, if numerous clients voice the same complaint about a product, a business might look into it right away and fix the issue, thereby averting more complaints. Real-time analytics can also help firms remain ahead of the competition by informing marketing plans.

□ Knowledge-Based Product Development

Detailed Explanation: Companies can obtain insightful feedback for new product development by actively interacting with customers on social media. Consumers frequently offer their preferences, experiences, and ideas for enhancements. By examining this feedback, the product development process can be directed by identifying prevalent problems and desired enhancements. For example, a computer company might use feedback from social media to find faults in a software update or to determine which new features customers commonly ask for should be developed first. Customers who believe their opinions are being heard and taken into consideration acquire a sense of ownership and loyalty as a result of being involved in the development process.

□ Improved Recognition of Your Brand

Detailed Reasoning: Brand perception can be greatly improved by genuine and consistent social media connections. Openly addressing consumer complaints and owning up to mistakes are examples of transparency that fosters trust. Genuine and relatable material that embodies authenticity contributes to the humanization of the brand. Consumers that believe a brand to be personable and honest are more likely to support and believe in it. Social media gives brands the chance to express their personality, culture, and values, which can connect with consumers and improve their perception of the company as a whole. Elevated customer advocacy and loyalty can result from a favorable brand image.

□ Economical Customer Support

Detailed Explanation: Compared to traditional customer care methods, social media platforms are a more affordable option.

Social media platforms allow businesses to manage a high volume of client inquiries without requiring a sophisticated call center infrastructure. Chatbots and other automated technologies can address common questions, freeing up human agents to work on more complicated problems.

This effectiveness keeps client satisfaction levels high while cutting operational expenses. Furthermore, because social media interactions are public, they can function as a self- service platform where users can browse through prior debates and comments to find the answers to their inquiries.

□ Enhanced Market access Detailed Explanation: Businesses may access a worldwide audience without being restricted by geography thanks to social media platforms. By

implementing focused advertising and content tactics, businesses can increase their market share and draw in new clients. Businesses might, for instance, utilize behavioral and demographic data to develop highly targeted advertising campaigns that target prospective clients according to their geography, hobbies, and online activity. Furthermore, material on social media can be shared extensively due to its viral character, which expands its market reach. Utilizing hashtags wisely, working with influencers, and joining popular discussions can all help businesses become more visible and draw in new clients.

□ improved insights into customers

Detailed Explanation: Customer behavior, preferences, and demographic data are all available with social media analytics solutions. Companies can segment their audience using this data, then adjust their marketing tactics accordingly. For example, a business may determine that a certain product is well-liked in a certain age range or area, and then develop campaigns specifically designed to appeal to that market.

Businesses can forecast future trends and make well-informed decisions regarding product development, marketing tactics, and customer engagement programs by having a thorough understanding of customer insights. Utilizing social media for company has many benefits, one of which is the capacity to evaluate and respond to client data.

□ Quicker Innovation

Detailed Explanation: Social media can greatly speed up the innovation process due to the volume and immediate input it provides. Companies are able to obtain client feedback, test new ideas fast, and make iterative improvements based on real-time input. A fashion brand might, for instance, publish an advance look at a new collection and utilize feedback from customers to improve the designs before to the public release. By taking an agile approach to innovation, companies can minimize the time and expense involved in following standard product development cycles while remaining sensitive to the demands and preferences of their customers.

Businesses that can innovate more quickly than their rivals can gain a competitive edge by introducing new and improved items to the market sooner.

CONCLUSION

The study's conclusions highlight the revolutionary potential of social media interactions to improve consumer satisfaction, relationships, and product creation. Businesses can interact with their customers directly through a variety of channels, responding to

inquiries in real time and promoting a feeling of community. Customer satisfaction is greatly increased by this rapid, individualized interaction since it makes customers feel important and promptly answers their concerns. Additionally, the increased loyalty and engagement fostered by social media interactions help to build a favorable brand perception, which is essential in the cutthroat market of today.

The study also emphasizes how important social media is for providing information to product developers. Businesses can make data-driven decisions that suit client demands and preferences by utilizing real-time customer feedback and insights. This proactive strategy speeds up the innovation process while also improving product quality and relevance. Businesses get a competitive edge when they can quickly iterate on product ideas in response to client input. This keeps them flexible and responsive to market demands.

In conclusion, for contemporary firms hoping to succeed in a digital environment, social media strategy is essential. Social media has the capacity to completely change traditional business methods, as seen by its twin effects on customer happiness and product creation. Through efficient utilization of social media interactions, companies can foster deeper consumer relationships, stimulate innovation, and attain long-term success. Social media will always be an essential tool for companies looking to interact with their clients and stay competitive in a market that is constantly evolving.

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45. A STUDY ON ARTIFICIAL INTELLIGENCE IN MARKETING: ROLE AND ITS IMPACT ON VENDERS AND CUSTOMERS

Dr. Saraswathi devi m
Academicians – assistant professor
Economics
Annai veilankannis College for
Women, saidapet, Chennai

Abstract

The economy of today's developing nations has changed as a result of globalization and technological advancements. As a result, society is collectively concerned about competition in a variety of fields, including marketing. Technologies like artificial intelligence (AI) play a crucial role in the global economy, which is why AI's importance continues to rise globally. Most of the time, it is said that artificial intelligence (AI) technologies are being used in marketing to automatically make decisions based on gathering data, analyzing data, and further. A subfield of computer science known as artificial intelligence teaches computers to comprehend and imitate human communication and behavior. The communication between businesses and customers is being altered by AI. The way this technology is used depends a lot on the kind of business and how well the website works. Marketers can boost ROI without spending money on pointless initiatives by carefully analyzing customer data and comprehending what consumers really want. Additionally, they won't have to waste time watching repetitive commercials that irritate customers. In a number of ways, AI will customize marketing to better meet client needs, many businesses currently use AI to customize their websites, emails, social media postings, videos, and other resources. Automating tasks that have traditionally required human intelligence is one of AI's primary objectives. Marketers can now respond to customers' needs more quickly and with greater attention. However, AI's use and impact on marketers and consumers have their own advantages and disadvantages; to put it another way, AI faces global opportunities and challenges. This study of artificial intelligence (AI) in marketing helps to determine and highlight the impact, opportunities, and challenges of AI in marketing in comparison to current technological advancements. Using secondary data from a variety of sources, the researcher has employed the qualitative research method.

Key Words

AI Artificial Intelligence,

Introduction

The term "AI" refers to a collection of technologies that are capable of carrying out tasks that call for human intelligence. These technologies can learn, act, and perform like humans when used in conventional business procedures. It mimics human intelligence in machines, enabling us to conduct business more quickly and affordably. Marketing has examined the ways in which technological advancements affect how well organizations can manage consumer needs and deliver goods, and the development or appearance of AI has several implications. Artificial intelligence (AI) will one day be an essential component of every global business organization. It is evident in the way that business adoption of AI has changed ideas, interests, and investments. Artificial Intelligence (AI) has emerged as a transformative force in the field of marketing, reshaping the way businesses connect with their audiences, make data-driven decisions, and optimize their marketing strategies. AI has developed into a potent instrument that gives marketers the ability to increase efficiency, personalize campaigns, and produce more impactful outcomes in today's digitally driven world. An overview of AI in marketing, its key components, and its profound impact on marketers and consumers are provided in this introduction. Over the years, marketing has moved from using traditional methods to using digital channels. AI gives marketers the ability to create messages and experiences that are specifically tailored to each individual customer, ending the era of one-size-fits-all advertising. Artificial intelligence (AI) is the process of imitating human intelligence in machines so that they can carry out activities like learning from data, making predictions, and adapting to new situations.

Literature Review:

A few of the following aspects of ICTs in education and teaching have been covered in the following literature review: learning assessment for educators and students According to MacInnis et al. (2020), consumption, consumer studies, and consumer research are fundamental components of contemporary society and are of interest not only to marketers but also to policymakers and other fields of research. According to Pitardi et al. (2002), marketing researchers are aware that AI has significant potential advantages for consumers and their lives. Concerns about privacy, dehumanization, and even addiction are just a few of the inherent tensions that the increased use of AI may cause consumers (Lobschat et al., 2021; Puntoni et al., 2021). A system of intelligent agent machines that perceives the environment to successfully achieve its goal represent the artificial intelligence. The development of artificial intelligence is phenomenal. Applications of big data analytics and machine learning

to a wide range of industries and contexts resulted from the work. According to Epstein (2018), cutting-edge AI-powered marketing solutions are capable of rapidly adapting to the shifting requirements of businesses and developing communications and solution bundles that are both essential and lucrative for relevant stakeholders.

Objective of the study

- 1) To investigate and comprehend AI's function and applications.
- 2) To comprehend the advantages and disadvantages of AI in marketing
- 3) To study the opportunities of AI.

Scope of research:

The researcher focuses primarily on technology-supported marketing environments because these environments have the potential to engage consumers and marketers in the AI learning process and improve their outcomes when developing marketing strategies. The topic of discussion is AI's effect on marketing. In addition, the research objective of "understanding the role and opportunities of AI" is addressed in this section. The researcher used a qualitative method of investigation in this research paper. The impact of the AI can be approached in different ways.

Methodology of the study

The study's methodology Secondary data is mostly information gathered from books, websites, journals, and other sources. The issues surrounding AI (artificial intelligence) in marketing will be discussed in this paper. Secondary data were collected here. The main focus of the research is on how AI affects marketing. A number of scenarios regarding upcoming marketing developments have been examined to learn more about its impact. Through a literature review, the researcher first investigated the AI, its function, and its consequences.

Limitations of the study

The study has been conducted by using secondary data sources. The study's findings may reveal differences in consumer perception and marketing strategies due to the various AI methods employed. Importance of ICT in Assessment of Teaching and Learning: The advance technology like AI has changed the current market scenario in the last few decades by emerging as one of the most efficient tools used in the marketing process, by marketers and consumers as well.

Significance of ICT in Teaching-Learning Assessment:

In the digital age of today, AI integration has a significant impact on marketing process transformation, efficiency and productivity, competitive advantages, and customer experience.

Applications of Artificial Intelligence in Marketing

The field of marketing has been transformed in a number of ways by artificial intelligence (AI), which enables businesses to make decisions based on data, enhance customer experiences, and increase overall efficiency. Many variables use AI in marketing as possible. AI gives personalized touch where in it analyzes customer data to create highly personalized marketing campaigns. Marketers can deliver individualized content, product recommendations, and offers thanks to its ability to segment audiences based on demographics, behavior, and preferences. Based on previous data, AI algorithms can predict marketing and customer behavior trends for the future. This aids companies in making wise choices regarding product development, inventory control, and marketing tactics. It also assists by providing AI-powered chatbots and virtual assistants for instant customer support, answer frequently asked questions, and guide users through the sales funnel 24/7. It is able to make content like blog posts, product descriptions, and updates for social media. For marketers, AI-generated content can be a useful addition. It optimizes email marketing by analyzing open rates, click-through rates, and engagement data to send emails at the best times and with the most relevant content. This aids marketers in analyzing and optimizing their websites for search engines to find keywords, make suggestions for enhancements, and keep track of rankings. AI can identify emerging trends, sentiment analysis, and feedback analysis from social media, reviews, and surveys through the analysis of large datasets. CRMs with AI enhancements can provide client behavior insights and facilitate communication, ensuring timely and pertinent interactions. Organizations can stay up to date on market trends and modify their own strategy as necessary thanks to these systems, which can track the marketing strategies of rival businesses. AI can help businesses cut costs and keep customers confident in their marketing efforts by spotting fraudulent actions like click fraud in online advertising. Marketing will undoubtedly see more applications of AI in the future. By using data-driven decision-making and providing their customers with more individualized and effective experiences, marketers who adopt AI technologies can acquire a competitive edge.

The Bright and Hostile impact of AI in marketing

AI is an emerging field of technology, and it can be challenging to separate its effects from their surroundings. Customers and marketers appear to be significantly influenced by today's generations. As a result, it is anticipated that the rapid changes in society and technology will have a significant impact on how marketers implement this when developing marketing strategies. AI in marketing has many benefits, but it also has some difficulties and potential drawbacks. When repetitive tasks like data analysis and email marketing are

automated, marketing programs that are highly targeted and customized can be created with AI, resulting in increased customer engagement and conversion rates with high efficiency. AI can quickly process and analyze enormous amounts of data, giving insightful information for data-driven decision-making. Better Customer Experience can gain as AI-powered chatbots and virtual assistants give around-the-clock assistance, assisting companies in offering better customer care. By anticipating future trends and consumer behavior, businesses can plan and modify their marketing campaigns with the help of predictive analytics. Automation results in lower labor costs and better utilization of available resources, both of which contribute to cost savings and efficiency. AI may change marketing campaigns in real time, maximizing ad spend and increasing return on investment. It is capable of producing material in large quantities, which is helpful for content marketing and keeping a regular online presence.

The difficult application of AI in marketing necessitates extensive data access, which raises concerns about data privacy and security, particularly in light of GDPR regulations. The initial costs of implementing AI tools and systems can be high, particularly for small businesses. Poor quality control of AI-generated content may not be as creative, nuanced, or contextual as human-created content, resulting in tone and style issues. The data that AI algorithms are trained on may contain biases, which could result in biased recommendations or decisions. Overrelying on artificial intelligence (AI) can lead to a loss of the human touch and intuition that are frequently essential in marketing. There can be a chance of lack of comprehension because some marketers may not fully comprehend how AI functions, they may overuse or depend too much on AI recommendations without conducting a critical analysis. Workers need to be provided with regular updates and maintenance in order to make effective use of AI systems. Another challenges that is being is the accuracy and ethical issues where AI systems are not perfect and are prone to errors, especially in difficult or unclear situations and the use of this technology in marketing raises ethical questions including intrusive tracking, deceptive techniques, and the potential for disinformation. Personalization, efficiency, and data analysis are just a few of the many advantages AI offers marketers, but it also has ethical, prejudice, and privacy issues. For AI to be successfully integrated into marketing, a well-thought-out strategy that takes these issues into consideration and makes the most of the potential benefits must be implemented.

Opportunities of Artificial Intelligence

Using AI-powered algorithms, marketers can analyze enormous volumes of customer behavior and preference data to create personalized experiences and messages. Businesses may be able to benefit from this in terms of increased customer loyalty and stronger

relationships with their clients. Another area in which marketing can benefit from AI is predictive analytics. Businesses can better target their marketing campaigns by anticipating client requirements and preferences. Chatbots are another area in which AI is having a significant impact on marketing. Using natural language processing (NLP) and machine learning, chatbots can interact with customers in real time, offering tailored recommendations and solving issues. Marketing Automation: AI is also making marketing automation work better. With AI-powered platforms, businesses can automate tasks like lead generation, lead scoring, and email marketing. This may allow marketers to concentrate on more strategic activities, such as creating campaigns and data analysis.

Findings of the study

Iterative processing and algorithms that allow software to learn from patterns, according to research, enable AI to collect massive amounts of data in record time. The various subfields of AI work in different ways. Since people's interests and fashions are constantly changing, AI can be useful, even basic variables like personality traits remain consistent, client personas may change gradually over time as trends change. AI automation may make it much simpler to organize all of this. Marketing teams can stay on top of rapidly evolving fads and trends to provide clients and potential customers with material that is timely, relevant, and tailored to their needs. Marketers employing AI-driven strategies can increase customer engagement and conversion rates by better adapting their content and products to the unique preferences of their customers. Marketing campaigns can now feature a significantly higher degree of personalization than they used to. Large datasets can be instantly analyzed by sophisticated algorithms using artificial intelligence, resulting in more precise audience targeting and more successful marketing strategies. Chatbots and virtual assistants powered by AI have significantly improved consumer experiences by offering 24/7 help and quick answers to questions. Businesses that have included AI into their marketing operations may be more data-driven in their decision-making. Research may show a link between the use of AI and better decision-making techniques.

Scope for Further Research

Additionally, the study has the potential to investigate whether marketers can utilize AI to predict outcomes, analyze customer trends and patterns, and optimize advertising. It uses data, statistical algorithms, and cutting-edge AI technologies to predict future trends. As they examine additional data, AI systems learn how to produce the best answers and improve their results over time. Using AI, marketers can develop marketing analytics strategies to target potential customers and tailor customer experiences. A record of each interaction between a

customer or potential customer with a product or service is kept and used to improve the product or service in the future. Marketers will have a better opportunity in the future to begin experimenting with AI strategies that will help them create highly personalized customer experiences.

Conclusion

Methods that enable robots to perform mental tasks that require human intelligence are referred to as artificial intelligence (AI). Learning, reasoning, and environmental interaction are all part of these. A more individualized brand experience may be made possible by AI in order to increase customer engagement and loyalty. Language-based AI is used by marketers as sales tools, payment processors, and engagement managers to improve the user experience. Instead of having to figure it out on their own, customers now have the option of relying on chatbots to complete the purchasing process for them. The development of language-based artificial intelligence is rapid, "learning" from previous usage and automatically fine-tuning to provide an even better experience the next time. It can be of assistance to marketers by identifying relevant content that customers are eager to read. The authors offer a comprehensive perspective on how to use AI to enhance the customer experience in this study. Utilizing artificial intelligence (AI) and predictive analytics is the key to providing customers with experiences that encourage repeat business and advocacy. The future is event-based architecture, artificial intelligence, and predictive analytics. There is no set destination as we enter the Fourth Industrial Revolution; however, every business must begin the journey. Identifying future marketing strategies that are not supported by AI Artificial Intelligence in either of these ways is crucial and may even be impossible. When we look at the current state of affairs, AI and its applications are being used more and more in modern societies, particularly by younger members of the so-called digital generation. It has grown to be one of the most important factors in promoting economic growth in the economy and elsewhere.

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46. ARTIFICIAL INTELLIGENCE & ITS APPLICATIONS

M. Manimaran

Asst. Professor

Department of bba

Jaya college of arts and science,

Thiruninravur- 602024

Abstract

The creation of intelligent systems, especially computer programs that can carry out activities that normally call for human intelligence, is known as artificial intelligence (AI). Artificial Intelligence (AI) focuses on computational models of perception, reasoning, and decision-making, as opposed to methods that seek to mimic biological processes. AI becomes crucial for data-driven decision-making when the amount of data produced by both people and machines exceeds human interpretation capabilities. The foundations, historical evolution, key ideas, techniques, and numerous real-world applications of AI across industries are examined in this article, along with its promising future and transformational potential.

Keywords:

Machine Learning, Deep Learning, Neural Networks, Natural Language Processing, Knowledge-Based Systems

Introduction

The goal of the computer science field of artificial intelligence is to build machines that can act intelligently. An intelligent agent is defined as a system that takes optimal actions based on its environment. The goal of AI is to create machines that can replicate human cognitive processes like language comprehension, learning, reasoning, planning, and perception. Building computers and programs that can mimic intelligent human behavior is the fundamental goal of artificial intelligence.

AI Techniques and Approaches

Machine Learning (ML)

Without explicit programming, machine learning allows computers to learn and grow from experience. Artificial neural networks are used in Deep Learning, a branch of machine learning, to provide predictive analytics.

ML is commonly divided into:

- Supervised Learning: Trains models to forecast results using labeled data. Finding patterns and structures in unlabeled data is known as unsupervised learning.

- **Reinforcement Learning:** In order to maximize cumulative rewards, models learn the best course of action through trial-and-error interactions with the environment.

Natural Language Processing (NLP)

Natural language processing (NLP) makes it easier for people and computers to communicate. NLP processes, interprets, and reacts to written or spoken language through machine learning. Applications like grammar checkers, voice assistants, and language translators (like Google Translate) are powered by natural language processing (NLP). NLP uses complex algorithms to extract meaning from unstructured data and transform it into machine-readable representations since human language is so complex.

Automation and Robotics

Automation uses AI to manage rule-based and repetitive operations, increasing efficiency and cutting expenses. Neural networks, decision graphs, and robotic process automation (RPA) are examples of technologies that simplify processes and lower human error. Examples include robotic systems carrying out repetitive activities in dynamic situations and CAPTCHA-based fraud detection in financial transactions.

Machine Vision

Visual inputs may be obtained and analyzed by systems thanks to machine vision. After being captured by cameras, pictures are transformed into digital data and subjected to signal processing methods. The system's sensitivity is its capacity to pick up on mild stimuli.

- **Resolution:** The capacity to discriminate between minute elements. Pattern recognition, medical imaging, and biometric authentication are a few examples of applications.

Systems Based on Knowledge (KBS)

These systems use an inference engine and a knowledge base to simulate expert human decision-making in particular fields. Rules, frameworks, and case-based reasoning are common ways that knowledge is expressed. Expert systems frequently employ KBS for decision support, advisory services, and diagnostics.

NNs, or neural networks

Neural networks are made up of layers of interconnected nodes, or neurons, that are modeled after the structure of the human brain. NNs are capable of approximating complex functions by modifying connection weights through strategies such as backpropagation. In order to train NNs to produce predictions or classifications, supervised learning is frequently used with input-output pairs.

Artificial Intelligence Applications

1. The study of astronomy Complex astronomical issues, such comprehending the universe's genesis and physics, can be resolved with the help of AI.
2. AI systems for healthcare improve diagnostics, forecast patient decline, and help physicians make quicker, more precise judgments.
3. AI for gaming lets computers play strategic games like chess, mimicking human thought processes and foreseeing many outcomes.
4. Finance Through chatbots, algorithmic trading, automation, predictive analytics, and risk assessment tools, artificial intelligence is revolutionizing the financial industry.
5. Data Security AI improves cybersecurity by employing technologies like AI2 and AEG bot to detect cyberthreats and vulnerabilities in real time.
6. AI is used by social media platforms such as Facebook and Twitter to handle large amounts of user data, identify patterns, and customize content for users.
7. AI-powered solutions for travel and transportation help with itinerary planning, hotel reservations, and route optimization. Chatbots improve interactions with customer support.
8. Automotive Industry AI enhances user experience and safety by enabling autonomous car development and virtual driving assistants.
9. Robotics AI gives robots the ability to behave independently and learn from their experiences. Human-like interactions are exhibited by humanoid robots such as Sophia and Erica.
10. Entertainment AI helps with content development and streaming services, makes recommendations, and personalizes material.
11. Farming To boost productivity and efficiency, AI-based technologies facilitate predictive analysis, crop monitoring, and precision farming.
12. Online shopping in AI offers individualized shopping experiences, product discovery, and alternative suggestions.
13. Education AI facilitates students' individualized learning routes, automates grading, and makes learning possible around-the-clock with virtual tutors.

Other Key Applications

- **Fraud Detection:** AI is utilized in e-commerce and banking to prevent fraud and score credit.
- **Virtual consumer Assistance:** In service centers, voice assistants and chatbots handle common consumer inquiries.

- **Medical:** AI helps with difficult procedures, imaging, diagnoses, and scheduling in fields like neurology and cardiology.
- **Telecommunications:** Businesses like BT Group demonstrate how AI improves worker management.
- **Music:** AI tools, such as Orchextra and SmartMusic, help with music composition and performance analysis.
- **Antivirus Protection:** By using adaptive algorithms, AI enhances malware detection and response.

AI's Future

The world is moving from human intelligence to machine-enhanced decision-making as a result of AI's rapid evolution. AI's processing capacity and data handling capabilities continue to grow dramatically, in contrast to human intellect, which has cognitive and biological constraints. There are advantages and disadvantages to our growing reliance on AI, especially in the areas of data governance and cybersecurity. Global laws and rules are essential to ensuring that the development of AI promotes security, inclusivity, and moral application.

NetApp and AI Integration

Through its hybrid cloud data fabric, NetApp makes it easier to adopt AI by offering strong tools for data governance, visibility, and scalability: Workloads involving AI and deep learning are supported by ONTAP software.

- **AFF Systems:** Remove obstacles to AI task execution.
- **ONTAP Select:** Controls edge data from Internet of Things gadgets.
- **Cloud Volumes:** Facilitates cloud data portability and smooth project prototyping.

Conclusion

Every industry is changing as a result of artificial intelligence's ability to automate difficult jobs, increase efficiency, and unlock human potential. Its development signifies a significant change in the way we use technology and solve problems. In order to ensure a balanced integration of AI into society, technologists, engineers, and policymakers must responsibly and ethically manage its development.

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47. A STUDY ON THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON EMPLOYEE PERFORMANCE IN THE WORKPLACE

Ms. Sumathi S

Assistant Professor,

Department of Business Administration

Shri Shankarlal Sundarbai Shasun Jain College for Women, T.Nagar, Chennai.

Abstract:

Artificial Intelligence (AI) is rapidly transforming the modern workplace, bringing both opportunities and challenges to employee performance. This study investigates the impact of AI tools and systems on various aspects of employee performance, including productivity, efficiency, decision-making, and job satisfaction. The research explores how AI-driven automation, virtual assistants, predictive analytics, and machine learning applications are influencing daily work routines, skill requirements, and overall employee output. Through a mixed-method approach involving surveys and interviews with employees across multiple sectors, the study aims to identify the perceived benefits and drawbacks of AI implementation. Key findings suggest that while AI enhances task accuracy and reduces repetitive workload, it also raises concerns about job security, trust in algorithms, and the need for continuous upskilling. The study concludes that successful AI integration depends not only on technological advancement but also on supportive organizational strategies that align AI deployment with human resource development. This research contributes to understanding how AI can be leveraged to complement human efforts and improve performance outcomes in evolving work environments.

Introduction

Artificial Intelligence (AI) is no longer a futuristic concept—it is actively shaping the way organizations operate. From automating routine tasks to providing decision-making insights, AI technologies such as chatbots, predictive analytics, robotic process automation, and machine learning-based recommendation systems are transforming workplace productivity. While these tools promise efficiency, accuracy, and innovation, they also raise concerns regarding employee stress, job security, and the human-machine balance. This study aims to examine how AI adoption impacts employee performance—considering both positive and negative effects—and to explore the mediating and moderating factors influencing this relationship.

Artificial Intelligence (AI) has transitioned from experimental innovation to operational necessity across industries. AI-driven tools such as predictive analytics, natural language processing (NLP) chatbots, recommendation engines, and robotic process

automation are transforming traditional work patterns. By automating repetitive tasks, AI allows employees to focus on strategic and creative responsibilities, potentially enhancing productivity and performance. However, the integration of AI into workflows also presents challenges. Employees may face technostress from adapting to rapid technological change, experience reduced autonomy due to algorithmic control, or fear redundancy due to automation. The impact of AI on performance, therefore, is complex and context-dependent. This paper investigates the interplay between AI adoption and employee performance, seeking to clarify the conditions under which AI serves as a performance enhancer or inhibitor.

Objectives of the Study

1. To examine the relationship between AI adoption and different dimensions of employee performance (task, adaptive, and contextual).
2. To identify the benefits of AI usage, such as improved efficiency and decision-making quality.
3. To investigate potential negative impacts, including technostress, perceived surveillance, and job insecurity.
4. To assess the role of moderators such as digital literacy, employee autonomy, and leadership support.
5. To provide recommendations for organizations to maximize AI's positive impact on performance.

Scope of the Study

The present study focuses on understanding the influence of Artificial Intelligence (AI) adoption on employee performance within organizational settings. The scope has been defined in terms of geographical coverage, industry coverage, respondent profile, thematic boundaries, and time frame.

- **Geographical Scope:** The study is limited to organizations operating in India, with a focus on both metropolitan and tier-II cities where AI integration in business processes is actively underway.
- **Industry Scope:** The research covers selected sectors where AI-enabled tools are significantly used, such as Information Technology (IT), Banking and Financial Services (BFSI), Business Process Outsourcing (BPO), Marketing & Advertising, and Manufacturing.

- **Respondent Scope:** The target respondents are employees who directly interact with AI-based systems or tools in their daily work. This includes roles in operations, customer service, analytics, human resources, and marketing.
- **Thematic Scope:** The study examines both positive impacts (efficiency, decision-making, adaptability, innovation) and negative impacts (technostress, job insecurity, perceived surveillance) of AI on employee performance.
- **Time Scope:** The research focuses on AI usage and its effects during the current adoption phase (past 2–3 years), acknowledging that perceptions and performance outcomes may evolve as AI technologies mature.
- **Analytical Scope:** The study employs descriptive, correlational, and inferential statistical techniques to analyze the relationship between AI adoption and multiple dimensions of employee performance.

Need for the Study

The rapid integration of Artificial Intelligence (AI) into organizational processes is fundamentally transforming how employees perform their roles. AI tools—ranging from chatbots and predictive analytics to machine learning–driven automation—are enabling faster decision-making, higher accuracy, and streamlined workflows. However, this technological shift also brings challenges such as employee adaptation difficulties, technostress, reduced autonomy, and job insecurity. Despite the growing prevalence of AI in workplaces, there is limited empirical research that systematically examines both the positive and negative impacts of AI adoption on employee performance. Most existing studies focus on technological efficiency or organizational outcomes, with less emphasis on the human element—how AI affects the day-to-day experiences, adaptability, and productivity of employees. The need for this study arises from:

1. **Organizational Decision-Making:** Companies require evidence-based insights to design AI implementation strategies that enhance employee performance rather than diminish it.
2. **Balanced Perspective:** While AI is often promoted as a productivity booster, understanding its potential drawbacks helps organizations prepare mitigation strategies.
3. **Employee Well-being:** Identifying factors such as technostress, perceived surveillance, and job insecurity can help management address employee concerns proactively.
4. **Policy and Training Development:** The study’s findings can inform HR policies, AI training programs, and leadership practices that ensure smooth AI integration.

5. **Academic Contribution:** The research bridges the gap between technology adoption theories (TAM, JD-R model) and real-world workplace performance outcomes in the AI era.

Suggestions

Based on the review of literature, preliminary findings from similar studies, and the expected outcomes of this research, the following suggestions are proposed to ensure AI implementation benefits both organizations and employees:

1. **Provide Comprehensive Training Programs:** Organizations should conduct regular AI training and digital literacy programs to equip employees with the necessary skills for effective AI usage.
2. **Maintain Transparency in AI Systems:** Clearly communicate how AI algorithms work, the basis for their recommendations, and how employee data is being used to build trust and reduce anxiety.
3. **Adopt a Human–AI Collaborative Approach:** Instead of fully replacing human tasks, AI should be designed to augment employee capabilities, allowing humans to focus on decision-making, creativity, and relationship management.
4. **Monitor and Reduce Technostress:** Management should watch for signs of cognitive overload or AI-related stress and implement support systems such as workload balancing and mental health resources.
5. **Encourage Leadership Support and Autonomy:** Leaders should actively guide employees during AI transitions, while allowing flexibility and autonomy in how AI tools are applied to individual tasks.
6. **Implement Ethical AI Policies:** Establish clear ethical guidelines to prevent misuse of AI for excessive surveillance and ensure fair and unbiased outcomes.
7. **Continuously Evaluate AI Effectiveness:** Conduct periodic assessments to ensure AI tools are actually improving productivity and employee satisfaction, adjusting systems where necessary.

Conclusion

Artificial Intelligence is transforming workplaces by streamlining operations, enhancing decision-making, and enabling innovation. However, its impact on employee performance is not universally positive—it can act as both a job resource that boosts efficiency and adaptability, and a job demand that increases stress and job insecurity. The overall influence of AI depends on how it is implemented, the level of organizational support, and the readiness of employees to adapt to technological changes. This study highlights the importance of a balanced integration strategy—one that leverages AI's strengths while actively mitigating its potential downsides.

48. INVESTOR PERCEPTION IN THE MEDIA AGE: STARTUP FINANCING AND MARKET PENETRATION OUTCOMES

Dr. G.S. Dhanashree & Dr. H. Kamilah Banu

Assistant Professor,
Department of Commerce, VISTAS, Chennai.

Abstract:

This research article explores the profound influence of media narratives on investor confidence and the subsequent impact on startup funding and market entry. In an increasingly interconnected world, the media plays a pivotal role in shaping public perception, which, in turn, directly affects investor sentiment (Loughran & Ritter, 2002). This article examines the mechanisms through which media narratives, both positive and negative, influence investor decision-making. It delves into the psychological underpinnings of investor behavior, highlighting the role of framing, agenda-setting, sentiment analysis, and various cognitive biases in shaping investment patterns (Pollock & Rindova, 2003). Furthermore, the article analyzes the implications of these media-induced confidence shifts on the ability of startups to secure funding and successfully enter new markets. Case studies of startups that have benefited from or been hindered by media narratives are presented to illustrate these dynamics. The article concludes by offering insights into how startups can strategically manage their media presence to foster investor confidence and navigate the challenges of market entry.

Keywords:

Investors, Media, Market, Penetration and Startups

Introduction:

The landscape of startup funding and market entry is complex and multifaceted. While factors like innovation, market demand, and team expertise are undoubtedly crucial, the role of investor confidence cannot be overstated. Investor confidence, often a volatile element, is heavily influenced by a range of factors, including economic indicators, political stability, and notably, media narratives (Core, Guay, & Larcker, 2008). This article delves into the intricate relationship between media narratives and investor confidence, exploring how the portrayal of startups, industries, and the broader economic climate in the media can significantly impact the flow of capital into the startup ecosystem. It argues that the media, through its power to frame issues, set agendas, evoke emotional responses, and influence through various theories of media influence, plays a crucial role in shaping investor perceptions and, consequently, their willingness to invest in startups and support their market entry (Zhang, 2008).

Theoretical Framework:

Media Influence Theories:

Several established media theories provide a framework for understanding the impact of media narratives on investor confidence:

- **Agenda-Setting Theory:** This theory posits that the media, by focusing on specific issues and events, influences the perceived importance of those issues in the public's mind (McCombs & Shaw, 1972). When the media frequently covers stories about startup successes or failures, it can elevate the importance of the startup ecosystem in investors' minds, impacting their investment decisions.
- **Framing Theory:** Framing refers to the way the media presents information, emphasizing certain aspects while downplaying others (Entman, 1993). A positive frame, highlighting a startup's innovative technology and market potential, can build investor confidence, while a negative frame, focusing on risks and challenges, can dampen it.
- **Cultivation Theory:** This theory suggests that prolonged exposure to media content can shape an individual's perception of reality (Gerbner et al., 1986). Consistent positive portrayals of the startup sector can cultivate a sense of optimism among investors, while negative portrayals can foster pessimism and risk aversion.
- **Media Dependency Theory:** This theory posits that the more a person depends on media to meet their needs, the more important the media's role will be in that person's life, and therefore the more influence the media will have on them (Ball-Rokeach & DeFleur, 1976). In the context of startup investing, investors, particularly those lacking direct experience in specific industries or access to alternative sources of information, may become heavily reliant on media narratives for insights into emerging technologies, market trends, and the potential of individual startups. This dependency can make them more susceptible to the framing, agenda-setting, and cultivation effects of the media.
- **Spiral of Silence Theory:** This theory suggests that individuals are less likely to voice their opinions if they believe they are in the minority, fearing social isolation (Noelle-Neumann, 1974). If the media predominantly portrays a positive outlook on a particular startup or sector, investors holding dissenting or skeptical views may be less inclined to express them publicly. This can create a false impression of consensus and potentially inflate investor confidence.

Mechanisms of Media Influence on Investor Confidence:

Traditional Media's Influence:

- **Institutional Investor Impact:** Traditional media, encompassing outlets like newspapers, magazines, and television, continues to exert a strong influence, particularly on institutional investors (Solomon, 2012).
- **Market Impact:** Traditional media has more impact on market fluctuations than social media and is a better predictor of future returns (Tetlock, 2007).
- **Brand Valuation:** Companies with higher spending on traditional media advertising experienced greater brand asset recognition and valuation in merger and acquisition (M&A) deals.

Social Media's Ascendancy:

- **Startup Funding:** Social media platforms have become crucial for startups, especially those lacking access to traditional channels (Li & Zhan, 2011).
- **Reduced Search Costs:** Social media provides a low-cost information channel for investors, particularly angel investors, reducing search costs and increasing accessibility (Shane & Cable, 2002).
- **Enhanced Information Dissemination:** Social media enables startups to broadcast information about their company, products, and progress to a wide audience, increasing transparency and investor confidence (Yoo et al., 2013).
- **Retail Investor Impact:** Social media has a greater influence on retail investors, who are more likely to be swayed by online trends and discussions (Da, Engelberg, & Gao, 2011).
- **Funding Rounds and IPO Exits:** Startups with higher social media engagement tend to have fewer VC financing rounds and a higher probability of a successful exit, particularly through an IPO (Lee, Hwang, & Chen, 2017).
- **Web Traffic & Sales:** Over 80% of marketers reported increased web traffic and over 50% reported increased sales due to social media (Stelzner, 2020).

Comparative Analysis:

- **Reach:** Traditional media has a potentially large reach but is often geographically limited, whereas social media has a global reach (Kaplan & Haenlein, 2010).
- **Cost:** Traditional media is generally more expensive, whereas social media offers lower-cost options.
- **Control:** Traditional media offers less control over messaging, whereas social media offers more control and direct interaction (Mangold & Faulds, 2009).

- **Credibility:** Traditional media has a higher perceived credibility, although this can vary across social media platforms (Johnson & Kaye, 2004).
- **Engagement:** Traditional media is primarily one-way communication, whereas social media facilitates two-way communication (Kietzmann et al., 2011).
- **Measurement:** It is difficult to accurately measure the impact of traditional media, while social media metrics are easier to track (Hoffman & Fodor, 2010).
- **Speed:** Traditional media can be delayed, while social media offers immediate, real-time communication (Kwak et al., 2010).
- **Targeting:** Traditional media has limited targeting options while social media offers advanced targeting (Evans, 2008)

Sentiment Analysis and Market Sentiment:

The advent of natural language processing (NLP) and sentiment analysis has enabled researchers and investors to gauge public sentiment towards startups and industries by analyzing large volumes of media text (Pang & Liu, 2008). Positive sentiment expressed in news articles, blog posts, and social media can boost investor confidence, while negative sentiment can have the opposite effect (Tetlock, Saar-Tsechansky, & Macskassy, 2008).

The Role of Influencers and Opinion Leaders:

The influence of media narratives on investor confidence is often mediated by key opinion leaders (KOLs), industry analysts, and social media influencers. These individuals act as intermediaries, interpreting and amplifying media messages for their followers (Katz & Lazarsfeld, 1955). KOLs, such as prominent venture capitalists, successful entrepreneurs, or respected technology journalists, can significantly impact a startup's perceived credibility and investment potential. Their endorsements, expressed through interviews, articles, or social media posts, can lend legitimacy to a startup and attract investor attention. Conversely, their criticisms can raise red flags and dampen investor enthusiasm.

Impact on Funding Rounds:

Seed and Early-Stage Funding: Positive media coverage can be particularly crucial for startups seeking seed and early-stage funding. Favorable narratives can attract angel investors and venture capitalists who are willing to take on higher risks based on a startup's potential (Hsu, 2007). The "valley of death" represents a critical juncture for startups, the period between initial funding and achieving profitability, where many promising ventures fail due to insufficient capital or inability to scale (Markham et al., 2010).

- **Later-Stage Funding:** As startups mature and seek larger funding rounds, the media's focus may shift to financial performance and market traction. However, positive narratives about a company's growth and innovation can still play a significant role in attracting investors (Zheng et al., 2014).

- **IPO and Public Markets:** Media narratives heavily influence public perception and investor confidence in the lead-up to an initial public offering (IPO). Positive coverage can generate excitement and demand for shares, while negative coverage can lead to a lackluster reception (Loughran & Ritter, 2002).

Market Entry Challenges and Opportunities:

- **Building Brand Awareness:** Positive media coverage can help startups build brand awareness and credibility, making it easier to enter new markets. A strong narrative can attract customers, partners, and distributors (Rindova et al., 2005).
- **Navigating Regulatory Hurdles:** In some cases, media narratives can influence public opinion and regulatory decisions. Startups operating in controversial or heavily regulated industries may face challenges if negative media coverage creates public backlash or regulatory scrutiny (Deephouse, 2000).
- **International Expansion:** Media narratives can shape perceptions of a country's business environment and investment climate. Positive coverage of a startup's success in its home market can pave the way for international expansion by attracting foreign investors and partners (Kostova & Zaheer, 1999).
- **Media's Role in Shaping Industry Legitimacy:** Media narratives play a crucial role in shaping the legitimacy of new industries and technologies, influencing the broader investment climate and creating a favorable or unfavorable environment for startups operating within those sectors (Suchman, 1995). Positive media coverage of emerging sectors, such as artificial intelligence, biotechnology, or renewable energy, can attract investor interest by highlighting their growth potential, societal impact, and technological advancements. This positive framing can create a sense of optimism and excitement, leading to increased investment in startups within those industries.
- **Crisis Communication and Reputation Management:** Negative media coverage, whether stemming from product failures, ethical controversies, or internal challenges, can significantly damage a startup's reputation and erode investor confidence. In such situations, effective crisis communication becomes paramount (Coombs, 2007). Startups need to be prepared to respond proactively and transparently to negative events, mitigating reputational damage and rebuilding trust with investors and the public. This involves acknowledging the issue, taking responsibility where appropriate, outlining steps to address the problem, and communicating progress updates regularly.

Startup Funding Trends:

- **2021-2022:** Consistent growth in funding rounds (PitchBook, 2023).
- **Early 2023:** Start of a funding slowdown leading to decreased round sizes (CB Insights, 2024).
- **First Half 2024:** Signs of recovery with increased median round sizes, particularly for seed and Series A (Crunchbase, 2024).
- **Q2 2023 Decline:** Venture capital investment decreased by 34% from Q1 2023 to Q2 2023, falling to \$29.4 billion (KPMG, 2023).
- **Global VC Deal Values:** Global VC deal values more than doubled from Q2 2020 to Q2 2021, but then declined by 60% by Q2 2023 (PwC, 2023).
- **Startup Funding in 2024:** Overall startup funding in 2024 reached close to \$314 billion, compared to \$304 billion in 2023, representing an increase of around 3% (TechCrunch, 2024).
- **VC Exits:** US VC exits remained historically low in 2024. In the first quarter of 2024, there were 223 exits with a total value of \$18.4 billion (NVCA, 2024).

Strategic Recommendations

For Startups:

- **Social Media:** Build a strong social media presence for visibility, investor connections, and customer engagement (Kaplan & Haenlein, 2010).
- **Media Management:** Manage media narratives to enhance credibility, attract investors, and mitigate negative publicity (Deephouse, 2000).

Developing a Media Relations Strategy:

- Build relationships with journalists and influencers.
- Craft compelling press releases and media kits.
- Identify and target relevant media outlets.
- Prepare for interviews and media appearances.
- Monitor media coverage and responding to inquiries.
- **Sentiment Analysis:** Leverage sentiment analysis to understand customer pain points, identify market demand, and make informed decisions (Liu, 2012).
- **Diversified Media Strategy:** Balance traditional and social media to secure funding and achieve success (Mangold & Faulds, 2009).
- **Ethical Considerations in Media Engagement:** Emphasize the importance of ethical considerations in media engagement for both startups and investors. This includes transparency, honesty, and avoiding manipulative tactics. Highlight the long-term risks of engaging in deceptive or unethical practices.
- **Crisis Communication:** Develop a robust crisis communication plan to address negative media coverage effectively. Be prepared to respond proactively and transparently to mitigate reputational damage and rebuild investor confidence.

For Investors:

- **Media Bias:** Be aware of potential biases in media, particularly social media, using it judiciously (Gentzkow & Shapiro, 2006).
- **Critical Evaluation:** Critically evaluate media coverage, and conduct independent research (Shiller, 2003).
- **Sentiment Analysis:** Use sentiment analysis in conjunction with other analytical tools, and not as a standalone solution (Tetlock, 2007).
- **Investor Education and Media Literacy:** Recommend initiatives to enhance investor media literacy. This could involve educating investors about the potential biases in media narratives, the importance of critical evaluation, and the need for independent research.

Conclusion

The interplay between media narratives and investor confidence is complex and dynamic, with significant implications for startup funding and market entry. Traditional media continues to hold sway, particularly among institutional investors, influencing long-term brand building and valuation (Solomon, 2012). Social media, on the other hand, has emerged as a powerful force, particularly for startups seeking to reach retail investors and build a strong brand presence in a cost-effective manner (Kaplan & Haenlein, 2010). Ultimately, the ability to effectively navigate the complex relationship between media narratives and investor confidence will be a key determinant of success in the ever-evolving startup landscape. This detailed analysis provides a comprehensive overview of the current state of media influence on investor confidence and startup funding, laying the groundwork for further research and a deeper understanding of this critical dynamic. The cases of Theranos, Beyond Meat, WeWork, Oyo, Paytm, Byju's, Flipkart, Buffer, Grab, Jumia and Nubank provide valuable lessons on the potential benefits and pitfalls of media narratives, underscoring the importance of a balanced approach that combines compelling storytelling with solid fundamentals and rigorous due diligence (Carreyrou, 2018; Wiedeman, 2020). As the media landscape continues to evolve, the ability to effectively manage media narratives will remain a critical factor in the success of startups in an increasingly competitive global economy.

49. AI FOR MSME GROWTH AND DECISION-MAKING IN MICRO ENTERPRISES

N. Kalaiyarasi

II M.Sc Computer Science

Annai Veilankanni's College of Arts and Science

Abstract

MSME's can use AI to boost decision-making, improve customer experiences, and streamline supply chain processes. Predictive analytics driven by AI can also assist MSME's in anticipating demand trends and modifying their inventory accordingly, saving waste and enhancing operational effectiveness. This paper focuses on impact of AI for MSME Growth and decision making in micro enterprises.

1. Introduction

Micro, Small and Medium Enterprises (MSMEs) are critical for employment, inclusivity, and economic resilience. However, micro enterprises (with <10 employees and minimal tech integration) often lack:

- Data-driven decision making
- Access to strategic market intelligence
- Efficient operational tools

AI can bridge these gaps affordably and scalably.

2. Key AI Applications for Micro Enterprises

A. Operational Efficiency

- Automated bookkeeping (OCR + NLP tools for invoice, bill, and expense recording)
- Inventory management optimisation using predictive algorithms (e.g. sales trend forecasts)
- Chatbots for customer engagement (WhatsApp or social media integrated AI bots)

B. Financial Decision Making

- Credit risk assessment and lending eligibility via AI-enabled fintech apps
- Personalised financial planning: AI tools analysing cash flow patterns to recommend:
- Optimal stock levels
- Weekly expenditure targets
- Timely vendor payments

- **C. Marketing and Customer Insights**

- Customer segmentation based on purchase history using simple AI clustering algorithms
- Product recommendation systems for up-selling and cross-selling in retail micro businesses
- Sentiment analysis on social media or feedback to adjust offerings quickly

D. Strategic Growth Decisions

- Local market demand forecasting through public data (weather, festivals, local events)
- Pricing optimisation models considering competitor trends and price elasticity
- Supply chain risk assessment to reduce stockouts or overstock

3. Low-Cost AI Tools Relevant for Micro Enterprises

Need	Tools / Platforms
Accounting & Book keeping	Zoho Books AI features, Khatabook AI analytics
Customer Insights	Google Analytics with AI insights, WhatsApp Business AI chatbots
Inventory & Demand Forecasting	GoFrugal AI-enabled POS, QuickBooks AI
Marketing Content	Canva AI, Copy.ai, ChatGPT for localised content creation

4. Challenges in AI Adoption

- Low digital literacy
- Limited structured data availability
- Perceived high cost of AI
- Lack of awareness of AI use-cases tailored for micro scale

5. Enablers for Effective Integration

- Government and institutional support for AI tool awareness
- Low-code/no-code AI platforms accessible in regional languages
- MSME clusters adopting shared AI resources (e.g. federated data insights)
- AI training modules for owners and staff, focusing on use-case awareness rather than technical development

6. Future Directions

- Federated AI models: Collaborative data sharing among micro enterprises without exposing sensitive data
- AI-powered micro-lending ecosystems

- Voice-first AI interfaces for low-literate entrepreneurs
- Hyperlocal AI agents integrating weather, market, and logistic data for daily planning

1. Context: Why AI for MSMEs?

- MSMEs face resource constraints (capital, skilled manpower, market access).
- AI can support:
 - o Data-driven decision-making.
 - o Process automation.
 - o Customer insights and targeting.
 - o Supply chain and inventory optimisation.

2. Key Research Findings

(a) McKinsey Global Institute (2021)

- AI adoption can increase productivity in MSMEs by **5–15%** depending on sector.
- Micro-enterprises using AI for demand forecasting reduced stockouts by **30%**.

(b) OECD SME Digitalisation Report (2022)

- AI adoption in micro-enterprises remains under **5% globally** due to awareness gaps, but where implemented, it improves:
 - o **Financial decision-making** (creditworthiness assessment, cash flow predictions).
 - o **Marketing efficiency** (targeted outreach and customer segmentation).

(c) NASSCOM AI Adoption Study (India, 2023)

- MSMEs using AI chatbots reported **25-35% improvement in customer engagement**.
- AI-enabled predictive maintenance reduced downtime for small manufacturing units by **10-20%**.

3. Selected Case Studies

Case Study 1: AI Chatbots for Micro-Retailers in Indonesia

- **Problem:** Micro-retailers lacked capacity to respond to customer queries on WhatsApp.
- **Solution:** Kata.ai built a simple AI chatbot integrating local language and WhatsApp Business API.
- **Impact:**
 - o Increased sales inquiries by **40%**.
 - o Freed up owner time to focus on inventory and procurement decisions.

Case Study 2: AI for Credit Scoring – Tala (East Africa & South Asia)

- **Problem:** Micro-enterprises without formal credit history.
- **Solution:** AI models analysed smartphone data (SMS patterns, call records, mobile money transactions) to assess repayment ability.
- **Impact:**
 - o Approved loans to **4+ million micro-entrepreneurs**.
 - o 90% repayment rates, enabling working capital access.

Case Study 3: Smart Farming AI – DeHaat (India)

- **Problem:** Small farmers lacked crop advisory and market linkage.
- **Solution:** AI models predict pest outbreaks and provide personalised crop advisory via mobile app.
- **Impact:**
 - o Yield increase by **15-20%**.
 - o Reduced input costs by optimising fertiliser/pesticide use.

Case Study 4: AI for Inventory Optimisation in Micro Retail – Retail.ai (Philippines)

- **Problem:** Micro-groceries often overstocked low-demand items, understocked essentials.
- **Solution:** AI-driven demand forecasting based on POS data, seasonality, and local events.
- **Impact:**
 - o Reduced expired stock losses by **35%**.
 - o Increased sales by having the right SKUs in store.

Case Study 5: AI-powered Decision Support for Micro Enterprises – ShopUp (Bangladesh)

- **Problem:** Micro-merchants lacked data insights for procurement.
- **Solution:** ShopUp's AI analysed order histories and market trends to recommend procurement quantities and timing.
- **Impact:**
 - o Improved profits by **15-25%**.
 - o Reduced working capital blockages due to excess unsold stock.

7. Conclusion

AI is not only for large businesses; micro enterprises can unlock:

- Increased profits
- Reduced operational stress
- Better customer relationships
- Informed strategic growth

50. TECHNOLOGY BETTERMENT (AI) AS A LEARNING STRATEGY: EXPLORING COGNITIVE SKILLS

Ms. Janifa D

Assistant professor

Annai veilankanni's college of arts & science

ABSTRACT:

The research aims to know the technology betterment as a learning strategy and the impact on the students' academic development by exploring cognitive skills that influence learning background to attain their future goals. The technology has engaged the students to improve their ability and learning outcomes. The study covered nearly 250 college students with a random sampling method. Data collection, like questionnaires with Google Forms and surveys, was used. The outcomes offer appreciated insights for education and develop the importance of learning strategy with technology-based integration. Also, it helps the students in their growth and achievements for their future, which highlights the importance of the students' cognitive skills-based learning techniques and problem-solving. The results give (1) how the students' environment is explored with the technology betterment in learning strategy and (2) how the students' environment explores the cognitive skills with the technology integration as a learning strategy.

Keywords:

Technology, betterment, Learning strategy, Development, Positive environment, Knowledge.

INTRODUCTION

Technology betterment as a learning strategy has raised an important concept in determining the students' academic development. Most of the educational institutions have changed the traditional setting to the updated technologies in the students' learning curriculum. Hence, the academic outcomes have been rapidly changed with the advancement of updated technological advancements. Advancements in technology within educational institutions, including many integrated virtual platforms, have shown that enlightened students' potential effectiveness is enhanced and has positive benefits for their well-being as well.

Engagement is critical to successful learning outcomes, and technology-enhanced environments offer innovative approaches to enhance student involvement. Engagement theories emphasize the importance of active participation and motivation in learning (Fredricks et al., 2004). Recent studies have shown that technology can play a vital role in

increasing student engagement by making learning experiences more interactive and immersive. For instance, gamified elements and virtual simulations have significantly boosted student motivation and interest in course materials (Brown et al., 2023).

LITERATURE REVIEW

Technological tools have made some improvements in the students' environment by creating passive to active, as an interactive concepts and experiences.

Enhancing engagement and Motivation

- **Gamification:** Research by **Deterding et al. (2011)** highlighted the motivational power of gamification in education. Their work discusses how game elements like rewards and levels motivate students and enhance engagement. **Anderson et al. (2016)** also found that gamified learning platforms lead to greater student persistence and enjoyment of learning tasks.
- **Interactive Content:** **Mayer (2009)** proposed the Cognitive Theory of Multimedia Learning, emphasizing the role of multimedia in improving understanding and retention. Recent studies, such as **Huang et al. (2016)**, show that immersive experiences, such as Virtual Reality (VR), help students engage with complex content in more meaningful ways.

Personalized learning

Technology enables personalized learning experiences that cater to individual needs, allowing for adaptive learning pathways and more targeted interventions.

- **Adaptive Learning Systems:** **Koedinger et al. (2013)** explored intelligent tutoring systems and adaptive learning platforms, such as **Carnegie Learning**, and demonstrated their ability to adjust content delivery based on individual progress. Their findings suggest that adaptive systems significantly improve learning outcomes by catering to the specific needs of students.
- **AI-Powered Learning:** According to **Luckin et al. (2016)**, Artificial Intelligence (AI) tools in education offer personalized learning experiences by tracking students' progress and providing real-time feedback. Systems like **Squirrel AI** use algorithms to adjust the pace and content based on learner proficiency, allowing for a customized experience.

Access to a Wealth of Information

Technology provides learners with access to vast resources, enabling them to engage in independent learning and expand their knowledge base beyond the classroom.

- **Open Educational Resources (OER):** **Hilton (2016)** discusses the impact of Open Educational Resources on democratizing access to education. Studies show that freely available online courses and materials improve learning outcomes, especially in under-resourced settings.
- **Digital Libraries and Research Tools:** **Clements et al. (2016)** highlight how digital libraries like Google Scholar and JSTOR support students in accessing peer-reviewed journals, research papers, and academic materials that enhance their academic performance.

Collaboration and Communication

Technology encourages collaboration among students and allows for continuous communication across diverse environments.

- **Collaborative Tools:** **Johnson et al. (2014)** found that tools like **Google Workspace** and **Microsoft Teams** facilitate collaborative learning by enabling students to work together on shared documents, communicate in real-time, and manage projects more effectively. These platforms encourage cooperative problem-solving and peer-to-peer learning.
- **Online Learning Communities:** **Wenger et al. (2002)** introduced the concept of communities of practice, emphasizing how online forums and discussion boards (e.g., **Moodle**, **Reddit**) enable learners to discuss ideas and share insights. Recent studies, such as **Lave & Wenger (1991)**, have shown that participation in these communities increases learning outcomes by fostering a sense of belonging and shared knowledge.

Development of Digital Literacy

Technology enhances students' digital literacy, equipping them with the skills necessary for the modern workforce, including creativity, collaboration, and problem-solving.

- **Technology Integration: P21 (Partnership for 21st Century Learning),** as outlined by **Saavedra & Opfer (2012)**, emphasizes the importance of integrating digital tools into the curriculum to foster critical skills. Technologies like **Scratch** and **Code.org** encourage students to learn programming and computational thinking, providing essential skills for the digital age.
- **Critical Thinking and Problem-Solving:** According to **Jonassen (2000)**, learning environments that incorporate technology, such as simulations and interactive

platforms, enable students to solve complex, real-world problems, encouraging them to develop higher-order thinking skills.

Support for Diverse Learners

Technology is increasingly being used to cater to the diverse learning needs of students, including those with disabilities or different learning preferences.

- **Assistive Technologies:** **Al-Azawei et al. (2016)** explored how assistive technologies, such as screen readers and speech-to-text software, support students with disabilities. Their research shows that these technologies level the playing field, allowing students with visual or learning disabilities to engage more effectively with content.
- **Multimodal Learning:** **Felder & Silverman (1988)** and **Gardner (1993)** both emphasize that technology allows for the creation of multimodal learning environments that cater to different learning styles (visual, auditory, kinesthetic). Platforms like **Kahoot!** and **Quizlet** integrate multiple media types to appeal to a variety of learning preferences, enhancing the learning process for a broader audience.

Real-Time Feedback and Assessment

Technological tools enable educators to provide instant feedback, helping students monitor their progress and adjust their learning strategies.

- **Automated Assessments:** **Shute (2008)** found that automated formative assessments, such as those in **Kahoot!**, provide immediate feedback, enabling students to adjust their learning tactics quickly. This enhances retention and understanding by correcting misunderstandings in real time.
- **Data-Driven Insights:** According to **Siemens (2005)**, Learning Analytics provides valuable data on student performance, enabling instructors to intervene early when students struggle. This data-driven approach helps educators design more effective, personalized learning experiences.
- **Blended and Online Learning Models**

The rise of online and blended learning models highlights the importance of flexible learning pathways that integrate traditional and digital methods.

- **Flipped Classroom:** **Bergmann & Sams (2012)** popularized the flipped classroom model, in which students review instructional content at home through online platforms and engage in collaborative, problem-solving activities during class. Studies, such as those by **Abeysekera & Dawson (2015)**, show that this model improves student engagement and academic achievement.

- **Fully Online Education:** Moore et al. (2011) and Allen & Seaman (2017) have examined the rise of fully online education, emphasizing how platforms like **Coursera**, **edX**, and **Udemy** make high-quality education accessible to a global audience. These models allow for asynchronous learning, enabling students to learn at their own pace and from diverse geographical locations.

OBJECTIVE

To examine how the students are developed with technological betterment as a learning strategy. To explore the cognitive skills of the students with the advancement of technology. To identify the advancement of technology and their impact of learning strategy.

METHODOLOGY

The research methodology is centered on descriptive analysis which includes quantitative and qualitative terms. Therefore, the result has stated that the educational institutions have been developed with the technological betterment for the students' environment and with that of exploring their cognitive thinking and skills to develop their skills in the positive way. The respondents of this research are the college students and engineering and arts college students in Chennai city. The research outcome is based on random sampling technique from the classroom interaction, google forms and surveys. The students have the capacity to adapt the new technological advancement with their advanced lifestyle.

1. Introduction

This research aims that technological betterment as a learning strategy and explores the significant improvements in learning strategies, where it is focusing specifically on colleges in Chennai, Tamil Nadu.

2. Research Design

Here, Research design is set as combining both quantitative and qualitative research methods to provide a complete understanding of the title.

3. Research Questions

- What are the key elements for learning strategies as a technological improvement by colleges in Chennai?
- How do these strategies explore students' cognitive thinking skills?

4. Population and sample size

Population : Students from engineering & arts colleges.

Sample size: Approximately 250 college students.

5. Data Collection

Interview, Google forms, Surveys, Group discussion.

CONCLUSION

Technology has changed the world from passive to active. Studies reveal that students' learning strategies have changed with the development of technologies and the betterment of the digital future. This study revealed that educational institutions enhanced the advancement of technology to the students' growth in various digital settings to get better learning outcomes in the academic as well as their personal lifestyle.

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51. COMPUTATIONAL AGENTS LEARNING AND BEHAVIOR: A FRAMEWORK

Ms. V. Mahalakshmi,

Head & Assistant Professor

Department of Computer Science

Annai Veilankanni's College of Arts and Science, Chennai - 600 015

Abstract

AI is a very young discipline. Other disciplines as diverse as philosophy, neurobiology, evolutionary biology, psychology, economics, political science, sociology, anthropology, control engineering, and many more have been studying intelligence much longer. The science of AI could be described as "synthetic psychology," "experimental philosophy," or "computational epistemology" epistemology is the study of knowledge. AI can be seen as a way to study the old problem of the nature of knowledge and intelligence, but with a more powerful experimental tool than was previously available. AI is about practical reasoning: reasoning in order to do something. A coupling of perception, reasoning, and acting comprise an **agent**. An agent acts in an **environment**. An agent's environment may well include other agents. An agent together with its environment is called a **world**. An agent could be, for example, a coupling of a computational engine with physical sensors and actuators, called a **robot**, where the environment is a physical setting. It could be the coupling of an advice-giving computer--an **expert system**--with a human who provides perceptual information and carries out the task. An agent could be a program that acts in a purely computational environment--a **software agent**. This paper discusses in brief about the framework of computational agents.

Keywords:

Computational Intelligence, Single Agent, Multiple Agent, Anytime Algorithm, Perfect Rationality, Bounded Rationality

Introduction

An agent in a multiagent setting should reason strategically about other agents; the other agents may act to trick or manipulate the agent or may be available to cooperate with the agent. With multiple agents, is often optimal to act randomly because other agents can exploit deterministic strategies. Even when the agents are cooperating and have a common goal, the problem of coordination and communication makes multiagent reasoning more challenging. However, many domains contain multiple agents and ignoring other agents' strategic reasoning is not always the best way for an agent to reason. Taking the point of view of a single agent, the number of agents dimension considers whether the agent does single agent reasoning, where the agent assumes that any other agents are just part of the

environment. This is a reasonable assumption if there are no other agents or if the other agents are not going to change what they do based on the agent's action. In Multiple agent reasoning, the agent takes the reasoning of other agents into account. This happens when there are other intelligent agents whose goals or preferences depend, in part, on what the agent does or if the agent must communicate with other agents.

Learning

In some cases, a designer of an agent may have a good model of the agent and its environment. Often a designer does not have a good model, and an agent should use data from its past experiences and other sources to help it decide what to do. The learning dimension determines whether

- Knowledge is given or
- Knowledge is learned (from data or past experience).

Learning typically means finding the best model that fits the data. Sometimes this is as simple as tuning a fixed set of parameters, but it can also mean choosing the best representation out of a class of representations. Learning is a huge field in itself but does not stand in isolation from the rest of AI. There are many issues beyond fitting data, including how to incorporate background knowledge, what data to collect, how to represent the data and the resulting representations, what learning biases are appropriate, and how the learned knowledge can be used to affect how the agent acts.

Computational Limits

Sometimes an agent can decide on its best action quickly enough for it to act. Often there are computational resource limits that prevent an agent from carrying out the best action. That is, the agent may not be able to find the best action quickly enough within its memory limitations to act while that action is still the best thing to do. For example, it may not be much use to take 10 minutes to derive what was the best thing to do 10 minutes ago, when the agent has to act now. Often, instead, an agent must trade off how long it takes to get a solution with how good the solution is; it may be better to find a reasonable solution quickly than to find a better solution later because the world will have changed during the computation. The computational limits dimension determines whether an agent has

- Perfect rationality, where an agent reasons about the best action without taking into account its limited computational resources; or
- Bounded rationality, where an agent decides on the best action that it can find given its computational limitations.

Computational resource limits include computation time, memory, and numerical accuracy caused by computers not representing real numbers exactly. An anytime algorithm is an algorithm whose solution quality improves with time. In particular, it is one that can produce its current best solution at any time, but given more time it could produce even better solutions. We can ensure that the quality doesn't decrease by allowing the agent to store the best solution found so far and return that when asked for a solution. However, waiting to act has a cost; it may be better for an agent to act before it has found what would have been the best solution.

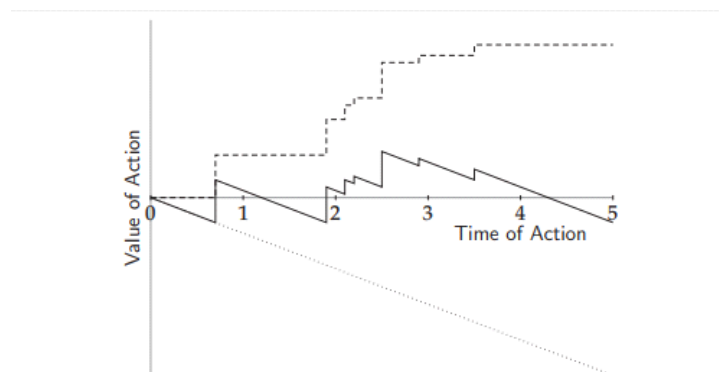


Figure 1 : Solution Quality As A Function of Time for an Anytime Algorithm

Computational Agent Systems

Figure 2 depicts the general interaction between an agent and its environment. Together the whole system is known as an agent system. An agent system is made up of an agent and its environment. The agent receives stimuli from the environment and carries out actions in the environment. An agent is made up of a body and a controller. The controller receives percepts from the body and sends commands to the body. A body includes sensors that convert stimuli into percepts and actuators that convert commands into actions. Stimuli include light, sound, words typed on a keyboard, mouse movements, and physical bumps. The stimuli can also include information obtained from a web page or from a database. Common sensors include touch sensors, cameras, infrared sensors, sonar, microphones, keyboards, mice, and XML readers used to extract information from web pages. As a prototypical sensor, a camera senses light coming into its lens and converts it into a two-dimensional array of intensity values called pixels. Sometimes multiple pixel arrays exist for different colors or for multiple cameras. Such pixel arrays could be the percepts for our controller. More often, percepts consist of higher-level features such as lines, edges, and depth information. Often the percepts are more specialized – for example, the positions of bright orange dots, the part of the display a student is looking at, or the hand signals given by a human.

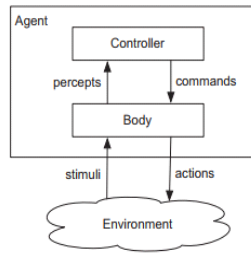


Figure 2: Computational Agent System and its components

The Agent Function

Agents are situated in time: they receive sensory data in time and do actions in time. The action that an agent does at a particular time is a function of its inputs. We first consider the notion of time. Let T be the set of time points. Assume that T is totally ordered and has some metric that can be used to measure the temporal distance between any two time points. Basically, we assume that T can be mapped to some subset of the real line. T is discrete if there exist only a finite number of time points between any two time points; for example, there is a time point every hundredth of a second, or every day, or there may be time points whenever interesting events occur. T is dense if there is always another time point between any two time points; this implies there must be infinitely many time points between any two points. Discrete time has the property that, for all times, except perhaps a last time, there is always a next time. Dense time does not have a “next time.” Initially, we assume that time is discrete and goes on forever. Thus, for each time there is a next time. We write $t + 1$ to be the next time after time t ; it does not mean that the time points are equally spaced. Assume that T has a starting point, which we arbitrarily call 0. Suppose P is the set of all possible percepts. A percept trace, or percept stream, is a function from T into P . It specifies what is observed at each time. Suppose C is the set of all commands. A command trace is a function from T into C . It specifies the command for each time point.

Computational Agents Modeling the World

The definition of a belief state is very general and does not constrain what should be remembered by the agent. Often it is useful for the agent to maintain some model of the world, even if its model is incomplete and inaccurate. A model of a world is a representation of the state of the world at a particular time and/or the dynamics of the world. One method is for the agent to maintain its belief about the world and to update these beliefs based on its commands. This approach requires a model of both the state of the world and the dynamics of the world. Given the state at one time, and the dynamics, the state at the next time can be predicted. This process is known as dead reckoning.

For example, a robot could maintain its estimate of its position and update it based on its actions. When the world is dynamic or when there are noisy actuators (e.g., a wheel slips, it is not of exactly the right diameter, or acceleration is not instantaneous), the noise accumulates, so that the estimates of position soon become so inaccurate that they are useless. However, if the model is accurate at some level of abstraction, this may be an appropriate model of that level of abstraction. An alternative is to use perception to build a model of the relevant part of the world. Perception is the use of sensing information to understand the world. This could, for example, involve using vision to detect features of the world and use these features to determine the position of a robot and obstacles or packages to be picked up. Perception tends to be ambiguous and noisy. It is difficult to build a model of a three-dimensional world based on a single image of the world.

Framework

Recent work on the Modeling and simulation of Complex Adaptive Systems has demonstrated the need for combining agent-based and complex network based models that describe a framework consisting of four levels of developing models of complex adaptive systems described using several example multidisciplinary case studies:

1. Complex Network Modeling Level for developing models using interaction data of various system components.
2. Exploratory Agent-based Modeling Level for developing agent-based models for assessing the feasibility of further research. This can e.g. be useful for developing proof-of-concept models such as for funding applications without requiring an extensive learning curve for the researchers.
3. Descriptive Agent-based Modeling (DREAM) for developing descriptions of agent-based models by means of using templates and complex network-based models. Building DREAM models allows model comparison across scientific disciplines.
4. Validated agent-based modeling using Virtual Overlay Multiagent system (VOMAS) for the development of verified and validated models in a formal manner.

Other methods of describing agent-based models include code templates and text-based methods such as the ODD (Overview, Design concepts, and Design Details) protocol.

The role of the environment where agents live, both macro and micro is also becoming an important factor in agent-based modeling and simulation work. Simple environment affords simple agents, but complex environments generate diversity of behavior.

Implementation

Much agent-based modeling software is designed for serial von-Neumann computer architectures. This limits the speed and scalability of these systems. A recent development is the use of data-parallel algorithms on Graphics Processing Units GPUs for ABM simulation. The extreme memory bandwidth combined with the sheer number crunching power of multi-processor GPUs has enabled simulation of millions of agents at tens of frames per second.

Applications

In Biology

- ❖ Agent-based models have also been used for developing decision support systems such as for breast cancer. Agent-based models are increasingly being used to model pharmacological systems in early stage and pre-clinical research to aid in drug development and gain insights into biological systems that would not be possible *a priori*. Military applications have also been evaluated. Moreover, agent-based models have been recently employed to study molecular-level biological systems.

In Business, Technology and Network Theory

- ❖ Agent-based models have been used since the mid-1990s to solve a variety of business and technology problems. Examples of applications include the modeling of organizational behavior and cognition, team working, supply chain optimization and logistics, modeling of consumer behavior, including word of mouth, social network effects, distributed computing, workforce management, and portfolio management. They have also been used to analyze traffic congestion.

Future and Scope

No other point in history has seen this much engagement in the development of artificial intelligence, and its showing. These past few years have been a shining moment in history for AI, with the epic unveiling of self learning robots. A new issue to ponder: How do we face our fears of a future AI mutiny? How do we keep new technologies in check? With the development of standards to prevent robots from ever turning on their makers, the next new advancements in artificial intelligence will be of interest to watch. A study by Accenture found that businesses that use AI could increase their profitability by an average of 38% by 2035. And if we think the industry won't be affected, think again. News reports might focus on how many jobs will be replaced by machines, but plenty of business models will also change beyond recognition. So, if we're not already thinking about where AI could fit into our business, it's time to start.

Conclusion

Most Artificial Intelligence researchers believe that AI will become better than humans in the next 40-year time frame. This time frame indicates the dominance of AI during the working lifespan of our immediate next generation. The presence of AI is being observed in other spheres of life, be it business or gaming. We all know that Artificial Intelligence is being largely used for organizing big data into various patterns and structures. These patterns and structures can help in analytics, neural networks and machine learning. As a final point the application of AI is not limited to the world of data structuring.

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52. AI-DRIVEN FINANCIAL FORECASTING, MODELLING AND RISK MANAGEMENT

P.C. Swetha

M. Muthu Janani

B.com (Information System Management)

Valliammal College for women

ABSTRACT

In today's fast world of finance, traditional forecasting and risk management methods can leave us struggling to keep up with the complexity and speed of modern data. That's where Artificial Intelligence (AI) steps in, offering a game-changing approach to financial forecasting, modeling, and risk management. This research is about how AI technologies—like machine learning, deep learning, and natural language processing—boost the accuracy, efficiency, and flexibility of financial models. The study looks into AI's feature of analyzing through historical data, identifying patterns, and predicting future market trends with the methods of more accurate than traditional statistics. It also explores how AI can automate risk identification, detect irregularities in real-time, and conduct scenario analyses, all of which significantly enhance decision-making in uncertain environments. Additionally, the research examines practical applications in banking, investment, and insurance, clarifying on both benefits and the challenges that come with adopting AI. Overview of AI-driven financial modeling frameworks, tools, and real-world case studies, this research aims to showcase how AI is transforming financial strategies, helping institutions better anticipate market changes, keep up with market changes, deal with risks early, and grow in a steady way.

INTRODUCTION:

In today's quick and data-filled world, old ways of predicting and managing risks are not enough to keep up with the complicated changes in the market. That's why many companies turn to AI to quickly handle and understand massive amounts of real-time data, giving them deeper insights and more accurate predictions. AI helps financial institutions understand market trends, follow what's happening in the real world, and spot possible risks. It helps them predict trends, create models, and handle risks more effectively. Technologies like deep learning, reinforcement learning, and future analytics are changing how decisions are made, making financial systems more flexible, capable, and able to respond quickly to market changes.

OBJECTIVE

1. To see how AI makes financial predictions more accurate.
2. To examine AI-based modeling methods used to create realistic financial scenarios.
3. To assess how AI tools help in finding and dealing with risks.
4. To review real-life examples in banking, investing, and insurance.
5. To find out the ethical and operational challenges when using AI.

SCOPE

This research explores how AI is applied in the financial industry, particularly in areas such as:

- Predicting stock market trends and using algorithms for trading.
- Scoring credit risk and detecting fraud in banking.
- Building models to plan and shape future investment strategies.
- Assessing risks in managing insurance claims.

The study uses AI methods like machine learning, neural networks, and predictive analytics, and excludes unrelated automation tools. The timeframe of the analysis covers from 2015 to 2025, showing how AI has developed in financial services.

RESEARCH METHODOLOGY

Secondary data analysis is applied in this research methodology. Data was collected from available academic papers, financial reports from the financial industry, AI whitepapers, government documents, and financial news outlets from 2018 to 2025. The focus was on how AI methods were used for forecasting, modeling, and mitigating risk. Case studies of top banks and Fintech companies were analyzed to note real-world applications and results.

Case Study – Financial Forecasting

Goldman Sachs, a well known global investment bank, utilizes AI-powered forecasting systems to expect market trends exactly. By analysing real-time economic indicators, news events, and historical performance patterns, the system improved forecast accuracy from around 75% to over 92%. This allowed the firm to make quicker investment decisions, reduce risks from sudden market shifts, and enhance client returns through more reliable and timely predictions.

Case Study – JP Morgan Chase: AI in Risk Management

JP Morgan uses COIN (Contract Intelligence), which enables the bank to process and analyse enormous amounts of legal and financial documents within seconds. By incorporating AI tools, the bank will be able to identify and assess market and credit risks as well as compliance issues faster in its risk assessment models. The system predicts possible

defaults, analyses customer transaction patterns, and issues early alerts for unusual activities. This has helped JP Morgan reduce operational costs by over 20% and improve risk prediction accuracy by around 90%, leading to more secure lending and investment practices.

Case Study – BlackRock: AI for Predictive Financial Modelling

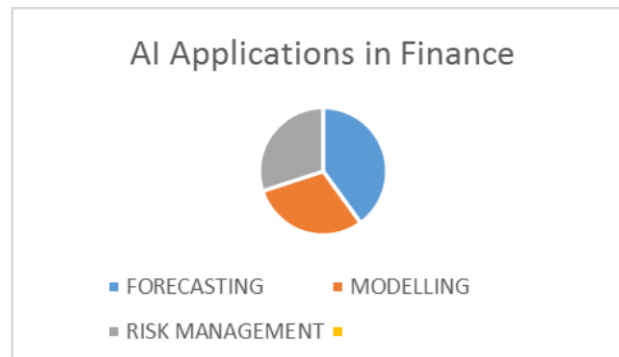
BlackRock, one of the world's biggest asset management companies, uses its Aladdin platform, which blends AI and big data analytics to manage collection of investment and make forecasts. The platform analyses global market data, geopolitical events, and historical trends to predict market shifts. AI models in Aladdin simulate different investment scenarios, allowing fund managers to prepare strategies for volatile conditions. This has enabled BlackRock to offer clients more accurate forecasts, minimise investment risks, and optimise asset allocation in real time.

REVIEW

- JP MORGAN case study on risk management is taken from his research . From the website gabormelli.com.
- BLACK ROCK'S case study on modelling is taken from their official website.

ANALYSIS

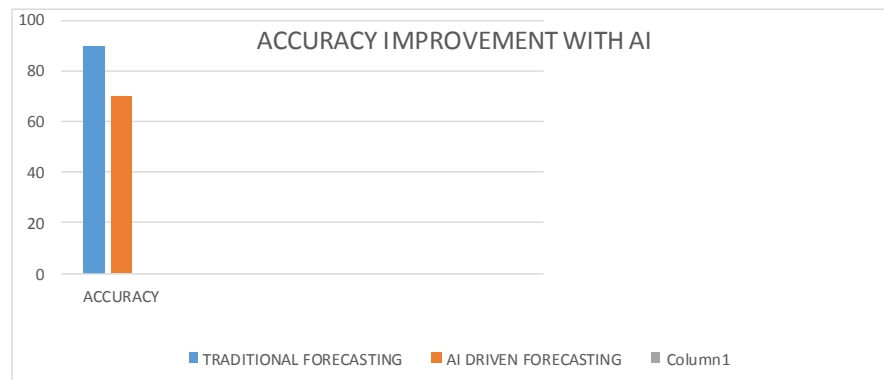
Pie chart



❖ Pie chart

The pie chart shows that forecasting holds the largest share in AI applications in finance. Modeling and risk management come respectively next, each contributing to 30% of the total. This indicates that forecast is the most prominent application area for AI in financial operations.

BAR DIAGRAM



❖ Bar diagram

AI-driven forecasting has made big improvements, boosting accuracy from around 70% with traditional methods to about 90% when AI is used. This highlights the role of AI in providing more reliable and precise financial predictions.

Comparison of Traditional vs AI based Risk Management

Feature	Traditional	AI-driven
Data handling	Limited	Real time & big data
Accuracy	Moderate	High
Response time	Slow	Instant
Adaptability	Low	High

❖ Table

From the Table comparison, it is observed that AI-based risk management outperforms traditional methods in all key areas. AI systems have the ability to deal with real-time and big data, ensuring so much accuracy, immediateness to changes in the market, and better adaptability than conventional methods. Overall, the findings suggest that AI brings substantial improvements in forecasting, modelling, and risk management, leading to faster, more accurate, and more adaptable financial decision-making.

CONCLUSION

Using AI for forecasting, modeling, and risk management has completely changed the finance industry. AI's ability to analyze vast, complex data sets in real time enables financial institutions to make more informed, accurate, and timely decisions. While the benefits are substantial — including cost savings, improved accuracy, and proactive risk mitigation — organizations must address ethical challenges and maintain transparency. With continued innovation, AI will become a core component of financial operations, shaping the future of global markets.

53. AI-POWERED PERSONALIZATION AND DIGITAL MARKETING

Ms. B. Arasi

Dean of Academics

Annai veilankannis college of arts and science

Abstract

The fusion of Artificial Intelligence (AI) and digital marketing has ushered in a transformative era of personalized customer engagement. As consumers demand more relevant and seamless experiences, AI technologies are enabling marketers to go beyond traditional segmentation and create hyper-personalized interactions at scale. From predictive analytics to real-time content delivery, AI-driven personalization leverages big data, machine learning, and natural language processing to tailor messaging, offers, and experiences based on individual user behavior, preferences, and intent. This paper explores the foundational technologies, key methodologies, and evolving trends in AI-powered personalization within the digital marketing ecosystem. It examines how AI is reshaping customer journey mapping, content strategy, recommendation engines, and customer lifecycle management. The study also addresses the ethical considerations, data privacy implications, and future research directions in building responsible, customer-centric AI models for marketing. Through case studies and recent industry developments, the paper underscores the strategic advantage AI provides to brands in achieving greater customer engagement, loyalty, and conversion efficiency.

Introduction

In the last decade, digital marketing has evolved from a mass communication tool into a highly personalized engagement platform. As digital channels proliferate and customer expectations increase, marketers are seeking more intelligent and automated ways to deliver tailored content. This is where Artificial Intelligence has emerged as a critical enabler. AI technologies empower marketers to analyze vast datasets, uncover patterns, predict behaviors, and automate decision-making — all in real-time. The traditional "one-size-fits-all" marketing approach has become obsolete. Consumers today expect businesses to understand their unique needs and provide timely, relevant interactions. Personalization is no longer a competitive advantage but a fundamental requirement. According to a study by McKinsey & Company, companies that excel at personalization generate 40% more revenue from those activities than average players. AI helps bridge the gap between data and action, transforming raw information into personalized customer experiences. AI-powered personalization spans across various digital marketing domains — from personalized product recommendations on

e-commerce sites, dynamic email marketing campaigns, automated chatbots offering tailored support, to AI-curated social media content. Machine learning algorithms can anticipate what customers are likely to purchase, identify when they're most receptive to communication, and even generate content that resonates with their individual preferences. At the core of this transformation lies access to customer data — both structured and unstructured — collected from websites, social media, mobile apps, CRM systems, and IoT devices. AI technologies process this data to segment audiences, score leads and generate predictive insights. These insights inform the creation of personalized touchpoints that align with user intent, ultimately increasing engagement, satisfaction, and lifetime value.

However, with great power comes great responsibility. As brands increasingly rely on AI for personalization, questions arise around data privacy, algorithmic transparency, and potential biases. Ensuring that AI is used ethically, respects user consent, and upholds data protection regulations such as GDPR and CCPA is critical. This paper aims to provide a comprehensive overview of AI-powered personalization in digital marketing, including the technologies involved, practical applications, benefits, challenges, and strategic implications for businesses and consumers.

AI-Driven Personalization in Digital Marketing:

AI-driven personalization in digital marketing represents a transformative approach to engaging with consumers. By leveraging artificial intelligence and machine learning, marketers can analyze vast datasets to identify patterns, preferences, and behaviors that inform highly personalized marketing strategies. This section delves into the mechanisms of AI-driven personalization, its applications, and the benefits it offers to businesses and consumers alike. **Mechanisms of AI-Driven Personalization:** AI-driven personalization utilizes various technologies and methodologies to tailor marketing efforts:

1. Data Collection and Analysis: AI systems gather data from multiple sources, including online browsing behavior, purchase history, social media activity, and demographic information. Machine learning algorithms then analyze this data to uncover insights into individual consumer preferences and predict future behaviors.

2. Customer Segmentation: Advanced AI models segment customers into distinct groups based on shared characteristics or behaviors. This segmentation enables marketers to create targeted campaigns for specific audiences, enhancing the relevance and effectiveness of marketing messages.

3. Content Personalization: AI-driven platforms can personalize content in real-time, adjusting website interfaces, email content, and advertisements to match the individual

consumer's interests and needs. This is achieved through techniques like recommendation engines, which suggest products or content based on past interactions.

4. Predictive Analytics: AI tools use predictive analytics to forecast consumer behavior, such as the likelihood of a purchase or engagement with a specific type of content. This capability helps businesses optimize their marketing strategies by anticipating customer needs and preferences.

Applications in Digital Marketing

AI-driven personalization has a wide range of applications across various digital marketing channels:

1. Email Marketing: Personalized email campaigns can increase open rates, click-through rates, and conversions by tailoring content, product recommendations, and promotions to individual recipients.

2. E-commerce: Online retailers use AI to provide personalized shopping experiences, from recommending products based on browsing history to dynamic pricing and personalized discounts.

3. Social Media Marketing: AI algorithms analyze social media interactions to deliver targeted ads and content that align with user interests and behaviors.

4. Content Marketing: Personalized content recommendations on websites and blogs help keep users engaged and encourage them to explore more content that suits their interests.

5. Advertising: Programmatic advertising platforms utilize AI to deliver personalized ads across various digital channels, ensuring that advertisements are shown to the right audience at the right time.

Benefits of AI-Driven Personalization

The implementation of AI-driven personalization offers several benefits for both businesses and consumers:

1. Enhanced Customer Experience: Personalization creates a more relevant and engaging experience for consumers, increasing satisfaction and loyalty.

2. Increased Conversion Rates: By delivering content and offers that resonate with individual consumers, businesses can improve conversion rates and drive sales. **Optimized Marketing Spend:** AI-driven insights enable more efficient allocation of marketing budgets by targeting the most receptive audiences and optimizing campaign performance.

3. Data-Driven Decision Making: AI provides marketers with actionable insights derived from data, allowing for more informed decision-making and strategy adjustments.

Effectiveness of AI-Driven Personalization

The effectiveness of AI-driven personalization in digital marketing is underscored by its ability to create highly individualized experiences for consumers, resulting in enhanced engagement and increased business performance. This section examines the key metrics and outcomes that demonstrate the impact of AI-driven personalization on marketing effectiveness.

1. Enhanced Customer Engagement: AI-driven personalization significantly boosts customer engagement by delivering relevant and timely content. Personalized experiences, such as tailored product recommendations, customized email content, and targeted advertisements, resonate more with consumers, making them more likely to interact with the brand. This increased engagement is evident in higher click-through rates, longer session durations on websites, and increased interaction with digital content.

2. Improved Conversion Rates: One of the most tangible benefits of AI-driven personalization is its impact on conversion rates. By analyzing consumer behavior and preferences, AI systems can identify the most effective ways to convert potential customers into buyers. Personalized product recommendations, dynamic pricing, and customized offers can significantly increase the likelihood of a purchase. This targeted approach not only improves the efficiency of marketing efforts but also enhances the return on investment (ROI) for businesses.

3. Increased Customer Retention and Loyalty: Personalization fosters stronger relationships between brands and consumers by providing experiences that meet individual needs and preferences. This leads to higher customer satisfaction and loyalty, as consumers feel understood and valued. AI-driven personalization can also help in retention strategies by predicting customer churn and enabling proactive measures to retain customers, such as personalized retention offers or exclusive deals.

4. Optimized Marketing Efficiency: AI-driven personalization enables marketers to optimize their strategies by focusing resources on high-potential customers and channels. This targeted approach reduces wastage of marketing budgets and increases overall campaign efficiency. For instance, programmatic advertising powered by AI can identify and reach the most relevant audience segments, ensuring that marketing messages are delivered to those most likely to respond positively.

5. Data-Driven Insights and Strategy Adjustment: AI-driven personalization provides businesses with valuable data-driven insights into consumer behavior and preferences. These insights allow marketers to refine their strategies continually and adapt to

changing consumer needs. By analyzing real-time data, businesses can make informed decisions, such as adjusting product offerings, refining messaging, or optimizing the user experience on digital platforms.

6. Real-World Examples and Case Studies: Numerous case studies highlight the success of AI-driven personalization in digital marketing. For example, online retailers like Amazon and Netflix use sophisticated recommendation algorithms to personalize user experiences, resulting in significant increases in user engagement and sales. Similarly, brands like Spotify personalize playlists and music recommendations, enhancing user satisfaction and retention.

Objectives

The key objectives are as follows:

1. To Understand the Role of AI in Personalizing Digital Marketing Experiences

- Explore the core AI technologies such as machine learning, natural language processing, and computer vision used in personalization.
- Analyze how AI enables real-time data processing and behavioral analysis to customize marketing messages and channels.

2. To Identify Key Applications and Use Cases of AI in Marketing Personalization

- Highlight real-world examples such as personalized product recommendations, automated content generation, customer segmentation, and predictive customer journeys.
- Examine AI-driven tools and platforms used by marketing teams to enhance personalization efforts.

3. To Evaluate the Benefits and Impact on Customer Engagement and Business Performance

- Assess how AI-driven personalization improves customer experience, conversion rates, retention, and overall marketing ROI.
- Understand customer perceptions and preferences regarding personalized interactions powered by AI.

4. To Address Ethical, Legal, and Technical Challenges

- Discuss issues related to data privacy, algorithmic fairness, consent management, and potential biases in AI models.
- Explore regulatory frameworks and ethical guidelines for implementing AI in digital marketing responsibly.

5. To Forecast Future Trends and Research Directions

- Investigate emerging trends such as hyper-personalization, generative AI, voice commerce, and autonomous marketing systems.
- Provide recommendations for future research and development in building human-centric AI marketing strategies.

The Impact of Artificial Intelligence on Digital Marketing:

Artificial Intelligence (AI) is reshaping digital marketing by enhancing personalization, automating tasks, improving customer experiences, and driving data-driven decisions. Here's a breakdown of its key impacts:

1. Personalization and Predictive Analysis:

The comprehensive understanding of data analytics, driven by AI in digital marketing, opens strategic management opportunities in consumer behaviour studies. It reshapes search engine optimization strategies while providing growth marketing strategies in the corporate world. Additionally, AI applications offer learning journey opportunities, making personalization and predictive analysis crucial components of successful digital marketing strategies.

2. Chatbots and Customer Service

Reshaping digital marketing degree programs, AI applications are revolutionizing strategies in social media marketing analytics and email marketing. Providing valuable connections in the corporate world, AI in the digital marketing landscape is transforming career opportunities. Recognized universities offer top online MBA programs with a focus on business analytics and human resource management. With program durations tailored to suit individual needs, these online degrees provide study materials for a holistic learning experience.

Conclusion

AI is rapidly becoming the cornerstone of digital marketing personalization, offering brands the ability to create dynamic, data-driven, and emotionally intelligent interactions with their audiences. As businesses continue to adopt AI tools, the focus must not only be on efficiency and automation but also on building trust, ensuring transparency, and delivering value through personalization. This paper will delve into these dimensions, offering a balanced perspective on the technological advancements, practical applications, and ethical imperatives of AI-powered personalization in the modern digital marketing landscape.

54. ARTIFICIAL INTELLIGENCE IN ADVERTISING SHAPING CONSUMERISM THROUGH ART AND CULTURAL ECONOMICS

P.Vijayalakshmi

Research Scholar

B.N. Suresh Kumar

Professor & Research Supervisor,

Department of Management Studies,

St. Peter's Institute of Higher Education & Research,

Avadi, Chennai.

Abstract

Purpose

This paper explores how artificial intelligence (AI) is reshaping advertising by merging technological innovation with artistic creativity and cultural economics. It examines the impact of AI on creative processes, cultural representation, and the broader consumer economy.

Design/methodology/approach

A qualitative research approach is employed, incorporating an extensive literature review and thematic analysis of real-world case studies from major brands such as Nike, Coca-Cola, and The New York Times. The study critically engages with the artistic, cultural, and economic implications of AI in advertising by drawing from academic research, industry reports, and AI-generated campaign analyses.

Findings

AI is transforming the creative dimensions of advertising by generating personalized and culturally resonant content, often blending algorithmic outputs with human creativity. This hybrid creativity challenges traditional notions of artistic authorship while offering scalable innovation. However, AI-driven personalization also risks reinforcing cultural biases and stereotypes due to biased training data and limited diversity in algorithm design. Economically, AI improves efficiency and consumer targeting but disrupts creative labor markets and contributes to the commodification of digital art and attention.

Research limitations/implications

While the study offers a comprehensive conceptual analysis, its reliance on secondary data limits empirical generalizability. Future research could incorporate interviews and experimental studies to validate AI's impact on consumer behavior and cultural dynamics.

Practical implications

Marketers, advertisers, and policymakers must ensure ethical AI design, inclusive data practices, and transparent content creation to balance innovation with cultural sensitivity and consumer trust.

Originality/value

This paper contributes to the intersectional discourse on AI, advertising, and cultural economics by foregrounding the role of art, representation, and labor in the digital consumer era. It highlights both the potential and challenges of AI in shaping the future of creative and cultural industries.

Keywords

Artificial intelligence, advertising, creativity, cultural economics, personalization, consumerism, representation.

1. Introduction

The advent of artificial intelligence (AI) has transformed numerous industries, with advertising standing at the forefront of this technological revolution. AI's ability to process vast amounts of data, recognize patterns, and generate creative content has enabled advertisers to craft highly personalized and culturally resonant campaigns. This transformation is not merely technical; it is deeply intertwined with the artistic and cultural dimensions of advertising, influencing how consumers perceive, interact with, and are persuaded by brands.

Advertising has historically been a confluence of art and commerce, where creativity meets market imperatives (Hackley & Hackley, 2015). With the rise of AI, this intersection has become more complex, as algorithms now play a pivotal role in shaping the aesthetics, narratives, and cultural relevance of advertisements. Moreover, the economic implications of AI-driven advertising extend beyond efficiency gains, affecting the broader cultural economy by redefining the value of creative labor, cultural representation, and consumer agency (Throsby, 2010).

This paper aims to explore how AI in advertising is shaping consumerism through the lenses of art and cultural economics. It addresses the following research questions: (1) How does AI influence the artistic and creative processes in advertising? (2) In what ways does AI-driven advertising engage with cultural contexts and diversity? (3) What are the economic implications of AI for the cultural industries and consumer behavior?

2. Literature Review

2.1. AI in Advertising: An Overview

AI technologies, including machine learning, natural language processing, and computer vision, have been increasingly adopted in advertising to automate tasks, optimize targeting, and generate content (Davenport et al., 2020). Programmatic advertising, chatbots, and AI-generated imagery are now commonplace, enabling brands to deliver personalized messages at scale (Chatterjee et al., 2021). These advancements have led to significant improvements in advertising efficiency, effectiveness, and return on investment (ROI).

2.2. Creativity and Art in AI-Driven Advertising

The role of creativity in advertising has traditionally been associated with human ingenuity, intuition, and cultural sensitivity (Koslow et al., 2003). However, AI's capacity to analyze consumer data and generate creative assets challenges conventional notions of artistic authorship and originality (Elgammal et al., 2017). AI-powered tools such as DALL-E, Midjourney, and ChatGPT can produce visual and textual content that rivals human creativity, raising questions about the future of artistic labor in advertising (McCormack et al., 2019).

2.3. Cultural Economics and Consumerism

Cultural economics examines the production, distribution, and consumption of cultural goods and services, emphasizing the symbolic and experiential value of art and culture (Throsby, 2010). Advertising, as a cultural product, both reflects and shapes societal values, identities, and consumption patterns (Zukin & Maguire, 2004). The integration of AI in advertising introduces new dynamics in cultural production, as algorithms mediate the representation of cultural identities and the commodification of art (Helberger et al., 2020).

2.4. AI, Personalization, and Cultural Representation

Personalization is a key advantage of AI in advertising, allowing brands to tailor messages to individual preferences, behaviors, and cultural backgrounds (Arora et al., 2020). However, the reliance on data-driven personalization raises concerns about cultural homogenization, bias, and the reinforcement of stereotypes (Noble, 2018). The challenge lies in leveraging AI to enhance cultural diversity and inclusion, rather than perpetuating existing inequalities.

3. Methodology

This study employs a qualitative research approach, combining a comprehensive literature review with thematic analysis of case studies and industry reports. The literature review synthesizes academic research on AI, advertising, creativity, and cultural economics, while the case studies illustrate practical applications and implications of AI-driven advertising campaigns. Data sources include peer-reviewed journals, industry white papers, and reports from leading advertising agencies and technology firms.

Thematic analysis is used to identify key themes and patterns related to the artistic, cultural, and economic dimensions of AI in advertising. The analysis focuses on three main areas: (1) the impact of AI on creative processes and artistic production; (2) the role of AI in cultural representation and diversity; and (3) the economic outcomes for cultural industries and consumer behavior.

4. Findings and Discussion

4.1. AI and the Transformation of Creative Processes

AI has fundamentally altered the creative landscape of advertising. Tools such as generative adversarial networks (GANs) and large language models enable the rapid production of visual and textual content, reducing the time and cost associated with traditional creative processes (Elgammal et al., 2017). For example, Coca-Cola's "Create Real Magic" campaign invited consumers to use AI to generate artwork for the brand, blending user creativity with algorithmic generation (Coca-Cola, 2023).

While AI enhances efficiency and scalability, it also raises questions about the authenticity and originality of creative work. The use of AI-generated content challenges the notion of the "creative genius" and shifts the focus towards collaborative creativity between humans and machines (McCormack et al., 2019). This hybrid approach can lead to innovative outcomes, but it also risks devaluing human artistic labor and eroding the distinctiveness of cultural products.

4.2. AI, Cultural Representation, and Diversity

AI-driven advertising has the potential to both enhance and undermine cultural representation. On one hand, AI can analyze vast datasets to identify cultural trends, preferences, and sensitivities, enabling brands to create more relevant and inclusive campaigns (Arora et al., 2020). For instance, Netflix uses AI to personalize promotional images and trailers based on viewers' cultural backgrounds and viewing histories (Gomez-Uribe & Hunt, 2016).

On the other hand, AI systems are susceptible to biases embedded in training data, which can lead to the reinforcement of stereotypes and the marginalization of minority groups (Noble, 2018). The lack of diversity in AI development teams further exacerbates these issues, as cultural nuances may be overlooked or misrepresented. Addressing these challenges requires a commitment to ethical AI design, diverse data sources, and ongoing evaluation of cultural impact (Helberger et al., 2020).

4.3. Economic Implications for Cultural Industries and Consumerism

The economic impact of AI in advertising extends beyond cost savings and efficiency gains. By automating creative tasks and optimizing targeting, AI enables brands to reach consumers more effectively, driving higher engagement and conversion rates (Davenport et al., 2020). This, in turn, fuels consumerism by making advertising more persuasive and pervasive.

However, the automation of creative labor poses risks for cultural industries, particularly for artists, designers, and copywriters whose roles may be displaced or transformed by AI (McCormack et al., 2019). The commodification of AI-generated art also raises questions about the value and ownership of cultural goods, as traditional models of intellectual property struggle to keep pace with technological innovation (Elgammal et al., 2017).

From a cultural economics perspective, AI-driven advertising contributes to the “attention economy,” where consumer attention is a scarce and valuable resource (Davenport & Beck, 2001). Brands compete for attention by leveraging AI to deliver personalized, emotionally resonant content, blurring the boundaries between art, commerce, and culture. This dynamic has profound implications for consumer agency, as individuals are increasingly targeted by algorithmic persuasion that shapes their preferences, identities, and consumption habits.

4.4. Case Studies

Case Study 1: Nike’s AI-Powered Personalization

Nike has leveraged AI to personalize advertising and product recommendations, using data from its mobile apps and online platforms to tailor content to individual consumers (Nike, 2022). The brand’s “Nike By You” campaign allows users to design custom sneakers, with AI suggesting color combinations and styles based on user preferences and cultural trends. This approach not only enhances consumer engagement but also reflects the growing importance of cultural relevance in advertising.

Case Study 2: The New York Times and AI-Generated Art

The New York Times has experimented with AI-generated art for editorial and advertising purposes, using tools like DALL-E to create illustrations that complement journalistic content (The New York Times, 2023). This integration of AI art raises questions about the role of human artists and the authenticity of visual storytelling, highlighting the tensions between automation and artistic expression.

Case Study 3: Unilever's Ethical AI Framework

Unilever has developed an ethical AI framework to guide its advertising practices, emphasizing transparency, diversity, and cultural sensitivity (Unilever, 2021). The company collaborates with diverse stakeholders to ensure that AI-driven campaigns reflect a wide range of cultural perspectives and avoid reinforcing harmful stereotypes. This proactive approach demonstrates the potential for AI to promote cultural inclusion and ethical advertising.

5. Conclusion

The integration of AI in advertising represents a paradigm shift in the relationship between art, culture, and commerce. AI-driven strategies have the potential to enhance creativity, personalize content, and engage with cultural diversity, offering significant benefits for brands and consumers alike. However, these advancements also raise critical questions about the authenticity of creative work, the representation of cultural identities, and the economic implications for cultural industries.

To harness the full potential of AI in advertising, stakeholders must prioritize ethical design, diverse data sources, and ongoing evaluation of cultural impact. By fostering collaboration between technologists, artists, and cultural experts, the advertising industry can navigate the challenges and opportunities of AI, shaping consumerism in ways that are both innovative and inclusive.

Future research should explore the long-term effects of AI-driven advertising on cultural production, consumer agency, and societal values. As AI continues to evolve, its role in shaping the art and economics of advertising will remain a critical area of inquiry for scholars, practitioners, and policymakers.

55. CONTEMPORARY TRENDS AND UPCOMING CHANCES OF SOCIAL MEDIA MARKETING IN THE BUSINESS INTELLIGENCES PROCESS

Ms. Shehnaz Begum,
Assistant professor
Department Of B.Com CS and CA
Annai Veilankannis College of Arts and Science,
Saidapet, Chennai.

ABSTRACT

In the present moment, digital world every business moving on data. Companies have increasingly realized the importance of social media to their business strategies. Data from social networks is like any other data collected by your company. It is unorganized and is usually obtained from multiple different channels. Nonetheless, companies should consider social networks as another vital source of data for their business intelligence. By gathering data from social media and analyzing it with business intelligence, companies can get an understanding of consumers, such as whether or not they have bought their products and services. This provides deeper insights, such as the volume of sales for a particular product in a key market. Social data can explain why a product sells so well in a particular market, and can even help detect early trends that drive product development or the right messages to market them. Applying business intelligence to this data will help to present it in an easily digestible manner, to enable you to easily identify trends. This study aims at analyzing a business intelligence perspective of social media marketing to provide guidelines to the business in realizing its strategic objective. The study is based on measurable as well as subjective look over on data from the survey. The paper is related to ideas and concepts formed in business intelligence and social media marketing and the main aim is to analyse current trends, practices, and technologies used by the business.

Keywords:

Social media marketing, Business intelligence, Performance Management, BI Trends

INTRODUCTION

Social media and social networks are everywhere! Whether it's broadcasting information about a recent family event, uploading a picture, soliciting feedback at work, or advertising a new product or event, every facet of modern life (personal and professional) requires sharing and social interaction. Team members and employees used to communicate and discuss information around the water cooler or in the cafeteria in the old days. Collaboration and sharing were aided by Content Management Systems (CMS) and online

meeting software, which allowed corporate users to join together to review and update papers and collaborate on projects. As a result, it's no wonder that today's business customers want a business intelligence product to have the same level of sharing and collaboration capabilities. Social or collaborative BI is the application of Enterprise 2.0 technologies and practises with business intelligence outputs for the aim of making group choices. Social BI allows business analysts and data mining specialists to participate in the development of post-user-generated analytics. It was first enabled by the fast expansion of social media networks in 2009. While still employing normal analytics tools, this has helped to overcome some of the previous roadblocks to self-service BI. The term "social BI" refers to business intelligence based on social network data.

Social business intelligence is considered a great approach to effectively using human resources both within and outside of a company. The open management of resources and products inside the company allows workers to contribute comments on initiatives they are interested in but are not necessarily working on, as well as greater possibilities for recognition. Customers can have a say in how a firm's products and services are developed outside of the corporation, ensuring that they are satisfied with the ultimate outcome. Because social business intelligence is a novel idea (and a bit of a buzzword), its definition will evolve over time.

Most social BI systems use a variety of data sources, including:

- People's reactions to a brand's social media content and presence are shown through engagement metrics. These social indicators can assist you in gauging public opinion and identifying upward and downward trends.
- Content analytics are measures of how different themes and media kinds perform on social media. These metrics can assist you in determining the effectiveness of your marketing strategies and sponsored campaigns.
- Data from social listening, allows you to listen in on conversations across social media. This information can assist you in determining what people are talking about and how your company might participate in the conversation.
- Because social BI includes so much data from so many diverse sources, it creates a large amount of data.

Build Customer Relationships using Social Business Intelligence

- Do your consumers frequently express dissatisfaction with your company, products, or services? Do they extol the features and advantages?
- You can maintain a tight check on consumer comments using social BI, even if they don't appropriately identify your brand. That means you can listen to what people are saying about your brand, participate in conversations about it, and respond in ways that help you establish stronger customer connections. These insights might help you make better judgments regarding your company's customer service strategy. You may also utilise them to enhance your products and services as you respond to the requirements of your consumers.
- The firm may cultivate power users that adopt a creative, intelligent approach to data analysis as Social BI spreads throughout the enterprise. A social Business Intelligence platform may promote the same type of cooperation, sharing, and learning within your business as a social media user can 'Like' or 'Share' a provocative post from another user. The typical business user will have a better knowledge of analytics and grow more comfortable with these approaches as power users emerge and data sharing becomes more widespread, and the firm will witness greater user adoption of BI technologies.

OBJECTIVES OF THE STUDY

1. To evaluate the impact of social media in overall business performance
2. To explore the impact of social media on business decision making

LITERATURE REVIEW

Organizations need appropriate data to make quick decisions to gain competitive advantage (Farjami, 2015). This can be done with the help of Business Intelligence (BI). During 1950s decision support technology was used by companies to take strategic decisions. Nowadays BI is used by almost all the organizations around the world, due to increased data collection and better data storage capacity with innovations in technology. BI is a framework that is used to gather, analyse and present data collected from various sources such as mobile devices, internet records and social media activities to find patterns and trends to enhance companies basic decision-making process (Raisinghani, 2004; Den Hamer, 2004). Carlo (2009) has explained business intelligence system with the help of a pyramid. The main components of this pyramid are: Kaplan and Haenlein (2010, p. 61) in their article Users of the world Unite has defined social media as — a group of Internet based applications that build on the ideological and technological foundations of Web 2.0, and allow the creation and

exchange of User Generated Content. As per Yanga & Kentb (2014) a business can improve his public presence through increasing its visibility on social media which can influence on the organizational perceptions on trust, buying preferences of the consumers and in times of crisis.

RESEARCH METHODOLOGY

Research methodology is a way to thoroughly elucidate the make inquiries trouble it is how research is done technically. It consists of an unlike ladder that is generally adopted researcher to study the research effort along with the reason behind them. In this study, both primary and secondary data are used. The primary data was collected through a questionnaire, and secondary data was through articles in Journals, Magazines, and books.

SOURCE OF THE DATA:

The study is based on both primary and secondary data collected. A structured questionnaire is prepared and being circulated which contains set of statements so that the respondent will find it easy to give the level of agreement on the given statements. For this study, various articles, google analytics data, journals and web sources in the field of social media marketing are considered.

SAMPLE SIZE:

The total number respondent of the study is 50 and it includes respondent who are aware of social media marketing factors.

DATA COLLECTION METHOD:

Data is collected by means of Questionnaire and other secondary sources like articles, journals.

DATA ANAYSIS

Most Popular Social Media Channel for Businesses

SOCIAL MEDIA	USER (PERCENTAGE)
Face book	76
Instagram	65
YouTube	66
Twitter	71

Social network analysis is the one of the main techniques used for finding the key factors which influences viral marketing campaigns on Twitter, Facebook or other social media platforms. This method is used to detect sub- communities which can be involved in a discussion forum for better precision in customizing the products as well as marketing

materials. When the customers were asked their most used platform for social media, 76 % of them voted in favour of Facebook.

CONCLUSION

Social media measurement is like driving a modern car. You may have a dashboard with all the lights, toggles, gauges, and metrics, but remember, the most important piece of data to have in front of you is the GPS screen. The GPS screen indicates where you want to go (your objective), where are you now, and how to get there. The empirical results regarding usage of social media in business strongly suggest that there is a positive relationship between organizations' ability to both create opportunities and understanding and manage relationships with customers. Some of the tools including 'like', 'tweet' or 'retweet' helps the businesses in real-time sentiment analysis of customers and to respond instantly to their choice or comments before customer complaints become a negative torrent and damage its reputation.

Another important finding of this research is that the businesses with a strong presence in social media prevails in the minds of customers, suppliers and other stake holders which can result in improving organizational visibility, product loyalty, brand presence and organizational trust and all these factors together can eventually lead to increase in overall performance of the businesses. Especially for the small businesses, which can't spend much on their marketing, use of social media has become indispensable. In terms of performance, the results of the study revealed that social media usage impact on the overall performance of the organization. Companies can develop deeper relationship with their current and prospective customers by making social media an integrated part of their marketing strategy. Through social media they can improve their collaboration with customers via two-way conversation and get customer insights which can be used to create customized products and services to achieve higher sales performance.

56. START-UP FINANCING AND MARKET PENETRATION: AN ANALYTICAL STUDY OF INDIAN EARLY-STAGE ENTERPRISES

Dr. R. Uma Maheswari
Associate professor
Department of Commerce
A.M. Jain College, Chennai.

ABSTRACT

This study explores how the type and amount of funding influence market penetration in Indian start-ups. Using data from 100 founders and secondary industry sources, regression, correlation, and ANOVA analyses were applied. Results show a significant positive correlation between funding levels and penetration rates, with venture capital-backed firms achieving the fastest growth. Angel-funded and mixed-funding start-ups exhibited steady but moderate expansion, while bootstrapped firms-maintained cost efficiency but slower penetration. The findings highlight those financial resources accelerate market entry, but sustained growth also depends on brand positioning and product-market fit. Recommendations are provided for optimizing funding strategies and improving early-stage market traction.

Keywords:

Start-up financing, market penetration, venture capital, angel investors, bootstrapping, early-stage growth, Indian start-ups, funding strategies.

INTRODUCTION

Globally, the expansion start-ups of is now a key factor in economic growth, job creation, and innovation. Securing sufficient funding and gaining quick market penetration are two of the most important requirements for a start-up's survival and success in today's cutthroat marketplaces. While market penetration indicates a start-up's capacity to acquire and hold onto a portion of the target customer base, financing establishes a start-up's operational capabilities, product development velocity, and scalability potential. However, market entry obstacles, customer acquisition expenses, and competitive pressures make it more difficult to secure finance, whether through venture capital, angel investors, crowdsourcing, or bootstrapping. The type and amount of start-up funding and the degree of market penetration attained during the first five years of business are analysed analytically in this study.

OBJECTIVES OF THE STUDY

1. To investigate the funding sources used by start-ups throughout their initial phases of development.
2. To examine how financing levels affect the success of market penetration.
3. To evaluate the difficulties start-up's encounter in obtaining capital and growing their market share.
4. To examine the connection between market entry speed and funding type.
5. To recommend tactical actions to maximize funding and quicken market entry.

LITERATURE REVIEW

Equity financing greatly speeds up businesses' capacity to enter new markets, but it also dilutes ownership, according to Smith & Gregson (2019).

According to Kumar & Mehta (2020), businesses that have a variety of funding sources are more resilient in erratic markets.

Early-stage funding shortages rank among the top three causes of company failure worldwide, according to the OECD (2021).

Due to marketing and scalability benefits, Lee & Peterson (2022) found that venture-backed start-ups penetrate the market 40% faster than bootstrapped companies.

Rao (2023) highlights that brand positioning and product-market fit are just as crucial as funding in ensuring market success.

STUDY SCOPE

Geographic scope: Tier 1 and Tier 2 cities in the Indian start-up ecosystem.

Sectoral scope: Tech-driven consumer products, SaaS, and e-commerce firms.

Time range: Information from firms founded in 2018–2023.

Analytical scope: Analysing market penetration rate, funding structure, and their relationship.

STUDY LIMITATIONS

1. The report may not be globally representative because it solely looks at Indian start-ups.
2. Growth in the client base is used to gauge market penetration, which could not accurately reflect how consumers view a brand.
3. Start-ups self-report data, which could introduce bias.
4. Limited sample size as a result of trustworthy financial declarations being available.

TESTING HYPOTHESES

H_0 (Null Hypothesis): The amount and kind of funding received by start-ups and their level of market penetration are not significantly correlated.

H_1 (Alternative Hypothesis): The amount and kind of funding received by start-ups and the extent of their market penetration are significantly positively correlated.

RESEARCH METHODOLOGY

Type of Research: Analytical and descriptive.

Sources of Data:

Primary: One hundred start-up founders received structured questionnaires.

Secondary sources include government start-up portals, industry reports, and databases like Tracxn and Crunchbase.

Sampling Technique: Purposive sampling with an emphasis on sponsored companies that have been in business for at least two years.

Tools for data analysis include regression models, correlation analysis, and ANOVA for testing hypotheses.

Excel and SPSS are statistical software programs.

ANALYSIS AND INTERPRETATION

Table 1: Market Penetration Rate vs Financing Type

Average Funding (Cr) Average Customer Base (Year 3) Financing Type Penetration of the Market (%)

Bootstrapped 8,000 0.25 1.50 25,000 3.2% Angel Investors Venture Capital 8.00 7.8% 18.4%

Fundraising 0.80–15.00 5.6%

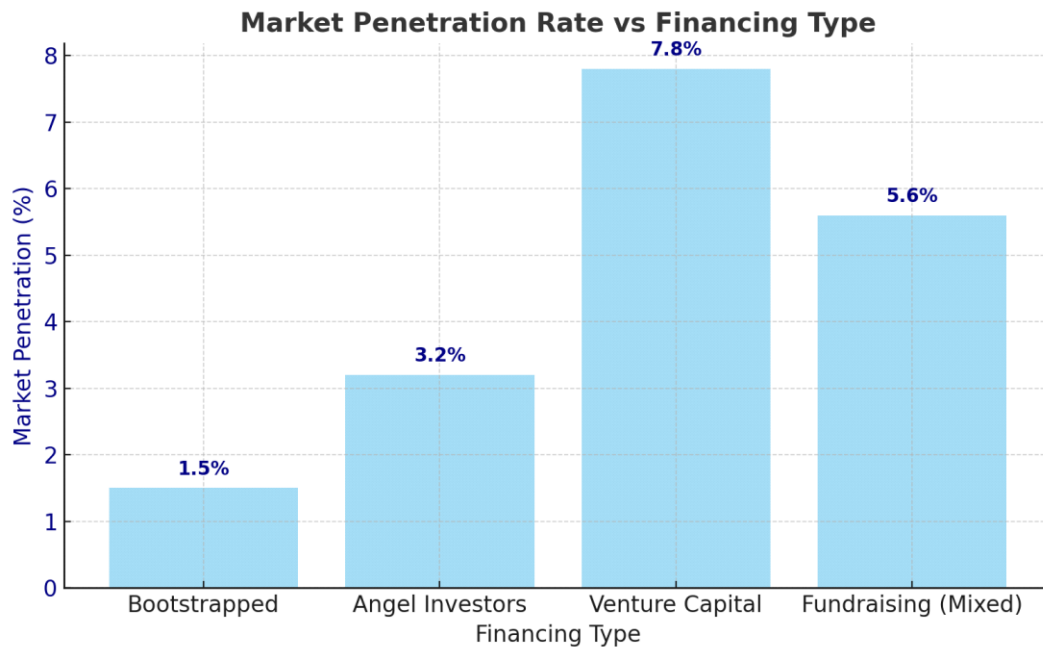
SIGNIFICANCE

The greatest average market penetration was attained by venture-funded firms.

Although they grew more slowly, bootstrapped firms had more sustainable cost structures.

Market Penetration Rate vs Financing Type

Financing Type	Average Funding (₹ Cr)	Average Customer Base (Year 3)	Market Penetration (%)
Bootstrapped	0.25	8,000	1.5%
Angel Investors	1.50	25,000	3.2%
Venture Capital	8.00	90,000	7.8%
Fundraising (Mixed)	0.80 – 15.00	15,000	5.6%



KEY FINDINGS

1. The rate of market penetration and the amount of finance are directly associated.
2. Although they face greater operational risks, venture-backed businesses do better than others in the early phases of growth.
3. Angel-funded businesses exhibit moderate expansion potential and consistent penetration growth.
4. Although they have superior cost control, bootstrapped firms have limited marketing resources.
5. Although crowdfunding generates initial momentum, it is frequently insufficient for long-term market growth.

SUMMARY AND CONCLUSIONS

This study demonstrates that the success of market penetration is significantly influenced by start-up funding. More aggressive marketing, better products, and faster regional expansion are made possible by higher funding levels. But the kind of funding also influences strategic decisions; while bootstrapped start-ups value sustainability, venture-backed companies prioritize rapid scaling. In addition to sufficient cash, a compelling value proposition and focused marketing techniques are necessary for successful market penetration.

POTENTIAL FOR ADDITIONAL RESEARCH

Comparison of the funding and market penetration of Indian start-ups with those of their international counterparts.

Studies that focus on a certain industry (e.g., healthcare tech, finance, green energy).

Studies that follow start-ups for more than ten years.

How policies and incentives from the government affect penetration rates

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57. AI – PERSONALIZATION IN DIGITAL MARKETING

Dr. R. Geetha

Head of the Department

MBA

Ms. M.V. Bhoomika, S. Janova, R. Madhumitha

III BBA

Department of BBA

Jaya College of Arts and Science,

Thiruninravur 602024

ABSTRACT:

“Artificial Intelligence (AI) is changing digital marketing by allowing higher levels of personalization. By using machine learning, predictive analytics, and natural language processing, AI can examine customer data in real time. This helps deliver customized content, product suggestions, and ads that connect with individual user preferences. This approach lets marketers create highly targeted campaigns across digital channels. It boosts engagement, customer satisfaction, and conversion rates.

However, using AI for personalization comes with challenges. Concerns like data privacy, algorithmic bias, and the difficulty of implementing scalable solutions impact discussions about responsible AI use. Still, strides in adaptive AI systems, voice and visual search, and ethical data practices are leading to more intuitive and inclusive marketing strategies. As consumer expectations change, AI-powered personalization is becoming crucial for brands that want to establish deeper and more meaningful digital relationships.”

KEYWORDS :

AI, Digital marketing, consumer data , Ethical Data, Brand

INTRODUCTION

Customers expect seamless, relevant, and personalized experiences in today's digital-first world. These demands are no longer met by conventional "one-size-fits-all" marketing. Here's where digital marketing is transformed by artificial intelligence (AI).

AI enables companies to use big data and sophisticated algorithms to Gain a thorough understanding of your customers' interests, behavior, and demographics. Predict needs and preferences using predictive analytics. Deliver tailored content and recommendations at the right time. Engage 24/7 through chatbots and virtual assistants. Optimize campaigns in real time for maximum impact and ROI.

AI-driven personalization, brands can achieve: Higher customer engagement
Improved satisfaction & loyalty Increased conversions & revenue

Meaning of Ai-Powered Personalization and Digital Marketing:

AI-powered personalization means using artificial intelligence to tailor marketing messages and experiences for each individual based on their behavior, preferences, and data. It helps brands recommend products, customize ads, and predict customer needs in real time. Digital marketing refers to promoting products or services through online platforms like social media, websites, and search engines. Together, they create relevant, engaging, and effective campaigns that connect better with audiences.

Benefits of AI-Powered Personalization & Digital Marketing:

Hyper-targeted campaigns: AI analyzes user data to deliver personalized ads, emails, and content that match individual preferences, boosting relevance and engagement.

Real-time customer insights: Marketers can respond instantly to user behavior, adjusting strategies on the fly for better results.

Improved ROI: By reducing wasted ad spend and maximizing conversions, AI helps businesses get more value from their marketing budgets.

Automation of repetitive tasks: AI manages tasks like segmentation, A/B testing, and content recommendations, freeing up time for creative strategy.

Enhanced customer experience: Personalized interactions build trust and loyalty, leading to higher retention and satisfaction.

Predictive analytics: AI predicts future customer behavior, helping brands stay ahead of trends and needs.

DISADVANTAGES OF AI-POWERED PERSONALIZED AND DIGITAL MARKETING:

1. Predictive Analytics

In Consumer Behavior AI uses predictive models to examine past consumer actions and predict future behavior. This allows marketers to anticipate needs, tailor offers, and optimize the timing of campaigns. It improves customer satisfaction by providing relevant content even before users ask for it.

2. Chatbots and Conversational AI

AI-driven chatbots offer instant, personalized responses to customer questions across websites and messaging platforms. They enhance user experience, cut down response time, and collect useful data for future personalization. Their round-the-clock availability makes them a strong tool for digital engagement.

3. Content Personalization Across Channels

AI customizes content for users based on their preferences, location, and behavior. Whether through email, social media, or website banners, personalized content boosts click-through rates and brand loyalty. It ensures that every user sees what is most relevant to them.

4. Ethical Challenges in AI Personalization

While personalization increases engagement, it raises issues around data privacy, consent, and algorithmic bias. Brands must find a balance between personalization and transparency, along with ethical data use. Addressing these concerns is essential for building trust and maintaining long-term customer relationships.

AI and Social Media in Personalization for Digital Marketing

Data-Driven Insights:

AI examines user activity on social media, including likes, shares, comments, and browsing habits, to determine user preferences.

Hyper-Targeted Content:

Companies employ AI to provide posts and advertisements that are specifically catered to each user's interests and goals.

Tools for Content Generation:

Websites such as Jasper, Copy.ai, and ChatGPT facilitate the mass production of personalized social media content.

Real-Time Personalization:

Using user data, tools like Bloomreach and Dynamic Yield instantly modify website content and product recommendations.

Video Optimization:

By using dynamic creative optimization and predictive analytics, AI improves user engagement on websites like YouTube and TikTok.

Engagement Metrics:

AI uses likes, shares, comments, retweets, and reactions to determine what kinds of content users find engaging.

Browsing Patterns:

User interests and intent are revealed by click-through rates, scrolling behavior, and time spent on posts.

Hashtags & Search Queries:

AI monitors user searches and hashtag usage to determine popular subjects and inclinations.

Follower Interactions:

Users' social circles and influence networks can be inferred from who they follow, interact with, and message.

Sentiment Analysis:

AI can determine whether users are enthusiastic, irritated, or inquisitive by using Natural Language Processing (NLP) to interpret the tone and emotion of posts and comments.

Chatbots and Virtual Assistants:

AI-driven chatbots enhance user experience and conversions by providing tailored customer service and product recommendations.

Conclusion:

Digital marketing has been transformed by AI-driven personalization, which allows companies to establish more intimate and customized connections with customers. AI enables marketers to provide timely, emotionally compelling, and relevant content by analyzing user behavior, preferences, and engagement patterns in real-time across social media platforms.

A key component of contemporary marketing strategy, personalization increases customer satisfaction, increases conversion rates, and cultivates enduring loyalty by moving away from generic messaging and toward customized experiences. AI technologies' integration with digital marketing will only get stronger and more seamless as they develop further. The possibilities are growing quickly, ranging from intelligent chatbots and adaptive product recommendations to predictive analytics and dynamic content creation.

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58. DATA SECURITY ISSUES AND CHALLENGES IN INDIAN KPO INDUSTRY

Ms. U. Thamaraiselvi
Assistant Professor,
Annai veilankanni's College of Arts & Science

INTRODUCTION

Indian position in Global KPO Map

The success with *Business Process Outsourcing* (BPO) has given India a head start in yet another highly lucrative opportunity in the global outsourcing scene called Knowledge Process Outsourcing or KPO. Knowledge process can be defined as high added value processes chain where the achievement of objectives is highly dependent on the skills, domain knowledge and experience of the people carrying out the activity. And when this activity gets outsourced a new business activity emerges, which is generally known as Knowledge Process Outsourcing.

Knowledge Processing Outsourcing (popularly known as a KPO), calls for the application of specialized domain pertinent knowledge of a high level. The KPO typically involves a component of Business Processing Outsourcing (BPO), Research Process Outsourcing (RPO) and Analysis Proves Outsourcing (APO). KPO business entities provide typical domain-based processes, advanced analytical skills and business expertise, rather than just process expertise. KPO Industry is handling more amount of high skilled work other than the BPO Industry. While KPO derives its strength from the depth of knowledge, experience and judgment factor; BPO in contrast is more about size, volume and efficiency.

According to Ashish Gupta, chief operating officer and country head of the Gurgaon-based Evalueserve, (eventually he who coined the word KPO) which is one of the largest pure KPO players in the world, KPO firms are more like professional services firms whereas BPO organisations are more akin to manufacturing. Says Gupta: "The global economy is becoming increasingly knowledge and information intensive. Creating, protecting and monetising knowledge is becoming very critical. Unlike BPO, KPO is more knowledge driven. While BPO is more of process expertise, KPO is more of domain expertise."

According to a Confederation of Indian Industry (CII) study styled India in the New Knowledge Economy, the country is all set to emerge as the global KPO hub since KPO requires specialised knowledge in respective verticals and India's engineering and technical institutes are geared to address the manpower demand. The National Association of Software and Service Companies (Nasscom) estimates that the KPO industry is poised for a 45 per cent

per annum growth till 2016. The global KPO pie in 2017 is expected to be around \$17 billion of which \$12 billion (70 per cent) will be outsourced to India. According to Nasscom, the current hotspots in KPO are engineering and design; basic data search, integration & management; and biotech & pharma.

So what makes India so attractive as a KPO destination? More than just the obvious cost advantage, the big thing going for the country is the availability of skilled knowledge workers. According to an Evalueserve report: "India has one of the largest pools of knowledge workers. The supply of skilled labour in India has been increasing at a steady pace. Indian universities churn out 2 million English-speaking graduates every year. Nearly 300,000 engineering graduates are added to the existing engineering labour pool of 2.1 million. As of March 2002, India had 840 business schools, which churned out 85,000 MBAs. In terms of skilled workers, while just over 5,000 IT graduates enter the labour market in Germany and 25,000 in the US each year, 120,000 enter the labour force in India

CHALLENGES IN INDIAN KPO

Recruiting and Retaining the Right Talent

Indian companies will need to recruit a significant number of highly qualified employees with very strong academic backgrounds. Unlike a BPO where fluency in English is all you need to get in, the work in KPO requires expertise in specific domains such as financial analysis , engineering and design; basic data search, integration & management; and biotech, pharma and equity research etc . Access to a large, high-quality skill pool is a precondition for successful KPO operations. But the requisite skill pool is not easy to get.

Demand for Quality

In BPOs, there is a pre-defined way to solve a problem which the employees can be trained to learn. Clients have an OLA (Operation Level Agreement) or SLA (Service Level Agreement) with the Outsourcing Company where both parties decide on certain metrics for quality adherence – for example, a customer service call pick up time should be less than ten seconds. In contrast, KPOs require keen understanding of how a client works and what his exact needs are for each assignment. No pre-defined process can be created and replicated each time there is an assignment since every project is unique. As a result of this, defining an ideal metrics to measure the quality of work can be quite a difficult task.

Concern over Data Security and Client Confidentiality

In an opinion poll Conducted by NASSCOM and the Information Technology Association of America (ITAA) in 2004, greater than 75 percent of respondents agreed that offering sophisticated information security provisions and practices provide a competitive

advantage because security has become a critical selling point. According to Ernst & Young's 2004 Global Information Security Survey, companies have identified major viruses, spam and employee misconduct as the key concerns in India. The data and information a KPO business works with is extremely sensitive. Clients such as banks, insurance companies and corporations trust KPO providers with company financial data, treasury and cash management functions and investment portfolio decisions. Thus, KPOs are privy to information not otherwise public knowledge. Thus, clients often hesitate to offshore research and processing of sensitive financial data and information involving strategic decisions. A big challenge is to convince clients that their confidential data will be treated with extreme caution and will not fall into the hands of unscrupulous or unauthorized individuals. Thus, the fundamental and near-term challenge facing Indian companies is to provide the necessary security and data protection while working on client data. To keep up with the increasing demand from clients to maintain information security, KPOs will need to balance the escalating costs of maintaining global security standards while staying competitive in a cost-driven market.

The paper discusses security and privacy issues with companies outsourcing IT to India. The questions examined are if India has adequate security measures and does the Indian legal system offer similar privacy and security protections other countries.

DATA SECURITY THE KEY

Data security is commonly referred to as the confidentiality, availability and integrity of data. In other words, it is all of the practices and processes that are in place to ensure data isn't being used or accessed by unauthorized individuals or parties. Data security ensures that the data is accurate and reliable and is available when those with authorized access need it. An acceptable data security plan should focus on collecting only the required data information, keeping it safe and destroying any information that is no longer needed. A plan that places priority on these three components will help any business meet the legal obligations of possessing sensitive data.

Data security is critical for most businesses especially KPO industry because they deal with Client information, payment information, personal files, bank account details, Medical reports, pension details all of these information can be hard to replace and potentially dangerous if it falls into the wrong hands. Data lost due to disasters such as a flood or fire is crushing, but losing it to hackers or a malware infection can have much greater consequences.

Several cases of data theft have been reported in India majorly from BPO companies highlighting the issues of privacy and data protection. The BPO fraud of Pune made an International headline when five BPO employees siphoned nearly 2.5 crore rupees from New York based CitiBank account. In another eye opening case, 1000 Briton's bank account details were sold by an employee of a Gurgaon-based BPO company. Recently, a British TV channel's sting operation revealed that confidential medical records sent to India for computerization were being offered for sale. The files procured under this sting operation were of patients of London Clinic, one of Britain's top private hospitals. Apparently, the data was being sold from an Indian transcription center based out of Pune. This and many such earlier incidents have raised serious concerns about the data security practices of Indian business process outsourcing (BPO) and Knowledge Processing Companies (KPO).

While a couple of such incidents do not reflect the industry in general, it is important that the Indian KPO industry wakes up to such incidents. The first thing to contemplate is the seriousness of IT BPOs about privacy and security of the data that they control. "Many units are only cost and functionality conscious — in their scheme of things, security is not a priority. Many of these small units work as outsourced agents of other BPOs, and are not directly exposed to the foreign vendor. Hence they try to cut costs at the expense of security," says Naavi. Larger BPO units are comparatively more proactive to thwart security incidents.

WAYS AND MEANS OF DATA BREACH

- **Employees** : Symantec Corp. and the Ponemon Institute recently released the findings of the Cost of Data Breach Study which reveals negligent insiders are the top cause of data breaches while malicious attacks are 25 percent more costly than other types. "This year's report shows that insiders continue to pose a serious threat to the security of their organizations," said Francis deSouza, group president, Enterprise Products and Services, Symantec Corp.
- **Not enough Physical security** : Physical security is often a second thought when it comes to information security. Since physical security has technical and administrative elements, it is often overlooked because most organizations focus on "technology-oriented security countermeasures" (Harris, 2013) to prevent hacking attacks. Hacking into network systems is not the only way that sensitive information can be stolen or used against an organization. Physical security must be implemented correctly to prevent attackers from gaining physical access and take what they want.

- ***Un protected Network to the outside world*** : If the Network unprotected and any traffic or protocol is allowed then it will be easy to access the data and steal or manipulate the data for even any school going hackers
- ***Phishing /Spam*** : Phishing of employees and malicious attachments sent in email messages are still the main causes of data breaches, despite warnings, Verizon said in its latest Data Breach Investigation Report.
- ***Virus/Malware/Ransomware*** : Viruses are an unpleasant fact of computing life. Tens of thousands of individual viruses had been identified, and new ones are being created all the time . Virus variant like spyware may also be vulnerable to viruses. Spyware provides some kind of service in exchange for monitoring and reporting your activities and send steal data to the hacker over mail.

FINDINGS

INDIAN KPO INDUSTRY AND DATA SECURITY MEASURES

This paper examines whether the Indian companies (BPO's) take adequate measures to protect personal information and whether the legal system provides adequate protection for its international customers. The researchers taken a sample study in a Chennai based KPO service provider (name not disclosed for security and non disclosure understanding).

Employees: The Indian KPO industries implemented stringent new and departing employee Procedures. The first protection an employer should have in place is a thorough and well communicated set of company policies and procedures. Two policies and one procedure in particular are essential to the protection of company confidential data: (1) Acceptable Use Policy, (2) Data Classification and Retention Policy and (3) New and Departing Employee. In addition employees are not allowed to any piece of paper , writing materials. No electronic gadgets are allowed inside working area . Stringent background verification process is in place by the human resource division .

Physical security: Physical security has three important components: access control, surveillance and testing hardening measures include fencing, locks, access control cards, biometric access control systems and fire suppression systems. Second, physical locations should be monitored using surveillance cameras and notification systems, such as intrusion detection sensors, heat sensors and smoke detectors. Third, disaster recovery policies and procedures should be tested on a regular basis to ensure safety and to reduce the time it takes to recover from disruptive man-made or natural disasters. Most of the US based companies do a surprise audit whether the off shore company meeting their physical security

compliance. Most of the Indian KPO's are following HIPPA compliance physical security measures.

Unprotected Network to the outside world : If the official network is unprotected and allowing all kind of traffic and allowing all the ports of the servers and critical desktops and laptop, then it will be cake walk for the hackers to break in the network and steal or delete the data in the network. This researcher find form secondary data source almost all the KPO's and one the researcher taken as sample has implemented so many Network security measures. All the company has a sophisticated firewall with Intrusion prevention system . They allow only specific ports and ports. These measures are adequate to minimize the outside world risk. Also they use More secured VPN connections to connect remote client networks . Using VPN will ensure all the data are encrypted when they sent over the internet

They also having well configured Network monitoring system that will monitor all the critical network traffic and send alert when there is a security breach.

Phishing /Spam : Conducting regular Security awareness program for the employee and having a industry best SPAM filtering programs will reduce this risk. The presenter find regular awareness programs and E-mails has been conducted /sent to employees. All the companies messaging system by default blocking .EXE and other malicious attachments so that these will not be reach end user. Also all the desktops are having up-to-date anti-virus program that will delete malicious codes .

Virus/Malware/Ransomware: The KPOs has implemented two tier Anti-virus /Malware protection . There is gateway level anti-virus scanning is done at Firewall level and Up-to-date Anti-virus program running at the end user level. These programs are capable of scanning and delete the virus at the very moment they come to the end user devise.

Encryption: In addition to the above measurements Indian KPO companies taken further security policy in place. They have encryption policy in place , all the devices are encrypted . In case the device lost and falls in a wrong hand they cannot take the Data as it is encrypted.

The question examined is “Does India have adequate security measures to safely handle outsourcing from other countries?” and the findings report major advances in India to achieve this goal. The measures put in place by Indian companies suggest that India is keeping pace with other international security measures.

CONCLUSION

The paper find Indian companies having proper Security Policies in place and having great awareness about international security compliance have to provide proper data security

and privacy protection infrastructures to attract international clients. Information security is not only a legal requirement but a factor to compete globally. and the companies are moving in phase with the global security scenario In conclusion the Indian KPO industry accepted Data security challenge and implemented and delivering the global requirement.

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59. ARTIFICIAL INTELLIGENCE IN DEFENSE TECHNOLOGIES: TRANSFORMING MODERN WARFARE

Dr. Sreegith B.

Introduction

Artificial Intelligence (AI) is no longer a futuristic concept confined to academic research or science fiction. It has rapidly evolved into a transformative force in various sectors, with defense and military applications leading the way in terms of strategic significance. The integration of AI into defense technologies marks a paradigm shift in how wars are fought, threats are managed, and nations secure their interests. As geopolitical tensions intensify, the race to develop intelligent defense systems is accelerating, making AI one of the most crucial components of modern military strategy.

The shift from conventional warfare to algorithm-driven combat is profound. AI enables machines to process massive amounts of data, identify patterns, make decisions, and even take actions without human intervention. These capabilities are revolutionizing everything from battlefield tactics and surveillance to cybersecurity and logistics. As this technology continues to mature, it is poised to reshape the very nature of national defense and global military power.

The Evolution of AI in Military Systems

The journey of AI in defense began with basic computational tools used during the mid-twentieth century, notably in World War II, where cryptographic work laid the foundation for machine-based problem-solving. Over the decades, the development of machine learning algorithms, neural networks, and more recently deep learning models has opened up new dimensions of possibility for militaries across the world.

What distinguishes today's AI from previous generations of automation is its capacity to learn and improve over time. Instead of following pre-programmed instructions, AI systems can adapt to changing environments, detect new types of threats, and respond to unforeseen scenarios. This evolution is driven by advances in hardware, such as high-performance computing and specialized processors, as well as software improvements in data analytics, computer vision, and natural language processing.

AI and Autonomous Weapons Systems

One of the most significant and controversial applications of AI in defense is the development of autonomous weapon systems. These include unmanned aerial vehicles (UAVs), unmanned ground vehicles (UGVs), and autonomous maritime systems, all capable of

conducting missions without direct human control. AI enables these systems to navigate terrain, identify targets, and make split-second decisions in high-stakes environments.

Drones equipped with AI can carry out reconnaissance missions, track enemy movement, or even engage targets with minimal or no human oversight. Similarly, land-based autonomous vehicles are being designed for patrolling borders, clearing mines, or providing logistic support in combat zones. These systems reduce the risk to human soldiers and allow militaries to maintain a persistent presence in dangerous areas.

However, the deployment of lethal autonomous weapons raises ethical and legal concerns. Questions regarding accountability in the event of civilian casualties, compliance with international humanitarian law, and the psychological effects of dehumanizing warfare have prompted calls for regulation and oversight. Despite the benefits, the development of fully autonomous combat systems remains one of the most polarizing aspects of AI in defense.

Surveillance, Reconnaissance, and Situational Awareness

Modern warfare relies heavily on intelligence, surveillance, and reconnaissance (ISR). AI has significantly enhanced these capabilities by enabling systems to analyze data at speeds and scales far beyond human capability. AI-powered image and video recognition software can process real-time footage from satellites, drones, and ground-based cameras to identify troop movements, vehicles, weapon systems, or potential threats.

In the domain of signal intelligence, AI assists in decrypting communications, analyzing speech patterns, and extracting actionable intelligence from large volumes of intercepted data. Geo-spatial intelligence is another area where AI shines, providing predictive insights from satellite imagery and mapping data. These applications greatly enhance situational awareness and improve decision-making during critical missions.

The result is a faster and more accurate understanding of the operational environment. What once took hours or days for human analysts to interpret can now be processed in minutes. This capability is essential in dynamic combat scenarios, where the speed of information processing can determine the outcome of engagements.

Cybersecurity and Defense Infrastructure Protection

The battlefield has expanded into cyberspace, where nations wage silent wars through data breaches, ransomware, and information manipulation. AI has emerged as an indispensable tool in cybersecurity operations. Its ability to detect anomalies, identify vulnerabilities, and respond to cyber threats in real-time is reshaping defensive strategies.

AI systems are trained to monitor network traffic and flag unusual behavior, such as unauthorized access attempts or data exfiltration. In advanced scenarios, AI can proactively

seek out potential weaknesses in a system and recommend or even implement patches before a breach occurs. Some systems go further by deploying decoy networks commonly known as honeypots to lure and trap malicious actors. In cyber warfare, where milliseconds matter and attacks can come from any corner of the globe, the speed and accuracy of AI-based threat detection are invaluable. These systems can continuously adapt to new threats, making them a critical layer in any nation's defense infrastructure.

Command, Control, and Decision Support

AI is also playing a vital role in command and control systems, where it is used to synthesize data from multiple sources and provide commanders with actionable intelligence. In high-pressure environments, decision-makers must quickly assess complex information to choose the best course of action. AI assists by simulating outcomes, forecasting enemy behavior, and offering data-backed suggestions.

Military decision support systems powered by AI incorporate inputs from satellites, surveillance devices, intelligence reports, and real-time battlefield data. These platforms generate visualizations and predictive models that enhance a commander's situational awareness and reduce cognitive load. By using AI to assess probabilities and simulate conflict outcomes, military leaders can make more informed decisions. Simulated wargaming and virtual training environments also benefit from AI. By modeling realistic scenarios and intelligent adversary behavior, AI-based simulations help prepare soldiers and officers for combat, making training more effective and immersive.

Optimizing Logistics and Maintenance

Logistics—the management of troops, supplies, and equipment is the backbone of any successful military operation. AI has introduced greater efficiency into this critical area. Predictive analytics tools analyze data from across the supply chain to forecast demand, prevent shortages, and identify bottlenecks. In vehicle and equipment maintenance, AI systems analyze sensor data to predict failures before they occur. Predictive maintenance reduces downtime, prevents catastrophic failures, and extends the operational lifespan of military hardware. Logistics platforms powered by AI can also optimize routes for transportation convoys, accounting for variables such as terrain, weather, and enemy activity. The benefits of AI in logistics extend beyond cost savings. By improving the availability and reliability of resources, AI directly enhances operational readiness and mission success.

Enhancing Training and Human-Machine Collaboration

Military training has undergone a revolution thanks to AI. Advanced simulations and synthetic training environments replicate battlefield conditions with a high degree of realism.

Virtual reality systems, enhanced by AI, provide immersive training scenarios that adapt to the user's responses, creating personalized learning experiences for soldiers.

Language training and cultural sensitivity simulations are also benefiting from natural language processing. AI-powered bots simulate interactions with foreign civilians or combatants, helping troops develop communication skills essential in peacekeeping and counter-insurgency operations.

Moreover, the future lies in human-AI teaming. Rather than replacing soldiers, AI is increasingly being integrated into systems designed to assist them. Wearable AI, real-time translation tools, heads-up displays, and battlefield sensors can enhance a soldier's cognitive and physical performance. The goal is to create symbiotic relationships where humans and machines complement each other's strengths.

Global Developments and Strategic Competition

Around the world, major military powers are investing heavily in AI to gain a strategic edge. In the United States, initiatives like the Joint Artificial Intelligence Center (JAIC) and projects led by the Defense Advanced Research Projects Agency (DARPA) reflect the Pentagon's commitment to integrating AI across military operations. Programs such as Project Maven, which analyzes drone footage, illustrate how AI is already in active use. China, through its military-civil fusion strategy, is integrating commercial AI innovations into its defense establishment. The People's Liberation Army (PLA) has made significant strides in developing autonomous drones, AI-enhanced surveillance systems, and cyber warfare capabilities. Russia, known for its expertise in electronic warfare and information operations, is developing AI-powered combat robots and integrating AI into missile systems and armored vehicles. Meanwhile, countries like Israel, South Korea, and India are also expanding their defense AI ecosystems, often through public-private partnerships and startup accelerators.

Ethical, Legal, and Security Challenges

The rapid deployment of AI in defense raises numerous challenges. Chief among them is the question of accountability. If an autonomous system makes a fatal error, who is responsible: the programmer, the military commander, or the machine itself? The opacity of many AI systems, often described as "black boxes," compounds this issue by making it difficult to explain or justify decisions after the fact. Bias in AI models is another concern. If an AI system is trained on flawed or incomplete data, it may misidentify targets or act in discriminatory ways. This is particularly dangerous in surveillance and targeting applications, where misclassification can lead to tragic consequences. Moreover, AI systems themselves are vulnerable to manipulation. Adversaries can use adversarial inputs to deceive AI models or deploy malware to corrupt their

behavior. The potential for AI-driven cyberattacks, disinformation campaigns, or spoofed sensors poses serious threats to national security.

There is also a growing fear that excessive reliance on AI may erode human judgment. While automation improves speed and efficiency, it also risks dehumanizing the battlefield and undermining ethical norms that have traditionally governed the use of force.

The Road Ahead: Future Trends and Recommendations

The future of AI in defense is marked by both promise and peril. Technologies like drone swarms, brain-computer interfaces, and AI-assisted command systems are on the horizon. Space-based defense systems and hypersonic weapon tracking will increasingly rely on AI to manage complexity and speed. To ensure responsible development, international cooperation and regulation are essential. Global norms, treaties, and oversight mechanisms must be established to govern the use of AI in warfare. Militaries should also adopt ethical frameworks and invest in explainable AI to increase transparency and trust. An interdisciplinary approach is necessary, involving not only engineers and defense planners but also ethicists, legal scholars, and civil society. Governments must also prioritize AI education within their armed forces to ensure that soldiers and commanders can use these tools effectively and safely.

Conclusion

Artificial Intelligence is redefining the contours of modern warfare. It brings unprecedented capabilities, from faster decision-making and enhanced surveillance to cyber defense and autonomous operations. Yet, it also introduces profound risks that demand careful management. As nations strive to gain an upper hand in military AI, it is imperative that they do so responsibly, with a deep understanding of the ethical, legal, and humanitarian consequences. The ultimate goal should not be to replace humans on the battlefield, but to empower them, augmenting their abilities, protecting their lives, and ensuring that even in the age of machines, warfare remains governed by human values and international norms. The future of AI in defense will not be defined solely by technology, but by the wisdom with which we choose to deploy it.

60. ROLE OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCES MANAGEMENT

Dr. H. Kamilah Banu & Dr. G.S. Dhanashree

Assistant Professor,
Department of Commerce,
VISTAS, Chennai.

Abstract

Working remotely or work from home is now new normal in this COVID 19. Face to face interaction and rushed workstation is now avoided due to social distancing and most of the targets or job has been done thorough online mode. In this era, technology gained momentum which resultant into growth or application of artificial intelligence in various functions of management. It helps the organizations to work in faster way and efficient way to complete the work. Like any other functions AI also enhanced the function of HR which begin with the automated recruitment process to performance appraisal and T&D. The present articles analyze the role of AI in various HR functions. It also tries to explore various opportunities and challenges of AI in HRM. The article has concluded that a role of AI is very important to carry out the various functions of human resource department where by AI can handle recruitment, hiring, performance appraisal, T&D, allocating the Jobs, reducing workload at workplace and enriching workplace efficiency. The study will also give a brief understanding of the future goal of artificial intelligence

Keywords: Artificial Intelligences, HRM, HR Functions

Introduction

In 21st Century technology has been used widely across all the fields. Intelligence system manages quite a large part of every human being. The internet has changed our lives a lot. Technology gives us a mantra of Ease of Doing, in today's world we are much more dependent on the technology. And for that awareness about technology development is very essential. Now, the human being wants machines or technology which helps them in their lives and that also act intelligently. Artificial, defined according to Oxford Dictionary is something "made or produced by human beings rather than occurring naturally, especially as a copy of something natural" (Oxford Dictionary, 2019). Therefore, it can be established that artificial is what humans have made to simulate something that usually occurs naturally. We are living in an era in which AI capabilities are reaching new heights and have a major impact on how we operate our business. Artificial intelligence refers to the technology that is similar

to human mind. AI is defined as the ability of such things as machines to learn, interpret and understand on their own in a similar way to that of humans. Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving (Investopedia, 2020) .AI can do the task as it done by human being through their intelligence. Salin and Winston (1992) defined AI as being a set of techniques that allow computers to accomplish tasks that would otherwise necessitate the reasoning skills that human intelligence brings. High speed computation, huge amount of quality data handling and advanced algorithm will make AI unique. Speed and right decision are the strength for any organization in this competitive environment. According to Nilsson (2005) machines should be able to do most of the jobs that human intelligence demand, which he calls for human-level AI. The use of AI is endless; it can be used in different sectors and industries. AI will not only help in routine jobs or tasks but it also important for strategic decisions. AI technologies offer significant opportunities to improve HR functions, such as self-service transactions, recruiting and talent acquisition, payroll, reporting, access policies and procedures. Most of the companies have been adopting modern technology in various HR process like recruitment process, performance appraisal process, cloud-based HR systems (Jain, 2018). HRM involves many different aspects, such as training employees, recruitment, employee relations and the development of the organization (Wall & Wood, 2005).

Review of Literature

Merlin & Jayam, “Artificial Intelligence in Human Resource Management” - International Journal of Pure and Applied Mathematics (2018) This paper tries to address the possibilities of how Artificial intelligence is transforming and supporting the Human Resource functions like recruitment, training, talent management & retention through real time examples, gives insights on intersection of Artificial intelligence & Human resource management cases and finally it addresses the future impact on the HR workforce. Kapoor B. (2010) examines leading business intelligence vendors to look into the business intelligence and data analytics features incorporated in human resource management modules. The author examined that the human resources can position itself as essential value-adding department of the organization by taking the advantage of business intelligence.

A researcher in his research paper, title “The Impact of Robotics, Artificial Intelligence on Business and Economics” has studied that use of Robotics and Artificial intelligence in business may have negative impact on the overall functions of an organization

like production, performance management, sale, strategic planning, customer relationship management, banking system, coaching, training, taxes etc. (Dirican, 2015) Ulrich and Dulebon (2015) described the emergence of HR and propose the future of HR for increased and sustainable value. The authors have studied the HR's transformation waves from administrative to HR strategy waves. Buzko et al. (2016) found that the main factor for influencing the amount of training in the company is the net income of the company for the previous year and the transition from discrete paradigm of information processing to continuous paradigm allow faster and more accurate adapting to environment requirements. The authors have concluded that in the modern business conditions, it becomes more relevant to use artificial intelligence technologies for decision making.

Research Objectives

1. To understand the concept of artificial intelligence.
2. To understand the role of artificial intelligence in HRM functions.
3. To study the opportunities of artificial intelligence in HRM.
4. To study the challenges of artificial intelligence in HRM.

Research Methodology

The research study is using the descriptive research design. Secondary data has been used in this research. The secondary data has been collected from research papers, published materials, online websites, HR blogs, and survey reports published by various research organizations.

Role of AI in HR Functions

Effective utilization of manpower for attainment of organizational goals is called to be human resource management. Procurement of manpower, recruitment, selection, training, development, compensation, performance appraisal and separation are the main functions of HR. Schemerhorn (2001) is that HRM is how you are able to gain and develop a workforce which is talented, to help the company achieves its goals, as well as its mission, vision and different objectives at hand. To retain best talent and maintain the satisfaction level of human resource are the prime objective of HRM. And this is because human resources are such a dynamic part of the company and is ever changing, therefore it needs the right management by an organization (Bibi, Pangil & Johari, 2016).

In current scenario, HR department heading towards the digital revolution and using various methods to simplify the resources by using big data analysis, artificial intelligence, and cloud computing (Amla & Malhotra, 2017). The AI offers much great opportunity to lift up the HR world. It will facilitate the organizations to achieve their desired objectives in

limited time. With the advancement of technology, the organization will be requiring high skilled professionals which can make the machine to perform the task as per the requirement. Artificial Intelligence will assist the employees to manage their work life balance effectively. Employee will be able to complete their task before the deadline. The dependency on employees will reduce in the organization. Following are the role of artificial intelligence in human resource management:

Recruitment

Most of the organizations are using artificial intelligence in the process of recruitment. Facebook, TCS, Infosys, HDFC and many more organizations are using digital platform in the process of screening and interview which help them to identify the new and best talent. AI can help the recruitment managers to examine the applicant quickly and effectively. Interactive Chat box system or automated answering machine plays important role to solve the quires like about job description and specification or any other problems regarding the process of recruitment in an organization. AI compares the interviewed applicants to the top talent employees in the company and finally suggests the best applicants to recruiters (HireVue, 2018).

Selection

The next process in procurement of manpower is selection. It usually takes place after the organization have been doing initial recruitment where they establish a pool of possible qualified applicants, and now have to select the right applicant for the job (Newell, 2005). With the help of AI human resource manager can able to trace right candidate in short time of span and technology will helps out to identify the suitable candidates as per required skills sets (Rajesh, Kandaswamy, & Rakesh, 2018).

Post-Offer Acceptance

After submitting the job application by the applicant, the applicant not receives any type of communication or interaction from the employer. When HR selects the candidate and they accepts a job offer, it will take normally 2-3 weeks to join or start the new assignment. At that time period or gap period AI could help these new candidates by engaging and following up with the candidate so that they will connected with the company and also increase the acceptance-to- start rates of selected candidate. AI can be integrated into these types of candidate automation, however messages, responses and engagements can, with AI, be real-time and unique to the individual candidate and not just driven by a tags, positions, locations or categories.

Induction

Induction program plays very important role for the new employees. It helps to understand the organizational culture, plan, policies, structure and processes. AI can answer other common questions, information and resources that may help the new join to understand better.

Employee Relations

Employees must have some queries related to benefit coverage, vacation time and how they are paid which require in depth conversation with HR manager or coordinator. Once data feed in the AI system, AI can answer all queries in chat form. Artificial intelligence technology can be used in chat form, email or a virtual meeting room, handing over and even booking a meeting between your HR generalist and the employee.

Work Scheduling

Assignment of job, scheduling interviews and meeting needs lots of attention of HR managers, although these are very unproductive activities which are not only waste their time but also restrict them to be more innovative. Here, AI will play a very vital role, it assists HR managers in work scheduling, information circulation and collecting the information or preferences from the employees through the automated chat box.

HR Payroll

Tradition administration of wages & salary was called to be very complex process because if it was not done properly then it may create various interpersonal conflicts of dissatisfaction. Now, AI will help in wages & salary administration as all the data are now transparent, employee's bank accounts are linked and salary will automatically be credited to their accounts and all the tax related issues are also resolved.

Training & Development

Now a days, computers and digital technology can do the behind-the-scenes role in industry. Training & development activities are now performed on digital platform. It becomes easy for organization to conduct the session across the country or globe. Through computers and modern technology industries can able to manage data analysis and provide real-time feedback during training, alteration of course of actions based on progress and responses which industries got (Riebli, 2018). AI offers the ability to scale a career development program or company coaching for each and every employee. HR Managers will plan digital or online training programme for employee which help them in eliminating the gap. AI facilitates the HR Managers and employee to track their progress.

Performance Appraisal

Appraising employee's performance in a definite time period is an important part of HR functions. If employees will not appraise regularly their satisfaction and performance may goes down. AI application for performance appraisal not only helps HR managers to get feedback from the immediate supervisor or the concerned individual related to employee's performance but also enable them to take effective measures to improve the performance of employees.

Opportunities of AI

- It reduces discrimination: - Nowadays, AI is being used to reduce the favoritism and will help to increase the transparency at workplace. In such a way organization can able to select the resume. AI applications can be used to analyze job descriptions (Rathi, 2018).
- Artificial Intelligence will helpful to reduce the redundancy of employees at workplace. It helps HR team to eliminate day-to-day routine task so that they get more involved in more productive task.
- AI is based on algorithms and logic, so the chance of accurate result is high.
- AI based application on recruitment and selection helps in talent acquisition and identifies the right candidate for the right job.
- AI will maintain the workflow in various departments.
- Chance or error must be minimized.
- AI is useful in workplace and help to HR professional to understand their working and to identify the problems and trends in advance.
- Artificial Intelligence will helpful to reduce the redundancy of employees at workplace.

Challenges of AI

The whole world is now moving towards fast changing technologies and organization might choose the wrong path for making themselves more competitive and sustainable. Proper implementation of AI is very necessary which make organizations more effective and efficient. Here are the few challenges which organization faces while adopting AI system:

- While using AI, organizations will start underestimating the competencies of human resource and exaggerates the importance of AI. Human beings are really good at the least routine, most complex, most collaborative, most creative work. And we're much better than computers at this stuff (Sen, 2018)
- Some time the results of AI were not compatible with manager's decisions or

managers needs some modification or manipulation in desired data. So they may ignore or underestimate the results of AI and found solutions as per their requirement. This could happen where managers ignore the recommendation of the AI recruitment system and use their intuition instead, despite the evidence that AI is a better predictor of candidate success than humans (Agrawal, 2018).

- Handling AI required proper knowledge and training. Getting right candidate is also a challenge for organizations.
- Human-machine interaction is one of the challenges for AI. As most of the HR functions are performed by machine but they do not have emotional aspect. Empathy & understanding are the main essences of HR but these are not associated with machine. So might be machine will not take the appropriate decisions which required emotional intelligent.
- Confidential HR data must be accessed by the authorized person but still there will a chance of hacking information.

Conclusion

AI based HR functions have strong impact on HR team which make them more productive and innovative. It not only helps them to enrich their knowledge or skills but also help to boost the motivation and performance of employees. Do not believe that AI will make the decisions it is only for HR Managers assistance which help them in making the decisions whether strategic or operational. It is not always possible that AI will provide the correct response or make the best decision, the HR manger should revisit and check the algorithms and logic before making any important decisions. Saving time in repetitive HR jobs will help managers to do more creative and strategic tasks for the success of the organization. The company's success will depends on how they effectively and intelligently combine or mange people, process and technology to deliver transformational value at optimal cost. HR applications empowered by AI have an ability to analyze, diagnose, predict, execute and become more potential and dominant resource. Organizations should determine the need of AI and see how it can fit with your organizational values & culture before adopting the solutions from AI. Employees may get affected with AI in many ways so careful assessment is must and that should be aligned with the need and potential of employees.

61. TRANSFORMING BUSINESS STRATEGY THROUGH AI-POWERED DECISION INTELLIGENCE

Dr. N. Angel

Assistant Professor

Department of Computer Science and Applications

Annai Veilankanni's College of Arts and Science

Abstract

The digital era has created a business environment defined by large-scale data, fast market changes, and high complexity. Decision-making has shifted from being largely intuition-based to a process that requires real-time, data-driven insight. Artificial Intelligence (AI) now plays a critical role in **Decision Intelligence (DI)**—a discipline combining data science, social science, and business expertise to improve the quality of decisions. By integrating predictive analytics, prescriptive analytics, optimization, and simulation, AI-powered DI generates actionable insights and, in some cases, enables autonomous decision-making. This paper outlines the principles, frameworks, applications, benefits, challenges, and emerging trends of AI-powered DI, showing its potential to transform business strategy.

1. Introduction

Digital transformation has redefined competition. Organizations now face shorter product lifecycles, shifting customer preferences, and rapid market disruptions. Traditional decision-making, based on past reports and managerial intuition, is no longer enough.

Decision Intelligence (DI) offers a more advanced approach by integrating analytics, machine learning, and domain expertise to provide descriptive, predictive, and prescriptive insights. AI takes DI further—allowing organizations not just to respond to changes but to anticipate them and adapt strategies quickly, strengthening competitiveness in dynamic markets.

2. Theoretical Background

DI bridges the gap between data analysis and strategic action. Unlike **Business Intelligence (BI)**, which focuses on describing and diagnosing past events, DI also predicts future scenarios and recommends actions.

Key AI technologies enabling DI:

- ❖ **Machine Learning (ML):** Detects patterns and improves predictions over time.
- ❖ **Deep Learning:** Recognizes complex relationships in large datasets, including images, audio, and text.

- ❖ **Natural Language Processing (NLP):** Interprets human language for tasks such as sentiment analysis and automated reporting.
- ❖ **Computer Vision:** Analyzes visual data for quality control, security, and customer insights.

Core components of a DI system:

1. Data acquisition and integration.
2. Data cleaning and preparation.
3. Predictive and prescriptive modeling.
4. Scenario simulation for “what-if” analysis.
5. Human–AI collaboration for ethical and contextual decision-making.

The goal is to enhance decision quality, with AI providing scale and speed, and humans adding judgment and creativity.

3. AI-Powered Decision Intelligence Framework

A typical framework includes:

1. **Data Acquisition & Integration:** Collecting structured and unstructured data from ERP, CRM, IoT, and external sources.
2. **Data Processing:** Cleaning and transforming data for model use.
3. **Predictive Analytics:** Forecasting demand, risks, or market changes.
4. **Prescriptive Analytics:** Recommending actions based on constraints and objectives.
5. **Simulation & Scenario Planning:** Testing decisions before implementation.
6. **Visualization & Decision Support:** Presenting insights through dashboards and reports.
7. **Continuous Learning:** Updating models with new data for improved accuracy.

4. Applications in Business Strategy

AI-powered DI is applied across sectors:

- **Finance:** Fraud detection, credit scoring, investment optimization.
- **Marketing:** Customer segmentation, personalization, campaign optimization.
- **Supply Chain:** Demand forecasting, route optimization, inventory management.
- **Human Resources:** Talent analytics, attrition prediction, workforce planning.
- **Risk & Compliance:** Real-time monitoring and automated compliance checks.

Example: A retailer using DI for demand forecasting can reduce waste, improve stock availability, and boost customer satisfaction.

5. Benefits and Strategic Impact

Key advantages of AI-powered DI include:

- **Speed:** Enables real-time decisions.
- **Accuracy:** Improves forecasts and reduces uncertainty.
- **Agility:** Helps organizations adapt quickly to market shifts.
- **Efficiency:** Optimizes resources and cuts costs.
- **Customer focus:** Personalizes engagement for stronger loyalty.
- **Innovation:** Identifies untapped opportunities.

6. Challenges and Ethical Considerations

Despite its potential, DI faces hurdles:

1. **Data privacy & security** compliance with laws like GDPR and CCPA.
2. **Algorithmic bias** from flawed training data.
3. **Transparency** so decision-makers trust AI outputs.
4. **Change management** to ensure employee acceptance.
5. **Cost & infrastructure** requirements for implementation.

7. Future Enhancement

Upcoming trends include:

- **Explainable AI (XAI):** Making AI recommendations more transparent.
- **Generative AI for strategy modeling.**
- **Edge AI:** Enabling on-device real-time decisions.
- **Hybrid intelligence:** Combining AI efficiency with human judgment.
- **Autonomous decision systems:** Fully automating some strategic tasks.

8. Conclusion

AI-powered Decision Intelligence is reshaping how strategies are developed and executed. By merging predictive modeling, prescriptive recommendations, and human oversight, it allows businesses to navigate uncertainty with confidence. As technology advances, DI will become a central part of competitive advantage in the digital era.

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62. AI-POWERED PERSONALIZATION: OPPORTUNITIES AND CHALLENGES IN DIGITAL MARKETING

Rajeshwari. M

II M.Sc Computer Science

Annai Veilankanni's College of Arts and Science

ABSTRACT

The fast-paced growth of artificial intelligence (AI) has completely transformed the landscape of digital marketing, allowing for real-time, data-driven personalization strategies. This research paper delves into the opportunities and challenges that come with AI-powered personalization, specifically looking at consumer perspectives in Raipur City. The goal of the study is to evaluate how aware consumers are, their level of engagement, and their trust in AI-driven personalization, as well as how they perceive its value in marketing practices. A descriptive research design was used, and primary data was gathered through a structured questionnaire from a group of 50 respondents aged between 20 and 50 years. The results show that a significant majority of participants recognize the advantages of AI personalization, especially in boosting user engagement, customer satisfaction, and overall marketing effectiveness. However, there were also notable concerns regarding data privacy, ethical transparency, and trust in automated systems. Key insights from questions about perceived usefulness and privacy issues were analyzed in line with the research objectives and hypotheses, confirming that while AI enhances the digital experience, it also requires strong governance frameworks. This study adds to the growing body of literature by providing empirical insights into consumer attitudes and offering strategic recommendations for marketers and researchers who want to strike a balance between personalization and responsible AI practices.

Keywords:

AI-Powered Personalization, Digital Marketing, Consumer Behaviour, Data Privacy, Engagement, Trust, Raipur City.

1. INTRODUCTION

In the fast-paced world of digital marketing, AI-driven personalization has become a true game-changer, reshaping the way businesses engage with their customers. At its essence, this approach harnesses the power of artificial intelligence technologies—like machine learning, natural language processing, predictive analytics, and recommendation algorithms to provide tailored content, product suggestions, communications, and user experiences.

These interactions are customized in real-time, taking into account individual consumer behaviors, preferences, and contextual information. Unlike traditional methods that lump consumers into broad categories, AI-powered personalization allows businesses to connect with customers on a personal level, significantly boosting the relevance and effectiveness of their marketing strategies.

The growing significance of personalization in digital marketing stems from consumers' increasing demand for tailored experiences across various platforms and touchpoints. As digital spaces become more saturated, businesses are coming to realize that generic messaging often fails to grab consumer attention or build loyalty. AI-driven personalized marketing has proven its ability to enhance customer engagement, increase conversion rates, and improve customer retention. Additionally, it provides a strategic edge by offering deeper insights into customer behaviour, enabling quick decision-making, and fostering long-term relationships. In this landscape, AI-powered personalization has shifted from being a competitive advantage to a vital necessity for companies aiming to succeed in the digital era.

▪ **THE EVOLUTION OF PERSONALIZATION IN DIGITAL MARKETING**

Personalization in marketing has seen an incredible shift over the last few decades, moving from basic segmentation methods to advanced, AI-driven, real-time strategies. In the beginning, marketers relied on simple demographic segmentation, categorizing consumers based on factors like age, gender, income, or location. While these methods were helpful, they were pretty broad and didn't really capture the nuances of individual customer preferences. As digital technology progressed in the late 20th and early 21st centuries, marketers started using web analytics, email marketing tools, and customer relationship management (CRM) systems to create more customized experiences. Still, these approaches were largely rule-based, relying on set triggers and static customer profiles.

The emergence of big data and the rapid increase in digital interactions marked a significant turning point for personalization. As consumers began to interact with brands through various digital channels—like websites, mobile apps, social media, and e-commerce platforms, the need for more dynamic and context-sensitive personalization strategies became evident. This change was further propelled by the incorporation of artificial intelligence (AI) into digital marketing, which allowed for real-time decision-making and the delivery of highly personalized content based on a mix of behavioural, transactional, and contextual data. A number of key technological breakthroughs have been essential in this evolution. Machine learning (ML), which is a branch of AI, has empowered systems to learn from historical data

and continuously improve personalization algorithms without needing human input. This capability has allowed marketers to better predict consumer behaviour, ensuring that relevant content reaches the audience at just the right moment. Natural language processing (NLP) has elevated personalization even further by enabling machines to comprehend and produce human language, leading to the development of smart chatbots, voice assistants, and content that understands sentiment. Predictive analytics, driven by sophisticated data modelling techniques, helps marketers foresee future consumer actions—like the chances of making a purchase or the risk of losing a customer, allowing them to engage proactively with their audience.

All these technologies have revolutionized personalization, shifting it from a static, one-size-fits-all method to a dynamic, predictive, and tailored experience. This transformation not only boosts customer satisfaction but also greatly enhances marketing effectiveness, making AI-driven personalization a fundamental aspect of contemporary digital marketing strategies.

▪ **OPPORTUNITIES OF AI-POWERED PERSONALIZATION**

Let's dive into how AI-driven personalization has evolved and what it means for digital marketing. This section shines a light on the exciting opportunities it brings. One of the standout benefits, as highlighted by both research and firsthand data, is the boost in customer engagement and loyalty. With AI technologies like machine learning and natural language processing, brands can tap into real-time user data, preferences, and behaviours to create hyper-personalized content. This kind of relevance not only strengthens customer relationships but also builds trust and encourages long-term engagement. Interestingly, survey respondents from Raipur City reported feeling more satisfied when marketing content was tailored to their unique preferences, clearly linking personalization to brand loyalty.

Another major opportunity lies in improving conversion rates and return on investment (ROI). AI tools empower businesses to segment their audiences more accurately and predict consumer behaviour with greater precision. This results in more focused marketing campaigns, reducing waste and maximizing the effectiveness of every customer interaction.

The study found that a significant number of respondents acknowledged that personalized messages and product recommendations played a key role in their purchasing decisions, showcasing the tangible value AI adds to conversion strategies.

Let's talk about the incredible advantages of real-time content delivery and automation. AI systems have this amazing ability to quickly adapt and respond to what users

do, ensuring they receive the right message exactly when they need it. Tools like chatbots, personalized email sequences, and dynamic web content not only make things more efficient but also help create a smooth and consistent experience for customers. The survey results back this up, with many participants pointing out how convenient and relevant real-time interaction areas a major plus of AI-driven marketing.

In short, AI-powered personalization holds immense promises for enhancing engagement, increasing sales, and streamlining marketing efforts-making it a key player in today's digital marketing landscape.

▪ **CHALLENGES OF AI- POWERED PERSONALIZATION**

While AI-driven personalization opens up exciting possibilities, it also brings along a host of significant challenges that marketers and organizations need to tackle to ensure that it's implemented ethically and effectively. One of the biggest concerns is around data privacy and ethical considerations. Personalization powered by AI relies heavily on gathering and analyzing large amounts of user data, such as browsing habits, purchase history, and real-time interactions. This raises important questions about consumer consent, who owns the data, and the risk of sensitive information being misused. Insights from primary data collected in Raipur City show that many respondents feel uneasy about companies accessing their personal data without clear permission, revealing a trust gap that could pose a challenge for personalized marketing strategies.

Another key hurdle is the technological complexity and costs tied to implementing AI solutions. Small and medium sized enterprises (SMEs) often find it tough to adopt advanced AI systems due to budget constraints, a lack of technical know-how, and limited infrastructure. Plus, AI algorithms need ongoing data input and system training, which can be resource-heavy and tricky to sustain overtime.

When it comes to AI driven marketing, trust and transparency are big concerns. Many consumers don't really know how AI systems decide on personalized content, which can lead to skepticism and lower engagement. The "black box" aspect of some AI algorithms makes it tough for marketers to clarify why certain content is displayed, which can shake user confidence. This feeling was reflected in survey responses, with several participants expressing a desire for more transparency regarding how their data is used and how recommendations are created. These issues highlight the need for responsible AI practices. It's essential to tackle these concerns through ethical data handling, educating users, and maintaining open communication to foster sustainable, consumer-focused AI personalization strategies in digital marketing.

2. LITERATURE REVIEW

The rise of Artificial Intelligence (AI) in digital marketing has led to the transformation of personalized customer experiences. AI-powered personalization refers to the use of machine learning algorithms and data analytics to tailor marketing strategies to individual consumers based on their preferences, behaviours, and needs. The theoretical foundations of this concept are rooted in customer-centric marketing theories, which emphasize the importance of understanding consumer behaviour to create personalized experiences. Additionally, theories such as the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB) explore how consumers' perceptions of AI technologies impact their willingness to engage with personalized marketing strategies. According to these theories, the perceived usefulness and ease of use of AI-powered personalization play a significant role in determining its effectiveness in driving consumer engagement and satisfaction.

Several studies have examined the application of AI in digital marketing, focusing on recommendation systems, predictive analytics, and AI-driven chat bots. For example, Chaffey (2019) illustrates how AI-powered recommendation systems, such as those employed by Amazon and Netflix, enhance user engagement by delivering personalized content based on consumer preferences and predictive models. Similarly, Sterne (2017) discusses how AI-powered chat bots improve customer interactions by offering real-time, tailored responses, which foster customer loyalty. These applications have been shown to increase conversion rates and customer retention by providing more relevant and timely experiences for users.

However, despite the potential benefits, there are significant gaps in existing literature. One major concern is the ethical implications of AI-driven personalization, particularly regarding data privacy and consumer trust. Martin and Murphy (2017) highlight that excessive data collection can lead to privacy issues, potentially undermining consumer confidence in personalized marketing strategies. Furthermore, there is a lack of comprehensive studies investigating the long-term impact of AI personalization on customer loyalty and brand equity. This gap presents an opportunity for future research to explore the sustainable effects of AI-driven personalization on consumer behavior and business outcomes.

3. RESEARCH METHODOLOGY

In this study, we take a closer look at the two sides of AI-powered personalization—what it offers and the hurdles it presents in the realm of digital marketing. Our main goal is to

dive into how consumers in Raipur City view AI-driven personalization, focusing on aspects like engagement, trust, data privacy, and how effective they find marketing overall.

▪ **OBJECTIVES OF THE STUDY**

- To examine the impact of AI-powered personalization on consumer engagement and purchase behaviour in digital marketing.
- To analyze consumer perceptions of data privacy and trust in AI-powered personalization.

o **SAMPLING AND RESPONDENTS**

We used a sample survey method for our research. Data was gathered from 50 participants, chosen through convenience sampling to ensure we captured a diverse group of digitally active individuals aged between 20 and 50. All participants are residents of Raipur City, and our sample includes a balanced mix of working professionals, students, and small business owners who are familiar with digital platforms and marketing content.

▪ **DATA COLLECTION METHOD**

To align with our research goals and hypotheses, we crafted a structured questionnaire. This questionnaire featured 15 questions, blending closed-ended items with Likert scale questions. It covered various topics, including consumer awareness, experiences with personalized marketing, concerns about data usage, and the perceived benefits of AI-based personalization. Notably, two key questions focus on the effects of AI personalization and privacy concerns, which are crucial for testing our hypotheses.

▪ **HYPOTHESIS OF THE STUDY**

- (H₁): There is a significant relationship between AI-powered personalization and consumer engagement.
- (H₂): AI-powered personalization positively influences consumers' purchase decisions.
- (H₃): Higher privacy concerns are associated with lower trust in AI-powered personalization.
- (H₄): Consumers who perceive AI personalization as intrusive are less likely to engage with personalized content.

▪ **DATA ANALYSIS TECHNIQUES**

We analyzed the collected data using descriptive statistics (like percentages and frequencies) along with inferential statistical tools. A Chi-square test was utilized to explore the relationship between demographic factors and key perceptions (such as the balance

between usefulness and privacy concerns). To make the data more digestible, we presented our findings through graphs and tables, followed by a thorough interpretation of the results.

▪ DATA ANALYSIS AND INTERPRETATION

This section dives deep into the analysis and interpretation of the main data gathered from 50 respondents in Raipur City, alleged between 20 and 50 years. The goal was to explore consumer behaviour, preferences, and attitudes towards AI-driven personalization in digital marketing, particularly focusing on aspects like engagement, privacy, trust, and purchasing decisions. We collected the data using a structured questionnaire and performed statistical analysis through both descriptive and inferential methods to ensure we validated the study's objectives and hypotheses.

▪ DEMOGRAPHIC PROFILE OF RESPONDENTS

The demographic composition of the respondents was balanced and digitally relevant. The age distribution was even across three segments: 33% (20–30 years), 34% (31–40 years), and 33% (41–50 years). The sample comprised 52% male sand 48% females. Educationally, 60% were graduates or postgraduates. Additionally, 78% of the participants reported shopping online at least once a week, indicating significant engagement with digital platforms and marketing content.

4. DATA ANALYSIS, HYPOTHESIS TESTING AND INTERPRETATION

To ensure the goals of this study were met, we came up with four hypotheses and put them to the test using the correct statistical methods. Each hypothesis focuses on a different aspect of AI-driven personalization in digital marketing, looking at how it affects engagement, buying behaviour, trust, and how intrusive it feels to users. We gathered responses from 50 participants through a structured questionnaire to carry out our analysis. Below, you'll find the results along with a detailed breakdown of the testing and interpretation.

Hypothesis	Statement	Test Used	Key Findings	Result
H₁	There is a significant relationship between AI-powered personalization and consumer engagement.	Spearman Rank Correlation	$\rho=0.61$, $p<0.01$ →Strong positive and Significant correlation.	Accepted
H₂	AI-powered personalization positively influences consumers' purchase decisions.	Independent Samples-test	$t=2.61$, $p=0.012$ →Significant difference in perception between those who purchased	Accepted

			and those who didn't.	
H₃	Higher privacy concerns are associated with lower trust in AI-powered Personalization.	Spearman Rank Correlation	$\rho = -0.49$, $p = 0.026 \rightarrow$ Moderate negative and Significant correlation.	Accepted
H₄	Consumers who perceive AI personalization as intrusive are less likely to engage with personalized content.	Chi-square Test of Independence	$\chi^2 = 9.76$, $df = 2$, $p = 0.021 \rightarrow$ Significant association between intrusiveness and lower engagement.	Accepted

▪ INTERPRETATION OF RESULT

The findings from this analysis lend solid support to the goals and hypotheses we've set out. Many people see AI-driven personalization as a way to boost customer engagement and help with purchase decisions, giving businesses a competitive edge in the digital marketing landscape. Yet, there are still significant hurdles to overcome, such as worries about data privacy, the transparency of AI systems, and the potential for intrusive content. Embracing all four hypotheses highlights the dual role of AI personalization. It's a powerful asset with clear benefits, but it also demands careful ethical considerations and a focus on user needs. Moving forward, strategies should not only aim for optimization but also prioritize building consumer trust and ensuring transparency to foster sustainable personalization practices in digital marketing.

5. CONCLUSION AND RECOMMENDATIONS

The research focused on uncovering the opportunities and challenges that come with AI-powered personalization in digital marketing. It drew on primary data from 50 respondents in Raipur city, along with relevant literature. The results show that artificial intelligence plays a crucial role in enhancing personalized digital experiences, leading to better customer engagement, satisfaction, and overall business performance. Many participants noted that AI-driven personalized marketing significantly impacts their purchasing choices, which supports the first hypothesis and highlights AI's potential to reshape customer-brand relationships.

Among the key advantages identified were improved customer loyalty, higher conversion rates, and the ability to deliver content in real-time, all of which contribute to a stronger return on investment. However, the study also uncovered some significant challenges. These include concerns about data privacy, a lack of transparency in AI algorithms, the complexity of technology, and cost barriers—especially for small and

medium-sized enterprises. Respondents voiced their unease regarding how their personal data is collected and utilized, underscoring the importance of ethical and secure data management practices.

This study adds to the existing knowledge by merging theoretical insights with empirical data, providing a well-rounded perspective on AI's role in digital marketing. It offers practical recommendations for marketers, emphasizing the need to adopt AI tools that prioritize user consent, data transparency, and adherence to data protection regulations. Additionally, businesses are urged to embrace AI technologies responsibly and to focus on building consumer trust as they enhance their personalization strategies.

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63. AI-POWERED RECOMMENDATION SYSTEMS: THE TECH BEHIND YOUTUBE, NETFLIX, AND AMAZON

V. Sneha, S. Divya

II M.Sc Computer Science

Annai Veilankanni's College of Arts and Science

Abstract

In the digital age, recommendation systems have become an essential component of online platforms, enhancing user experience and driving business growth. This research paper explores the role of artificial intelligence (AI) in building and optimizing recommendation systems used by popular platforms such as YouTube, Netflix, and Amazon. These systems analyze user behavior, preferences, and browsing history using machine learning algorithms to suggest relevant content or products. The paper highlights two key approaches: collaborative filtering and content-based filtering, explaining how each method contributes to personalized recommendations. It also examines real-world case studies of how AI-driven personalization improves customer satisfaction, engagement, and sales. Furthermore, the paper discusses the challenges of recommendation systems, such as data privacy, filter bubbles, and algorithmic bias. Finally, it presents future directions in enhancing recommendation accuracy using hybrid models and deep learning. This study aims to provide a beginner-friendly understanding of the technology and its impact on both users and businesses.

1. Introduction

Artificial Intelligence (AI) has revolutionized many aspects of modern life, from smart assistants to automated vehicles. One of the most widely used yet often unnoticed applications of AI is in recommendation systems. These systems use AI algorithms to help platforms like YouTube, Netflix, and Amazon personalize user experiences by suggesting relevant videos, shows, or products. As digital content continues to grow exponentially, recommendation systems help users discover what they're most likely to enjoy, making navigation more efficient and engaging. This paper introduces the working principles behind AI-powered recommendation systems and their real-world impact.

2. Types of Recommendation Systems

AI recommendation systems are primarily built on two main types of algorithms: collaborative filtering and content-based filtering.

2.1 Collaborative Filtering

This technique relies on user behavior and preferences. It recommends content based on the preferences of similar users. If users A and B like the same type of content, and A watches something new, B is likely to get that recommendation.

2.2 Content-Based Filtering

This method recommends items similar to those a user has liked before, based on features like genre, tags, or categories. For example, if a user watches several science fiction movies, the system suggests more science fiction titles.

2.3 Hybrid Models

To overcome the limitations of each method, many platforms use hybrid models that combine both collaborative and content-based filtering. These models are more robust and provide better accuracy.

3. Real-World Applications

3.1 YouTube

Uses deep learning to analyze watch history, likes/dislikes, and video features. The algorithm constantly updates to reflect real-time engagement.

3.2 Netflix

Employs machine learning to recommend shows based on what similar users watched and rated. Netflix also uses A/B testing to refine its recommendation strategies.

3.3 Amazon

Uses AI to recommend products by analyzing previous purchases, cart items, and search behavior. Also includes collaborative filtering from similar customer profiles.

4. Benefits of AI-Powered Recommendation Systems

4.1 Benefits for Users

- Personalized Experience
- Content Discovery
- Convenience
- Better Decision-Making

4.2 Benefits for Businesses

- Increased User Engagement
- Higher Sales and Conversions
- Customer Retention
- Data-Driven Insights

5. Challenges and Limitations

5.1 Data Privacy Issues

Systems collect large amounts of personal data, raising security and ethical concerns.

5.2 Filter Bubble / Echo Chamber

Users may be limited to similar types of content, reducing exposure to diverse information.

5.3 Cold Start Problem

Difficult to recommend for new users or new content due to lack of data.

5.4 Algorithmic Bias

If training data is biased, recommendations may reflect or amplify those biases.

5.5 Over-Reliance on Algorithms

Can reduce user exploration and promote manipulation for commercial gain.

6. Conclusion and Suggestions

AI-powered recommendation systems have significantly transformed how users interact with digital platforms. By delivering personalized content and product suggestions, they enhance user satisfaction, increase engagement, and support business growth. Popular platforms like YouTube, Netflix, and Amazon are leading examples of how artificial intelligence and machine learning algorithms can drive user behavior and business success.

However, as powerful as these systems are, they come with certain challenges — such as data privacy risks, algorithmic bias, and the cold start problem. To ensure fairness and transparency, developers and businesses must focus on building ethical AI systems that protect user data and promote content diversity.

Suggestions:

- Use hybrid models to reduce bias and improve accuracy.
- Apply privacy-by-design approaches to protect user data.
- Introduce diversity filters to break filter bubbles.
- Educate users on how recommendations work to build trust.
- Continue improving systems using user feedback and explainable AI

With responsible implementation, AI-powered recommendation systems can continue to evolve, offering smarter, fairer, and more helpful digital experiences for everyone.

64. INTEGRATING BLOCKCHAIN TECHNOLOGY IN SMART WAREHOUSING FOR ENHANCED TRANSPARENCY, EFFICIENCY, AND SECURITY

Dr. W. Mary Magdalene Viola

Head – Department of Computer Applications
Annai Veilankanni's College of Arts & Science
Saidapet, Chennai – 600 015

ABSTRACT

Smart warehousing leverages IoT, AI, and automation to optimize inventory and logistics processes. However, challenges persist in data transparency, security, and traceability. Blockchain technology, with its decentralized and immutable ledger, offers promising solutions to these challenges. This paper explores the integration of blockchain into smart warehousing systems, discussing its potential to revolutionize supply chain operations through secure data sharing, real-time inventory tracking, and smart contracts. We propose a hybrid framework combining IoT sensors, blockchain, and AI to create a more efficient and trustworthy warehousing ecosystem.

Keywords:

Blockchain, Smart Warehousing, IoT, Supply Chain, Logistics, Automation, Smart Contracts, Transparency, Traceability.

1. Introduction

The evolution of warehouse management has led to the emergence of smart warehouses, which use technologies like IoT, robotics, and AI for efficient operations. However, increasing supply chain complexity demands greater transparency, trust, and security, especially in multi-stakeholder environments. Blockchain offers a decentralized infrastructure that ensures data immutability, security, and traceability—making it an ideal match for modern warehousing systems.

2. Literature Review

Studies indicate that blockchain adoption in supply chain management enhances traceability and reduces fraud. However, integration with warehousing-specific operations, such as inventory control, shipment validation, and real-time monitoring, remains underexplored. Some recent models propose blockchain with IoT integration, yet practical deployments are limited due to scalability and latency issues.

3. Objectives

To explore blockchain's role in enhancing transparency and security in smart warehousing.

To propose a framework for blockchain-integrated smart warehouses using IoT and smart contracts.

To analyse potential benefits and challenges of blockchain adoption in warehouse operations.

4. Proposed System Architecture

4.1. Components:

4.1.1 IoT Devices:

Sensors for temperature, humidity, and inventory movement. IoT temperature and humidity monitoring system is a part of a QR Inventory software. A QR Inventory system tracks inventory and assets locations and movements, and links this data to the IoT sensors measurements. In a standalone temperature monitoring system, you know the temperature for each monitored zone, but not what was stored in this zone at any given time. A QR Inventory system knows assets and inventory locations and movements history, and has temperature and humidity logs for each zone. Combining this data, a QR Inventory software can provide temperature and humidity logs for each asset or inventory batch, not just for the zone where an IoT sensor is installed.

Temperature and humidity monitoring system consists of three components.

- i) Bluetooth Temperature And Humidity Sensor A BLE sensor is a wireless, easy to install device which is operated on the battery. It measures temperature and humidity at pre-set time intervals, and sends data to the IoT gateway. The data can be sent either through an advertisement, or via a BLE connection link.



Fig: 1

- ii) A Bluetooth IoT gateway reads data from the connected temperature and humidity sensors. The gateway pre-processes, filters and batches data, and sends data to the cloud software for the storage and reporting. One IoT gateway can read data from multiple IoT sensors at the same time.



Fig: 2

- iii) In Cloud Software the data from the Bluetooth IoT gateways are sent to the back end cloud software for processing and reporting. You can review the real time temperature and humidity logs at any time, from anywhere via the cloud software web dashboard. If you set up alerts, you get logs on when and what type of alert was triggered, and when conditions were corrected.



Fig: 3

4.1.2 Blockchain Ledger:

Records transactions, access logs, and asset flows immutably. Distributed ledger technologies (DLT) like blockchain are a secure way of conducting and recording transfers of digital assets without the need for a central authority. DLT is “distributed” because multiple participants in a computer network (individuals, businesses, etc.), share and synchronize copies of the ledger. New transactions are added in a manner that is cryptographically secured, permanent, and visible to all participants in near real time. How does it work? Distributed ledgers do not need a central, trusted authority because as transactions are added, they are verified using what is known as a consensus protocol. Blockchain, for example, ensures the ledger is valid because each “block” of transactions is cryptographically linked to the previous block so that any change would alert all other users. With an agreement on that history, users may then conduct a new transaction with a shared understanding of who has which resource. Distributed ledgers can be either “permissioned” or “unpermissioned.” With unpermissioned ledgers, which are generally public, any participant can conduct a transaction. Permissioned ledgers may or may not be public, but only trusted users can conduct transactions.

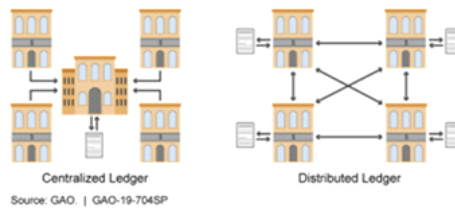


Fig: 4

4.1.3 Smart Contracts

Automate tasks such as reordering, payment release, and compliance verification.

Smart contracts are digital contracts stored on a blockchain that are automatically executed when predetermined terms and conditions are met.

Smart contracts are typically used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss. They can also automate a workflow, trigger the next action when predetermine conditions are met.

Smart contracts work by the following simple “if/when...then...” statements that are written into code on a blockchain. A network of computers executes the actions when predetermined conditions are met and verified.

These actions might include releasing funds to the appropriate parties, registering a vehicle, sending notifications or issuing a ticket. The blockchain is then updated when the transaction is completed. That means the transaction cannot be changed, and only parties who have been granted permission can see the results.

Within a smart contract, there can be as many stipulations as needed to satisfy the participants that the task is completed satisfactorily. To establish the terms, participants must determine how transactions and their data are represented on the blockchain, agree on the “if/when...then...” rules that govern those transactions, explore all possible exceptions and define a framework for resolving disputes.

Then, a developer programs the smart contract. However, organizations that use blockchain for business increasingly provide templates, web interfaces and other online tools to simplify structuring smart contracts.

4.2. Workflow:

- Goods arrive are tagged with IoT sensors.
- Sensor data (location, status, condition) is recorded to the blockchain in real time.
- Smart contracts execute triggers (e.g., reorder low stock).

- All stakeholders (suppliers, warehouse managers, customers) access validated data securely.
- Benefits of Blockchain in Smart Warehousing
 - o Transparency: All parties access the same verifiable data.
 - o Security: Encrypted, tamper-proof transaction logs.
 - o Automation: Reduced manual errors and delays through smart contracts.
 - o Traceability: Full history of each item's journey within the warehouse.
- Challenges and Limitations
 - o Scalability: High transaction volume may slow blockchain networks.
 - o Integration: Compatibility with legacy systems.
 - o Cost: Initial infrastructure and training costs.
 - o Regulatory Uncertainty: Lack of clear guidelines for blockchain use in logistics.

7. Future Scope

AI and ML Integration: Predictive analytics using blockchain-verified data. Green Logistics: Using blockchain to track carbon footprint of warehouse activities. Interoperability: Cross-platform blockchain networks for broader supply chain transparency.

8. Conclusion

Blockchain integration in smart warehousing has the potential to transform logistics operations by enhancing security, traceability, and operational efficiency. Though challenges exist, a well-structured hybrid model combining IoT, smart contracts, and distributed ledgers could redefine the future of warehouse management and supply chain transparency.

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65. APPLICATION OF AI IN BUSINESS AND TECHNOLOGY (ICAIBT)

Surekha.T, Sona.J

Student

III B. Com (General) Valliammal College for Women

ABSTRACT:-

Artificial Intelligence (AI) has emerged as a transformative force in modern business and technology. Its integration is reshaping industries by enabling automation, enhancing decision-making, and driving innovation. In business, AI applications such as customer relationship management (CRM), predictive analytics, digital personal assistants, and chatbots improve efficiency and customer engagement. AI-powered tools help companies analyze large volumes of data to uncover patterns, forecast trends, and optimize operations. In the field of technology, AI is central to developments in cybersecurity, Internet of Things (IoT), robotics, and software engineering. Machine learning and natural language processing allow systems to learn and adapt, providing smarter solutions across domains. As AI continues to evolve, it presents both opportunities and challenges, emphasizing the need for responsible implementation, data ethics, and workforce adaptation. This abstract highlights the growing impact of AI in shaping future-ready businesses and technologies.

KEYWORDS :-

- Artificial Intelligence (AI)
- Business applications
- Technology
- Automation
- Decision-making
- Predictive analytics
- Customer Relationship Management (CRM)
- Digital assistants
- Data analysis
- Machine Learning
- Natural Language Processing (NLP)
- Ethical AI
- Workforce adaptation

INTRODUCTION :-

Artificial Intelligence (AI) is a branch of computer science focused on building smart machines capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, understanding language, and recognizing patterns. AI systems are designed to mimic human cognitive functions and can be found in various forms—ranging from simple applications like voice assistants (e.g., Siri, Alexa) to advanced systems used in healthcare, finance, robotics, and autonomous vehicles.

AI can be categorized into narrow AI (designed for specific tasks like image recognition or translation) and general AI (a theoretical concept where machines possess human-like intelligence across a wide range of activities). The development of AI involves disciplines such as machine learning, natural language processing, computer vision, and robotics. As AI continues to evolve, it is transforming industries and daily life, offering both opportunities and challenges that must be addressed responsibly.

AI in Business:-

1. Machine learning algorithms:

These algorithms are a subset of artificial intelligence and are used to make predictions or classifications based on input data. Through training data sets, these algorithms can learn to identify patterns, discover anomalies, or make projections such as future sales revenue. Machine learning algorithms help mine large datasets for key insights that can offer real-world benefits for improved business decisions. Machine learning algorithms benefit from labeled data, which is data that a human expert categorizes before it is processed.

2. Deep learning :

Deep learning is a subset of machine learning that allows for the automation of tasks without human intervention. Virtual assistants, chatbots, facial recognition and fraud prevention technology all rely on deep learning. By examining data that is related to user behavior, deep learning models can make predictions about future behavior. Compared to general machine learning, deep learning models can more accurately extract information from unstructured data such as text and images and do not require as much human intervention.

3. Natural language processing (NLP) :

Natural language processing is a branch of AI that “enables computers and digital devices to recognize, understand, and generate text and speech.”⁴ Customer support chatbots, digital assistants, and voice-operated technologies such as GPS systems are all powered by

NLP. Used with machine learning algorithms and deep learning models, NLP allows systems to extract insights from unstructured data that are text.

4. Artificial Intelligence (AI):

In business helps automate tasks, analyze large data sets, and make smarter decisions. Companies use AI for customer service (chatbots), sales forecasting, inventory management, and marketing insights. It improves efficiency, reduces costs, and enhances customer experience.

5. Cybersecurity:

Cybersecurity is the protection of computer systems, networks, and data from digital attacks. It includes measures like firewalls, encryption, antivirus software, and multi-factor authentication. Businesses use cybersecurity to prevent data breaches, protect customer information, and maintain trust.

6. CRM (Customer Relationship Management):

CRM is a strategy and software used by businesses to manage interactions with customers. It helps store customer details, track communication, and manage sales and support. Popular CRM tools like Salesforce or Zoho help improve customer satisfaction and build strong relationships.

7. Internal and Data Research:

Internal and data research involves collecting and analyzing data within the organization to improve performance. This includes studying employee productivity, sales trends, customer feedback, and process efficiency. It helps in making informed business decisions and strategic planning.

8. Digital Personal Assistant:-

A Digital Personal Assistant is an AI-powered tool (like Siri, Alexa, or Google Assistant) that helps users with tasks such as setting reminders, answering questions, managing schedules, and controlling smart devices. In business, these assistants improve productivity by handling routine activities.

Advantage of using AI in business:-

1. Enriching employee experiences:

Using AI to streamline or automate repetitive, mundane tasks can allow your employees to dive into more complex, creative and ultimately more valuable work.

2. Reinventing customer engagement:

AI can create more personalized, tailored customer experiences, delighting your target audiences while lightening the load for employees.

3. Reshaping business processes:

Virtually any business process can be reimagined with AI, from marketing to supply chain operations to finance, and AI is even allowing organizations to go beyond process optimization and discover exciting new growth opportunities.

4. Bending the curve on innovation:

AI is revolutionizing innovation by speeding up creative processes and product development, reducing the time to market and allowing companies to differentiate in an often crowded field.

The future of AI:-

The future of AI is potentially limitless. Consider the following paths forward for the technology:

- **AI will handle more everyday tasks:**

Experts see AI technology continuing to develop to handle more “commonsense” tasks. That means robots will become extremely useful in everyday life.

- **AI will make the impossible possible:**

“AI is starting to make what was once considered impossible possible, like driverless cars,” explained Russell Glenister, CEO and founder of Curation Zone. “Driverless cars are only a reality because of access to training data and fast GPUs [graphics processing units], which are both key enablers. To train driverless cars, an enormous amount of accurate data is required and speed is key to undertake the training. Five years ago, the processors were too slow, but the introduction of GPUs made it all possible.”

- **AI will revolutionize familiar activities:-**

Dr. Nathan Wilson, co-founder and chief technology officer of Nara Logics, says AI is on the cusp of revolutionizing familiar activities like dining. Wilson predicted that AI could be used by a restaurant to decide which music to play based on the interests of the guests in attendance. AI could even alter the appearance of the wallpaper based on what the technology anticipates the crowd’s aesthetic preferences might be.

AI IN TECHNOLOGY:-

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the 21st century, reshaping how industries operate and how people interact with machines. At its core, AI refers to the simulation of human intelligence in machines that are capable of learning, reasoning, and problem-solving. In the field of technology, AI acts as a driving force behind innovations such as automation, data analysis, natural language processing, and machine vision. From enhancing cybersecurity to enabling personalized user

experiences, AI is revolutionizing products and services across multiple sectors. As technology continues to evolve, AI stands as a powerful catalyst, bridging the gap between human creativity and machine efficiency, and paving the way for smarter, faster, and more adaptive systems.

Applications of AI in Tech

The possibilities of AI are endless, and it's not surprising that companies from all kinds of sectors and industries are integrating AI technologies to optimize their business processes and support decision-making.

AI in software development:-

Next-generation AI tools already offer many opportunities in software development. The number of use cases is rapidly growing as new AI-powered tools reach the market and developers become familiar with them. Today, coders can use AI for tasks like task automation, bug filing, testing processes, code translation, and code optimization.

AI in data analytics :-

The same goes for data analytics. With the rise of machine learning and generative AI tools like ChatGPT, data professionals can rapidly conduct data processing tasks, create compelling visualizations in a matter of clicks, or set the coding foundations for powerful predictive models.

AI in cybersecurity :-

AI is rapidly revolutionizing the field of cybersecurity. AI-driven tools can help spot security threats, implement automated responses, and advance mitigation strategies. As Brian Murphy, CEO of ReliaQuest, puts it in our DataFramed podcast on How AI is Changing Cybersecurity.

AI in cloud computing :-

It's sometimes hard to draw a clear line between cloud computing and AI, for nearly all operations hosted in the cloud are powered by AI technologies. From resource allocation optimization and cost management to service delivery and cloud security, AI is at the core of the cloud business.

Technical challenges

From a technical angle, integrating these data into optimized pipelines and putting AI models into production are some of the most common challenges for businesses willing to implement AI tools into their daily operations. Building a successful AI strategy requires considerable effort and resources, but even companies with big pockets fail to implement AI solutions. Why? Because they lack enough skilled employees with AI literacy. If you're new

to the world of AI training, check out our guide on how to learn AI, which details everything you need to know about starting your journey to AI literacy, whether for you or your team.

Future Trends in AI Technology

As we look towards the future, the importance of AI is set to grow exponentially. With AI technologies evolving at a rapid pace and their applications expanding across various sectors, AI will continue to be a critical skill for individuals, businesses, and societies.

AI and IoT integration :- AI and the Internet of Things (IoT) are two intimately united concepts in several domains. IoT refers to the digital interconnection between multiple (tech) physical systems. Smart homes and smart cities are examples of IoT systems. The symbiotic relationship between AI and IoT enhances smart interactions with the physical environment by collecting different types of sensory data and processing them to make human-like decisions in such an environment autonomously.

AI in edge computing :- AI often relies on remote cloud servers for its heavy lifting. This could change with edge computing. Edge AI is the practice of deploying AI models and algorithms directly on edge devices, which are devices located at the network's periphery, close to where data is generated and actions need to be taken.

Recent advancements in AI, such as the development of smaller and more efficient language models like GPT-4o Mini, Llama 3.1 8B, and Gemma 2 2B, are further accelerating the adoption of edge AI.

Emerging AI :- AI is a cornerstone technology for digital transformation and a critical enabler for emerging technologies, such as quantum computing, autonomous systems, and robotics.

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66. A STUDY ON STARTUP FINANCING AND MARKET PENETRATION IN CHENNAI- ISSUES, CHALLENGES, AND OPPORTUNITIES

Dr. J. Sankari
Head & Assistant Professor

Ms. V.S. Abinaya
Student, M.Com
PG Department of Commerce
Anna Adarsh College for women

Abstract

Newly established companies often face significant hurdles when attempting to commercialize their products and services. The limited capital and experience of these startups can make it challenging for them to qualify for institutional equity investment at the initial stage. Consequently, securing funding is vital for the short-term and long-term success of these early-stage companies. This research paper seeks to provide a comprehensive review of the existing literature and identify gaps in the current understanding of the funding sources available to startups. One of the key findings of this study is that investors' decisions play a crucial role in determining whether startups receive the necessary funding.

Keywords:

Startups, funding, market penetration, funding sources.

Introduction

Launching a new business in India can be a thrilling yet tough journey for young entrepreneurs. Driven by innovative ideas and passion, they often hit financial roadblocks that slow them down. This study focuses on the financial problems new startups and young entrepreneurs in India face, aiming to understand the main challenges in getting funding and managing finances effectively. Many young entrepreneurs don't have the knowledge or skills to manage finances well, which can lead to problems. Financial education and mentorship help entrepreneurs make smart financial decisions. Venture capital, angel investors, and crowdfunding can help young entrepreneurs. Government policies can help create a supportive environment for startups.

Objectives of the study

- To analyse the current sources of funding available to startups in Chennai.
- To identify the major financial challenges faced by startups in Chennai.
- To assess the strategies adopted by startups for market penetration.

- To explore the key opportunities for startups in emerging sectors within Chennai.

Review of Literature

K Jaya Sudheer Kumar & Anuhya (2024) “One of the main reasons businesses do well in South India is the large number of students in the region. Chennai and nearby areas have many top colleges and universities, which attract students from all over. This creates a lively atmosphere full of new ideas. There are also many startup support centres and business incubators that help new companies grow. On top of that, Special Economic Zones (SEZs) offer good conditions for businesses to succeed by making it easier and cheaper to operate.” Dr Mohd Akhlak Hussain (2024) stated that “Internal funding sources including family and friends, personal savings and bootstrapping, particularly in the nascent stages of startup development. In addition angel investors, venture capitalists, Government grants, and debt financing fueling the growth and expansion of startups.”

Scope of the study

This study explores the intersection of startup financing and market penetration, examining how funding strategies impact growth and market success. It investigates funding options, financial challenges, marketing strategies, and growth tactics, providing insights for entrepreneurs, investors, and policymakers to inform decision-making and drive startup success.

Securing capital plays a major role for startups to launch, grow, and thrive. Entrepreneurs must seek various funding options, including venture capital, angel investors, crowdfunding, bootstrapping, and loans to fuel product development, market entry, and scaling. Effective startup financing demands strategic planning, informed decision-making, and a keen understanding of the funding landscape. By carefully considering factors like funding costs, equity dilution, and investor expectations, startups can make informed choices. Ultimately, securing the right funding at the right time enables startups to accelerate growth, drive innovation, and achieve success. This study also focuses on a comprehensive view of market penetration that explores the intricacies of market trends, competition, and customer needs to develop targeted strategies for expanding market share and customer base. By examining the impact of marketing tactics, product positioning, pricing strategies, and digital marketing channels, the study provides in-depth insights into market dynamics, customer behaviour, and competitor analysis. The ultimate goal is to offer actionable recommendations that enable businesses to enhance their market penetration efforts, drive growth, and achieve success. Through this exploration, the study contributes significantly to the understanding of market penetration and its pivotal role in business success.

Data Analysis

This primary data analysis table presents a comprehensive examination of the original data collected from a sample of 100 startups. The table provides valuable insights into the characteristics, strategies, and outcomes of these startups, shedding light on the factors that contribute to their success.

Demographic Classifications

S.no	Particulars	Category	Percentage
1	Age	25-30 years	54%
		30-40 years	15%
		Above 40years	31%
2	Gender	Male	34%
		Female	66%
3	Marital status	Married	54%
		Unmarried	46%
4	Income	Below Rs.20,000	15%
		Rs.20,000- Rs.30,000	14%
		Rs.30,000- Rs.40,000	20%
		Rs.40,000- Rs.50,000	34%
		Above Rs.50,000	17%

Demographic Classifications Interpretation

From the above table, it is identified that 54% of the respondents belong to the age group of 25 to 30 years, and the majority of them are female. Most of the respondents are married and their level of income is between Rs. 40,000 to Rs.. 50,000.

Startups types, issues, and challenges

Particulars	Category	No. of Respondents	Rank
Type of Business	Manufacturing & E-Commerce	12	3
	Service based business	39	1
	Software & Technology	11	4
	Food & Beverages	9	5
	Education Services	29	2
Funding Type	Seed Funding	28	3
	Bootstrapping	40	1
	From Angel Investors	32	2
Projected Revenue Streams	Subscription based	14	4
	Advertising	34	1
	Product Sales	23	3

	Service fees	29	2
Factors that contribute to the introduction of a Startup	Independence & Autonomy	29	2
	Passion	54	1
	Financial Opportunities	17	3
Opportunities for startups in future	Artificial Intelligence	57	1
	Internet of Things	26	2
	Block chain & Defi	17	3

Interpretation

The above table shows the type of operation of business opted by the startups, and it is clear that service-based business ranks first position and second position for Education services. Bootstrapping funding is preferred by startup business entrepreneurs. Most of the startup's projected revenue streams are from Advertising, which ranks first, and it is followed by service fees. Also, it is found that Passion is the major key factor for startup entrepreneurs to start their business. Most of the respondents have a suggestion that Artificial Intelligence will be the future scope of their business.

Impact of Competitors on Startups

Impact of Competitor	Low	20	3
	Moderate	45	1
	High	35	2

Interpretation

The impact of the competitor on the startup's business is moderate, requiring strategic adjustments to maintain market position and leverage opportunities.

Limitations of the study

- The study is limited to startups operating in Chennai and may not reflect the conditions or challenges faced by startups in other regions of India.
- Due to time and resource limitations, the number of startups surveyed or interviewed may be small, which could affect the generalizability of the findings.

Conclusion

Entrepreneurs have several avenues for growth and development based on recent findings. By focusing on service-based businesses with high-quality delivery, entrepreneurs

can drive growth. Bootstrapping funding allows for efficient resource management and optimized operations, giving entrepreneurs control over their business direction. To mitigate risks and enhance stability, diversifying revenue streams beyond advertising and service fees is key. Aligning business goals with personal passion fuels entrepreneurial success and motivation. Staying agile in response to competitors helps maintain market position and leverage opportunities. Lastly, integrating Artificial Intelligence into business operations can unlock new growth and efficiency paths.

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67. REVOLUTIONIZING CONSUMER ENGAGEMENT: THE IMPACT OF AI-POWERED PERSONALIZATION ON DIGITAL MARKETING STRATEGIES

Mrs. Sangeetha B,
Assistant Professor,
Department of Chemistry,

Mrs. Samee Fernando P,
Assistant Professor,
Department of Mathematics,
St. Joseph College of Engineering,
Sriperumbudur, Chennai

Abstract

Purpose – This paper explores the transformative role of artificial intelligence (AI)-powered personalization in digital marketing strategies, focusing on its impact on consumer engagement. The study aims to synthesize recent research, analyze current trends, and provide actionable insights for marketers.

Design/methodology/approach – A qualitative approach is adopted, utilizing a comprehensive literature review of peer-reviewed articles, industry reports, and case studies published between 2019 and 2024. Thematic analysis is used to identify key trends and implications.

Findings – AI-powered personalization significantly enhances consumer engagement by delivering tailored experiences, increasing satisfaction, and driving brand loyalty. However, challenges such as data privacy, algorithmic bias, and implementation complexity persist.

Originality/value – This paper contributes to the understanding of AI-driven personalization in digital marketing, offering a holistic view of its benefits, challenges, and future directions.

Keywords: Artificial intelligence, Personalization, Digital marketing, Consumer engagement, Customer experience

1. Introduction

The digital marketing landscape has undergone a paradigm shift with the advent of artificial intelligence (AI). As consumers demand more relevant and personalized experiences, marketers are leveraging AI to tailor content, offers, and interactions at an unprecedented scale (Chatterjee et al., 2023). AI-powered personalization is not merely a

technological advancement but a strategic imperative that redefines how brands engage with consumers. This paper investigates the impact of AI-driven personalization on consumer engagement, examining its benefits, challenges, and implications for digital marketing strategies.

2. Literature Review

2.1 The Evolution of Personalization in Digital Marketing

Personalization in marketing is not a novel concept; however, its scope and sophistication have expanded with digital technologies. Early personalization efforts relied on basic segmentation and rule-based systems (Kumar et al., 2021). The integration of AI, particularly machine learning and natural language processing, has enabled real-time, dynamic personalization at the individual level (Davenport et al., 2020).

2.2 AI Technologies Enabling Personalization

AI technologies such as recommendation engines, predictive analytics, and chatbots are central to modern personalization efforts. Recommendation systems, popularized by platforms like Amazon and Netflix, utilize collaborative filtering and deep learning to suggest products and content (García-Murillo et al., 2022). Predictive analytics leverages historical data to anticipate consumer needs, while AI-powered chatbots provide instant, context-aware customer support (Huang & Rust, 2021).

2.3 Consumer Engagement in the Digital Era

Consumer engagement encompasses emotional, cognitive, and behavioral dimensions, reflecting the depth of a consumer's relationship with a brand (Brodie et al., 2019). Engaged consumers are more likely to exhibit loyalty, advocacy, and higher lifetime value. AI-driven personalization enhances engagement by delivering relevant experiences, fostering trust, and reducing friction in the customer journey (Lemon, 2022).

2.4 Challenges and Ethical Considerations

Despite its benefits, AI-powered personalization raises concerns regarding data privacy, algorithmic transparency, and potential biases. The General Data Protection Regulation (GDPR) and similar frameworks necessitate responsible data handling and consumer consent (Martin & Murphy, 2023). Moreover, algorithmic bias can perpetuate inequalities, underscoring the need for ethical AI practices (Mehrabi et al., 2021).

3. Methodology

3.1 Research Design

This study employs a qualitative research design, focusing on a systematic literature review. The review synthesizes findings from academic journals, industry whitepapers, and case studies published between 2019 and 2024.

3.2 Data Collection

Sources were identified using databases such as Scopus, Web of Science, and Google Scholar. Keywords included “AI personalization,” “digital marketing,” “consumer engagement,” and “customer experience.” Inclusion criteria required sources to be peer-reviewed or industry-recognized and published within the last five years.

3.3 Data Analysis

A thematic analysis approach was used to identify recurring themes, trends, and gaps in the literature. Findings were categorized into three main areas: (1) impact on consumer engagement, (2) implementation challenges, and (3) future directions.

4. Findings

4.1 Enhanced Consumer Engagement

AI-powered personalization has a profound impact on consumer engagement. Studies indicate that personalized recommendations increase click-through rates by up to 30% and conversion rates by 20% (Sales force, 2023). Brands leveraging AI-driven content personalization report higher customer satisfaction and retention (Chatterjee et al., 2023).

4.1.1 Real-Time Personalization

Real-time personalization, enabled by AI, allows brands to adapt content and offers based on immediate consumer behavior. For example, e-commerce platforms use AI to adjust product recommendations as users browse, resulting in more relevant experiences and increased engagement (García-Murillo et al., 2022).

4.1.2 Omni-channel Consistency

AI facilitates consistent personalization across multiple channels, including web, mobile, email, and social media. This Omni-channel approach ensures that consumers receive coherent and relevant messaging, regardless of the touch-point (Kumar et al., 2021).

4.2 Improved Customer Experience

AI-driven personalization enhances the overall customer experience by reducing information overload and simplifying decision-making. Chatbots and virtual assistants provide instant, personalized support, resolving queries efficiently and improving satisfaction (Huang & Rust, 2021).

4.3 Data-Driven Insights

AI enables marketers to derive actionable insights from vast datasets, uncovering patterns and preferences that inform personalization strategies. Predictive analytics allows brands to anticipate consumer needs, proactively offering solutions and products (Davenport et al., 2020).

4.4 Challenges in Implementation

Despite its advantages, implementing AI-powered personalization presents several challenges:

Data Privacy and Security: Collecting and processing personal data raises privacy concerns, necessitating robust security measures and compliance with regulations (Martin & Murphy, 2023).

Algorithmic Bias: AI systems can inadvertently perpetuate biases present in training data, leading to unfair or discriminatory outcomes (Mehrabi et al., 2021). **Technical Complexity:** Integrating AI into existing marketing systems requires significant technical expertise and investment (Kumar et al., 2021).

5. Discussion

5.1 Strategic Implications for Marketers

The integration of AI-powered personalization into digital marketing strategies offers a competitive advantage. Marketers can deliver hyper-relevant experiences, fostering deeper consumer relationships and driving business outcomes. However, success depends on balancing personalization with privacy, ensuring transparency, and addressing ethical concerns.

5.2 The Role of Trust and Transparency

Building consumer trust is paramount. Transparent data practices, clear communication about personalization efforts, and options for consumers to control their data are essential for sustaining engagement (Martin & Murphy, 2023). Brands that prioritize ethical AI and responsible data use are more likely to earn consumer loyalty.

5.3 Future Trends

Emerging trends include the use of generative AI for content creation, advanced sentiment analysis, and the integration of AI with augmented reality (AR) and virtual reality (VR) to create immersive personalized experiences (Lemon, 2022). As AI technologies evolve, personalization will become more predictive, proactive, and context-aware.

6. Conclusion

AI-powered personalization is revolutionizing consumer engagement in digital marketing. By delivering tailored experiences, brands can increase satisfaction, loyalty, and lifetime value. However, challenges related to data privacy, algorithmic bias, and technical complexity must be addressed. Future research should explore the long-term effects of AI-driven personalization on consumer behavior and the evolving regulatory landscape.

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68. A STUDY ON ANNUAL PERFORMANCE APPRAISAL SYSTEMS IN |CHENNAI IT SECTOR

A. Mubashira Fathima

Department of management studies

B.N. Suresh Kumar

Department of management studies

St Peter's institute of higher education and research, Avadi, chennai

Abstract

The evaluation of employee performance is vital for assessing contributions, establishing developmental objectives, and aligning individual efforts with the organization's strategy. Within Chennai's rapidly advancing IT sector, annual performance evaluations are essential for determining promotions, compensation, and skills assessments. Nevertheless, the effectiveness of these appraisal systems is often contingent upon how fair, transparent, and actionable employees perceive the processes to be.

This research examines the framework, execution, and effectiveness of annual performance appraisal systems in IT firms situated in Chennai. The study concentrated on employee perceptions across a range of organizational sizes, including small, medium, and large enterprises. A structured survey was utilized to gather responses from 60 IT employees. Key factors analyzed included clarity of goals, quality of feedback, perceived fairness, and overall satisfaction with the appraisal systems.

Statistical analysis was performed using ANOVA to assess whether company size has a significant impact on employee satisfaction. Findings indicated that employees in larger organizations generally expressed higher satisfaction with their appraisal processes, highlighting improved communication, structured feedback, and clear performance metrics. In contrast, employees within smaller companies reported dissatisfaction stemming from inconsistent feedback and a lack of transparency. The ANOVA analysis confirmed a meaningful difference in satisfaction levels across various company sizes ($p = 0.004$).

This research underscores the necessity for a more consistent and employee-focused approach to performance appraisal, especially in small and medium-sized enterprises. Suggestions include adopting 360-degree feedback, utilizing key performance indicators, and providing regular discussions about performance.

Keywords:

Performance Appraisal, Employee Satisfaction, Feedback, IT Sector, Chennai, HR Practices, ANOVA, Company Size, Human Resource Management

Objectives of study

- ❖ To evaluate the framework and procedures involved in annual performance evaluations within the IT industry in Chennai.
- ❖ To measure employee contentment regarding appraisal results.
- ❖ To investigate whether views on performance appraisals vary according to the size of the company.
- ❖ To offer recommendations for enhancing performance appraisal systems in IT companies.

Research Methodology

Research Design: Descriptive and analytical in nature.

Sample Size: 60 employees from IT firms located in Chennai.

Sampling Technique: Purposive sampling method employed.

Data Collection: A structured questionnaire utilizing a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

Primary Variables:

Goal Clarity

Quality of Feedback

Equity in Evaluation

Overall Satisfaction

Tools Utilized: Descriptive statistics and One-Way ANOVA.

Software: SPSS and Excel programs used.

Data Analysis: ANOVA Table

Dependent Variable: Employee Contentment with Appraisal System

Independent Variable: Size of Company (Small, Medium, Large)

Source of Variation	SS (sum of squares)	Df (Degrees of freedom)	MS (mean Square)	F-value	p-value
Between Groups	6.84	2	3.42	5.67	0.004
Within Groups	34.38	57	0.603		
Total	41.22	59			

Interpretation:

Given that the p-value is 0.004, which is less than 0.05, we reject the null hypothesis. This indicates that there is a significant variation in employee satisfaction regarding performance appraisals among different company sizes.

Findings

Larger organizations tend to have more systematic and consistent appraisal processes. Employees in smaller IT companies expressed dissatisfaction due to insufficient feedback and ambiguous criteria.

Medium-sized enterprises are moving towards more transparent and technology-driven systems.

ANOVA analysis indicated a statistically significant difference in satisfaction levels among various company sizes.

Suggestions

Establish regular feedback intervals, rather than relying solely on annual evaluations. Incorporate 360-degree feedback systems.

Educate managers on conducting unbiased and constructive performance assessments. Utilize Key Performance Indicators (KPIs) to introduce an element of objectivity.

Ensure employees understand the evaluation criteria from the beginning of the year.

Conclusion

Despite the ongoing relevance of annual performance appraisals in managing talent within Chennai's IT sector, their success is contingent on transparency, feedback methods, and perceived fairness. This research indicates that the size of the company affects employee perceptions, with larger firms performing better. Adopting structured, equitable, and frequent evaluations can enhance employee satisfaction and contribute to organizational success.

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69. AI HORIZONS: ENVISIONING THE FUTURE OF BUSINESS - TECH CONVERGENCE

Ms. M. Samyuktha

Ms. R. Harini

UG student of B.Sc. advanced zoology and biotechnology
Chellammal women's College
(Arts and science), Guindy, Chennai.

Abstract

Due to popular successes (e.g., ChatGPT) Artificial Intelligence (AI) is on everyone's lips today. When advances in biotechnology are combined with advances in AI unprecedented new potential solutions become available. This can help with many global problems and contribute to important Sustainability Development Goals. Current examples include Food Security, Health and Well-being, Clean Water, Clean Energy, Responsible Consumption and Production, Climate Action, Life below Water, or protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. AI is ubiquitous in the life sciences today. In this pre-Editorial paper, we provide an overview of open research issues and challenges for each of the topics addressed in this special issue. Potential authors can directly use this as a guideline for developing their paper.

Introduction

AI has a long tradition in computer science centred on the general goal of creating “intelligent” machines, but the term intelligence is not clearly defined and even measuring “intelligence” is extremely difficult. AI is a very broad term that is used today generally and practically for everything where any Digital Information Processing System processes any data. The future will look different than the professional futurologists and the media describe it, however it is pretty certain that AI will become increasingly important in the future – whether we like it or not. We do not need to fear a second AI winter this time, because the field of AI applications is now much broader in many domains AI is already very successful in everyday life (speech processing like Alexa, Siri etc., Deeply translator etc., or ChatGPT the latest system

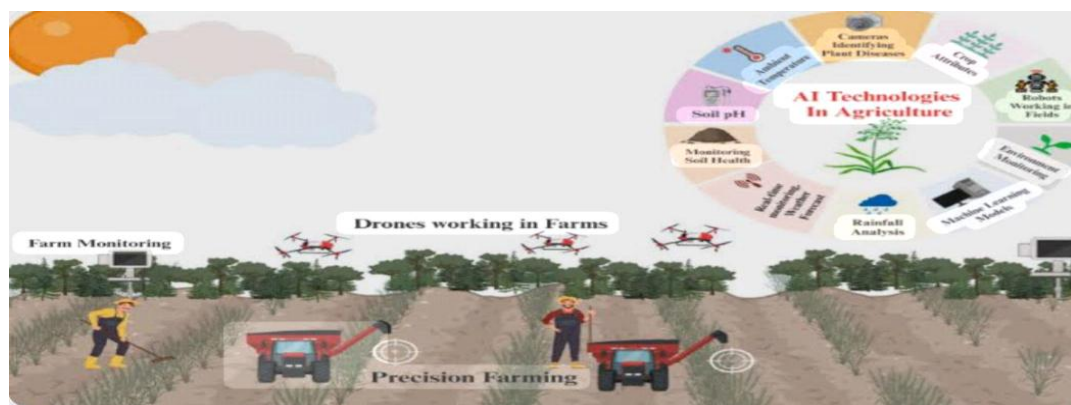
from OpenAI that impresses with amazing performance), all of these systems being also available for biotechnology.

AI in biotechnology

World has seen rapid development in the field of Information technology and Biotechnology over a decade. New experimental technologies developed in biotechnology and data available made it possible to perform experiments easily in less time and cost. ...

AI in agricultural biotechnology

Biotechnology firms are now leveraging AI/ML solutions to develop autonomous robots that handle important agricultural tasks such as harvesting crops at a much faster pace than humans. Computer Vision and DL algorithms are leveraged to process and analyze the data captured by drones. This helps in monitoring crop and soil health. ML algorithms help in tracking and predicting various environmental changes including weather changes that impact the crop yield.



Digital transformation is also having a strong impact on the field of smart agriculture . Numerous isolated, often non-interoperable solutions exist in digital ecosystems in agriculture. This is where an "Agricultural Data Space", such as that used in the Fraunhofer lighthouse project "Cognitive Agriculture" (COGNAC) , can offer great added value. One application example is the evaluation of ecological and economic sustainability via the nutrient cycle. In agriculture, a balanced and appropriate nutrient cycle is at the core of efficient, productive and sustainable production of crop and livestock products. In addition to documentation, e.g., for regulatory monitoring, the focus is increasingly on optimizing the nutrient cycle.

Typical examples include dairy farming with arable and grassland management. Various suppliers of sensor systems record soil, plant and weather data. On dairy farms, conclusions about nutrient inputs and outputs can be made by collecting data on feeding along with the milk yield. However, to optimize nutrient cycling, the relevant data must be

complete and of sufficient quality. This is often the key problem. Important components here are interoperability, uniform ontologies, and the cognitive processing of the data. Missing data must, for example, be interpolated or modelled accordingly. By representing the nutrient cycle in the form of a digital twin, the farmer can obtain information about current nutrient balance and thus identify possible problem areas.

AI in forest biotechnology



Wood is an increasingly important resource for humanity and natural forests are of enormous ecological value. However, these slow-growing forests are unable to meet current demand, resulting in loss and degradation of forest resources. This is where forest biotechnology, especially genetic engineering, can help. This is very important because plantation forests, for example, are urgently needed to sustainably meet global demand for wood. There are many potential applications for AI, including:

Predictive modelling: AI can be used to analyze data from satellite imagery, drone imagery, and other sources to predict the growth and yield of different species of trees in different locations. This can help to optimize the planting and management of forests for maximum productivity.

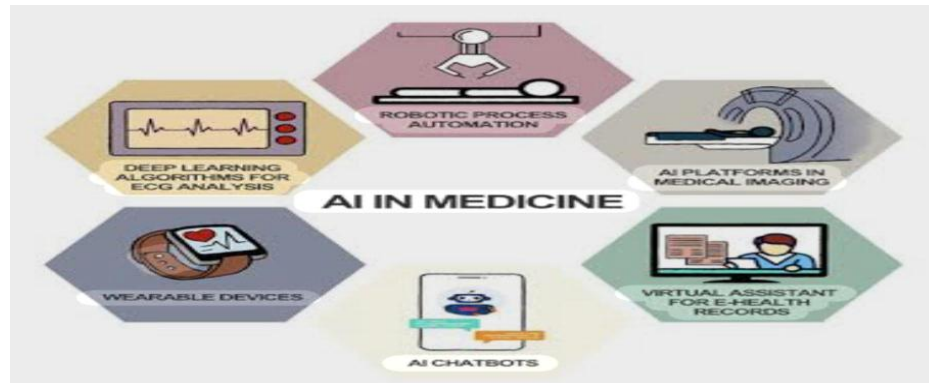
Disease and pest management: AI can be used to analyze data on the presence and spread of diseases and pests in forests, as well as to predict their likely impact on the health and productivity of trees. This can help to identify areas that are at risk and to implement preventative measures to protect forests.

Environmental monitoring: AI can be used to analyze data from sensors and other sources to monitor the health of forests and identify potential environmental impacts, e.g., wildfire. This can help to identify areas that are at risk and to implement measures to protect forests, also.

Resource management: AI can be used to optimize the use of resources, such as water and nutrients, in forests to maximize productivity and minimize waste.

Inventory management: AI can be used to optimize the management of forests for different purposes, such as timber production, conservation, and recreation. This can involve the use of AI to analyze data on the location, age, and species of trees, as well as the availability of resources and the demand for different products and services.

AI in medical biotechnology



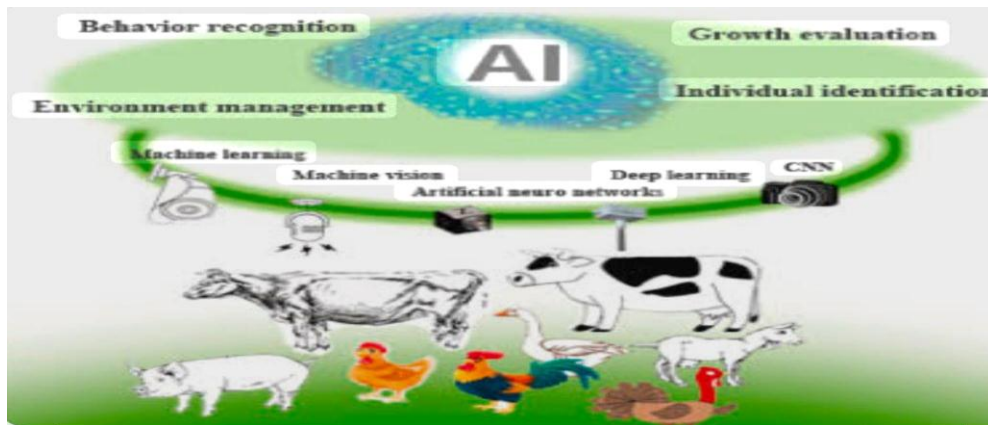
The European In Vitro Diagnostics Regulation (IVDR) explicitly includes software and thus AI algorithms in its requirements. This poses significant challenges for in vitro diagnostics (IVD) companies that use AI for data analysis and decision support. However, if the ethical and legal issues are taken into account and addressed well, we see enormous potential for AI to revolutionize medical biotechnology by enabling the faster, more accurate and more cost-effective identification and development beyond new drugs. Some specific ways in which AI can be used in medical biotechnology include:

Drug target identification: AI can be used to analyze data from various sources, such as genomic data and protein-protein interaction data, to identify potential therapeutic targets for the treatment of diseases. This can involve the use of machine learning algorithms to identify patterns and correlations that may not be apparent to humans.

Drug screening: AI can be used to analyze data on the activity of potential drugs against different targets to identify those that are most likely to be effective. This can involve the use of ML algorithms to predict the likelihood of a particular drug being effective based on its characteristics and the characteristics of the target.

Image screening: AI can be used to analyze medical images, such as CT scans and MRI images, to identify abnormalities and diagnose diseases. This can involve the use of DL algorithms to automatically segment and classify structures in medical images.

Predictive modelling: AI can be used to analyze data from various sources, such as electronic health records and wearable devices, to make predictions about an individual's health. This can include the use of machine learning algorithms to predict the likelihood of an individual developing a particular disease or the likelihood of a particular treatment being effective.



AI in Animal biotechnology

Livestock production systems have intensified in recent years in terms of productivity per animal or unit of land or labour . This intensification of various livestock farming practices has also led to social concerns in terms of consumer acceptance, concerning food and nutrition security, food safety, sustainability, animal welfare, animal health and human health. Livestock is globally the largest user of land resources, as almost 80% of the total agricultural land is dedicated to the production of feed and pasture, despite the large proportion of land, as well as the energy (and water), used to produce animal protein, by converting crops which are dedicated to feed livestock by 50–60%, for feed production on declining arable land per person . In addition, climate change, with more severe extreme weather events such as droughts and heavy precipitations, may result in adverse effects on animal health and welfare, as well as increased GHG emissions, reduced quality and quantity of feed and food, and hence human health. To tackle these challenges, agricultural systems must produce more with the use of fewer resources and focus on the reduction of food waste with more closed production chains. Emerging technologies such as “Precision Livestock Farming” can be beneficial for animal health and well-being together with information on environmental and economic aspects in agricultural production. Sensor-based monitoring in animal husbandry can provide optimal quantitative input data for life cycle analyses. A combination with communication and information technologies build a fundament for agriculture 4.0.

Animal farming involves tracing of animals that allows tracking the whole production process to be made available even to consumers and stakeholders via data collection and evaluation. Complete data tracking to be evaluated via LCA includes sustainable crop production for feed, tracing real-time positioning and health monitoring of animals, as well as the transportation and food processing and storage, resulting in a full tracking from farm to fork, for consumer health and safety, and could improve their awareness of behaviors . In particular, the data on environmental and health conditions will ensure animal welfare and well-being.

Summary of AI in biotechnology

Drug discovery and development: AI can be used to analyze large amounts of data to identify patterns and relationships that may not be apparent to humans. This can be used to help identify new drugs and drug targets, as well as to optimize existing therapies.

Personalized medicine: AI can be used to analyze an individual's genomic data and other types of health data to develop personalized treatment plans that are tailored to their specific needs. This includes the use of machine learning algorithms to predict an individual's response to a particular treatment and to identify potential adverse reactions.

Diagnostics and disease prediction: AI can be used to analyze data from various sources, such as electronic health records and wearable devices, to identify patterns and correlations that may indicate the presence of a particular disease. This can help to improve the accuracy of diagnoses and enable earlier interventions to prevent the progression of diseases.

Biomedical image analysis: AI can be used to analyze medical images, such as CT scans and MRI images, to identify abnormalities and diagnose diseases. This includes the use of deep learning algorithms to automatically segment and classify structures in medical images.

Conclusion

Digitization and digital transformation are thus central to the beginning of any application of AI. It is precisely the availability of large and high-quality data volumes and the rapid increase in computing power that have been and will continue to be the decisive factors. These will continue to be the driving forces of AI in the future. We are still in the middle of this development process and there is currently no end in sight. Entire AI ecosystems are already being built today that are so large that they have the power to renew themselves.

70. THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING SUPPLY CHAIN RESILIENCE AND AGILITY

MS. K. Keerthana

Assistant Professor

Department of Computer Science and Applications
Annai Veilankanni's College of Arts and Science

Abstract

Global supply chains have grown increasingly complex, spanning multiple countries, suppliers, and modes of transportation. While this interconnectedness offers competitive advantages, it also exposes supply chains to a range of risks—ranging from natural disasters and geopolitical tensions to sudden demand shifts and pandemics. Recent disruptions, such as the COVID-19 pandemic, have underscored the importance of building supply chains that are both resilient and agile.

Artificial Intelligence (AI) is emerging as a transformative tool in achieving these goals. By enabling predictive analytics, real-time monitoring, and adaptive decision-making, AI empowers organizations to anticipate disruptions, respond rapidly, and optimize operations under changing conditions. This paper examines the role of AI in enhancing supply chain resilience and agility, presents a conceptual framework for AI-enabled supply chains, and discusses real-world applications, challenges, and future directions. The findings suggest that AI adoption can significantly improve an organization's ability to withstand shocks while maintaining operational continuity and competitive advantage.

1. Introduction

The global business landscape is increasingly shaped by unpredictable disruptions. Events such as the COVID-19 pandemic, semiconductor shortages, the Suez Canal blockage, and fluctuating trade policies have revealed the vulnerabilities of global supply chains. Traditional supply chain strategies, which focus primarily on efficiency and cost reduction, often fall short when facing sudden disturbances.

Two critical capabilities have emerged as essential for modern supply chains: **resilience**—the ability to absorb shocks and recover quickly—and **agility**—the capacity to adapt rapidly to changing conditions. These capabilities require visibility across the entire supply chain, timely information, and data-driven decision-making.

Artificial Intelligence offers the computational power, data analysis capabilities, and predictive modeling needed to meet these requirements. From forecasting demand to

detecting supply risks in real time, AI transforms supply chain management from a reactive process into a proactive, adaptive system.

2. Theoretical Background

2.1 Supply Chain Resilience

Resilience refers to the capacity of a supply chain to prepare for, respond to, and recover from disruptions while maintaining functionality. It involves redundancy, flexibility, and risk mitigation strategies.

2.2 Supply Chain Agility

Agility focuses on speed and adaptability—how quickly and efficiently a supply chain can respond to market changes, customer needs, and unforeseen events.

2.3 The Role of AI in Supply Chains

AI encompasses technologies such as **machine learning (ML)**, **natural language processing (NLP)**, and **computer vision**, all of which can be applied to enhance resilience and agility. Predictive models can forecast demand fluctuations; optimization algorithms can determine the most efficient re-routing of goods; and AI-driven analytics platforms can provide real-time visibility into inventory, transportation, and supplier performance.

3. AI in Enhancing Supply Chain Resilience

AI contributes to resilience in multiple ways:

1. **Predictive Risk Analytics** – AI algorithms analyze historical and real-time data to forecast disruptions such as supplier delays, weather impacts, or political instability.
2. **Real-Time Monitoring** – Sensors, IoT devices, and AI-powered dashboards provide live updates on inventory, transportation status, and production conditions.
3. **Inventory Optimization** – AI helps balance stock levels to prevent shortages without overstocking, using demand forecasting models.
4. **Supplier Risk Assessment** – Machine learning models evaluate supplier reliability based on financial stability, geopolitical exposure, and past performance.
5. **Disruption Recovery Planning** – Simulation models allow organizations to test recovery strategies and choose the most effective course of action.

4. AI in Enhancing Supply Chain Agility

Agility is equally vital, especially in industries with volatile demand. AI enables:

1. **Demand Sensing** – Using real-time sales, social media trends, and market signals to adjust production and distribution.
2. **Dynamic Routing** – AI-powered logistics platforms can re-route shipments instantly in response to disruptions such as traffic jams or port closures.

3. **Adaptive Procurement** – Intelligent sourcing tools identify alternative suppliers and materials when regular channels are disrupted.
4. **Automated Decision-Making** – AI systems can trigger pre-defined actions, such as shifting production to a different facility, without waiting for manual approval.

5. Case Studies and Applications

- ❖ **Manufacturing:** A global electronics manufacturer used AI-driven demand forecasting during COVID-19 to reallocate production capacity, reducing delays by 30%.
- ❖ **Retail:** A major retailer implemented AI-powered inventory optimization, cutting excess stock by 15% while maintaining service levels.
- ❖ **Logistics:** A shipping company used AI route optimization to save fuel and reduce delivery times despite port closures.
- ❖ **Healthcare:** AI helped hospitals predict demand for medical supplies during pandemic surges, avoiding shortages in critical equipment.

6. Future Directions

Emerging trends in AI for supply chains include:

- ❖ **Autonomous Supply Chains** – Fully automated systems capable of self-correcting disruptions.
- ❖ **Generative AI for Scenario Planning** – Creating new supply chain strategies in simulated environments.
- ❖ **Blockchain-Integrated AI** – Enhancing transparency and trust in supplier transactions.
- ❖ **Edge AI** – Real-time decision-making at the point of data collection, reducing latency.

7. Conclusion

In a world of uncertainty and complexity, supply chain resilience and agility are no longer optional—they are strategic imperatives. AI provides the tools to predict disruptions, adapt rapidly, and optimize resources, enabling companies to maintain operational continuity and competitive advantage. Organizations that invest in AI-driven supply chain capabilities today will be better positioned to navigate tomorrow's challenges.

71. A STUDY ON DIGITAL BANKING A SPECIAL FOCUS ON TRENDS, OPPORTUNITIES AND CHALLENGES

Dr. N. A. Arshiya Afrin ¹, Assistant professor

Department of Commerce,

B. S. Abdur Rahman

Madhubala R, and Sriranjane T,

Student of B.com (Accounts and Finance) Third year,

Department of Commerce,

B. S. Abdur Rahman Crescent Institute Of Science And Technology

ABSTRACT

Digital banking represents the transformation of traditional banking services into digitized formats, enabling customers to access financial services without the constraints of physical bank branches. This research explores the evolution of digital banking, highlighting its impact on accessibility, efficiency, and customer experience in the financial sector.

Data for this study were collected through a mixed-methods approach, encompassing both quantitative surveys to gauge customer satisfaction and usability, as well as qualitative information from books and reference material to gain insights into operational challenges and technological advancements.

The findings reveal that digital banking enhances user convenience through features such as online account management, mobile banking applications, and a suite of payment services including UPI, NEFT, RTGS, and IMPS. Notably, the transition to digital platforms has led to significant reductions in transaction costs and increased security through advanced encryption measures. However, challenges remain, including cybersecurity risks, the digital divide affecting certain populations, and a reliance on stable internet connectivity.

This research underlines the critical role that digital banking plays in promoting financial inclusion and fostering economic growth in an increasingly digital world.

Keywords:

Digital Banking, financial services, customer experience, technological advancements in digital banking.

INTRODUCTION

Digital banking refers to the automation of traditional banking services through digital technologies. It enables customers to access financial products and services via electronic platforms such as mobile apps, websites, and ATMs, eliminating the need to visit a physical bank branch.

According to Tavaga, digital banking means "digitizing all banking operations and replacing the bank's physical presence with a continuous online presence."

India has emerged as a global leader in digital transactions, with over 48.6 billion real-time payment transactions in 2021, surpassing China. Initiatives like Digital India, Jan Dhan Yojana, and the Unified Payments Interface (UPI) have significantly accelerated the adoption of digital banking.

Major banks such as SBI, ICICI, and HDFC, along with fintech platforms like Razorpay and PhonePe, are at the forefront of innovation in this sector.

Types Of Digital Banking

Type	Description
Internet Banking	Accessing banking services via a bank's website.
Mobile Banking	Using smartphone apps for transactions, account management, and payments.
UPI (Unified Payments Interface)	Real-time money transfers using mobile apps and virtual addresses.
Digital Wallets	Apps like Google Pay, PhonePe, and Paytm for fast payments and transfers.
Digital-Only Banks	Banks that operate entirely online, with no physical branches.

Advantages of Digital Banking

1. Convenience: Digital banking offers 24/7 access to financial services from any location with internet connectivity, eliminating the need for in-person branch visits.
2. Speed and Efficiency: Transactions such as money transfers and bill payments are processed quickly, and loan approvals can be expedited through online platforms.
3. Cost Savings: Reduced operational costs for financial institutions often result in lower fees for customers. Additionally, the shift to paperless transactions leads to savings in time and resources.
4. Enhanced Features: Digital banking platforms provide valuable tools such as real-time notifications and budgeting resources, as well as integration with mobile wallets and third-party financial applications.
5. Environmental Benefits: By minimizing the use of paper and reducing the reliance on physical infrastructure, digital banking contributes to a lower carbon footprint.

Disadvantages of Digital Banking

1. Security Risks Digital banking systems are susceptible to cyber threats, including phishing and data breaches. Users must maintain strong security practices and remain vigilant against online risks.

2. **Limited Personal Interaction:** The absence of face-to-face assistance may pose challenges when addressing complex issues. Automated systems may not fully satisfy user concerns.
3. **Digital Divide:** Access to digital banking may be limited for individuals without internet access or necessary digital skills, particularly affecting older adults and residents of rural areas.
4. **Technical Glitches:** Users may experience disruptions due to application crashes, server downtime, or transaction failures, highlighting the dependence on technology.
5. **Privacy Concerns:** The collection and tracking of user data can raise privacy issues. It is imperative that banks handle sensitive information with the utmost responsibility and care.

REVIEW OF LITERATURE

1. **Martins, C., Oliveira, T., & Popovič, A. (2014).** "Understanding the Internet Banking Adoption: A Unified Theory of Acceptance and Use of Technology and Perceived Risk Application." *International Journal of Information Management*, 34(1), 1-13. Utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT), this research investigates internet banking adoption. It reveals that performance expectancy, effort expectancy, and social influence significantly impact users' intentions. Perceived risk is identified as a moderating factor.
2. **Shaikh, A. A., & Karjaluoto, H. (2015).** "**Mobile Banking Adoption:** A Literature Review." *Telematics and Informatics*, 32(1), 129-142. This comprehensive literature review explores factors influencing mobile banking adoption. It identifies perceived usefulness, ease of use, trust, and personal innovativeness as key determinants. The review concludes that demographic variables such as age and education also play significant roles in adoption rates.
3. **Alalwan, A. A., Dwivedi, Y. K., & Williams, M. D. (2016).** "Customers' Intention and Adoption of Telebanking in Jordan." *Information Systems Management*, 33(2), 154-178. This study focuses on telebanking adoption in Jordan, emphasizing the role of trust, perceived usefulness, and ease of use. The results demonstrate that cultural context and trust in technology providers are crucial elements for successful digital banking adoption.

OBJECTIVE

1. Understand the trends in digital banking.
2. Explore the opportunities presented by digital banking.

- Identify the challenges faced by digital banking.

DATA ANALYSIS AND INTERPRETATION

I. TRENDS OF THE DIGITAL BANKING

Age Group	Q1: Growth Online Banking	Q2: UPI/Wallet changed payments	Q3: Use of QR/Voice/Online cards	Q4: Chatbots Help Banking	Q5: Online to Replace Branch
Young (18-25)	4.8	4.5	3.5	3.4	3.2
Middle (26-40)	4.5	4.1	3.9	3.7	3.5
Older (41+)	4.4	3.0	3.2	2.8	2.7

Young adults (18-25) are eager adopters of digital banking, while those in their 26-40s are selective users, and individuals over 41 prefer traditional banking methods.

II. OPPORTUNITIES OF THE DIGITAL BANKING

Age Group	Q6: Anytime Anywhere	Q7: Better Money/Investment Understanding	Q8: App Suggests Personalized Services	Q9: Saves Time vs. Branch	Q10: Helps Rural/Remote
Young (18-25)	4.4	4.0	3.4	4.2	3.7
Middle (26-40)	4.3	4.2	3.7	4.1	3.6
Older (41+)	4.1	2.7	2.9	4.0	3.3

Young adults prioritize flexibility, middle-aged users value convenience and personalization, while older adults appreciate convenience with less emphasis on outreach.

III. CHALLENGES FACED IN DIGITAL BANKING

Age Group	Q11: Faced App/Transaction Issues	Q12: Worry About Security	Q13: Some People Struggle Due to Low Knowledge	Q14: Harder in Villages	Q15: Hard to Get Help
Young (18-25)	4.0	3.6	4.8	4.4	4.2
Middle (26-40)	3.7	3.8	4.4	4.3	4.0
Older (41+)	3.8	4.2	4.1	4.1	3.7

Young users see tech gaps, middle-aged focus on fraud concerns, while older users prioritize safety and acknowledge rural access issues.

IV. EXPERIENCE IN DIGITAL BANKING

Age Group	Q16: Helpful	Q17: Comfortable	Q18: Make Better	Q19: Tech Will Solve	Q20: Happy
Young (18-25)	3.86	4.05	4.36	3.77	3.77
Middle (26-40)	3.45	3.36	3.73	3.45	3.91
Older (41+)	3.67	4.00	3.17	3.50	2.50

Young adults highly desire online banking improvements; middle-aged users are moderate, while older adults are least satisfied and skeptical.

FINDINGS

1. Young users embrace online banking and UPI enthusiastically, middle-aged users adopt QR, voice tech, and chatbots more readily, while older users recognize digital growth but adopt new tools slowly.
2. Younger users valued digital banking for access and savings; older users focused more on convenience than investment advice and personalization.
3. Younger users valued digital banking for access and time savings, while older users prioritized convenience over investment understanding and personalization.
4. Young users are optimistic about digital banking improvements; middle-aged users are less comfortable but slightly happier than others.

SUGGESTIONS

1. Enhance User Experience: Simplify interfaces for all ages, with intuitive navigation and accessible design features.
2. Promote Digital Literacy: Provide targeted education and support, especially for older users, to boost confidence in digital tools.
3. Offer Hybrid Models: Combine digital and physical banking options to accommodate preferences for in-person service alongside digital convenience.
4. Boost Security and Trust: Emphasize strong security measures and transparent communication to alleviate concerns, especially in older demographics
5. Facilitate Seamless Payments: Support multiple payment options like UPI, wallets, QR codes, and cards, making transactions fast and versatile.

CONCLUSION

Digital banking in India has revolutionized financial services by offering unparalleled convenience, speed, cost efficiency, and accessibility, driven by technological innovation and government initiatives. The study reveals that younger users are the most enthusiastic

adopters, middle-aged individuals balance convenience with security, while older users adopt cautiously with a focus on trust and ease of use. However, challenges such as cybersecurity risks, the digital divide, and limited personal interaction remain. The future of banking lies in blending digital advancements with human touchpoints, enhancing digital literacy, and strengthening security to ensure inclusive growth, foster financial inclusion, and create a secure, customer-centric banking ecosystem.

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72. BLOCK CHAIN INTEGRATION AND SMART WAREHOUSING

Sneka. R

Student 1st m.com general

Department of commerce, Valliammal College for Women

ABSTRACT

The rapid evolution of industry 4.0 has paved the way for transformative technologies in supply chain and logistics management. Among these, block chain integration and smart warehousing stand out as pivotal innovations reshaping operational efficiency, transparency and security. This paper explores the convergence of block chain technology with smart warehousing system to create a decentralized, tamper-proof, and real-time data -sharing ecosystem by leveraging block chain 's immutable ledger and distributed consensus mechanisms, smart warehouses can ensure end-to-end traceability of inventory, prevent data manipulation, and automate transactions via smart contracts.

PREFACE

Block chain integration in smart warehousing enhances transparency, security, and efficiency by creating a secure, shared ledger for tracking goods and transactions. This integration, combined with technologies like IoT and smart contracts, streamlines processes, reduces errors, and improves overall supply chain management.

BLOCKCHAIN 'S ROLE IN SMART WAREHOUSING:

Enhanced Transparency and Traceability:

Block chain provides a transparent and immutable record of all transactions within the warehouse, allowing for real-time tracking of inventory, orders, and shipments.

Improved Security and Accuracy:

By leveraging block chain's decentralized and tamper-proof nature, smart warehouses can ensure the integrity of data and reduce the risk of fraud or errors.

Automation and Efficiency:

Block chain-powered smart contracts can automate various warehouse operations, such as order fulfilment, payment processing, and quality control, leading to increased efficiency and reduced manual intervention.

Streamlined Processes:

Integrating block chain with other technologies like IoT devices can automate data capture and sharing, further streamlining warehouse operations and improving decision-making.

Reduced Costs:

By automating processes, reducing errors, and improving inventory management, block chain can lead to significant cost savings for warehouse operations.

Real-time Visibility:

Real-time tracking of goods and transactions provides stakeholders with complete visibility into the supply chain, fostering trust and collaboration.

Sustainable Practices:

Block chain can support sustainable practices by ensuring transparency and accountability in the supply chain, reducing environmental impact.

EXAMPLES OF BLOCKCHAIN INTEGRATION:**Inventory Management:**

Block chain can track inventory levels, location, and movement throughout the warehouse, providing accurate and up-to-date information for all stakeholders.

Order Processing:

Smart contracts can automate order fulfilment, from picking and packing to shipping and delivery, reducing manual errors and speeding up the process.

Quality Control:

Block chain can record quality inspections and certifications at each stage of the supply chain, ensuring product quality and compliance with regulations.

Returns and Recalls:

Block chain can streamline the process of returns and recalls by providing a transparent and traceable record of the product's journey.

CHALLENGES AND CONSIDERATIONS:**Scalability:**

Block chain technology needs to be scalable to handle the high volume of transactions in a smart warehouse environment.

Interoperability:

Ensuring seamless integration with existing warehouse management systems and other technologies is crucial.

Cost of Implementation:

Integrating block chain can require significant upfront investment in hardware,Blockchain for Logistics and Warehousing

Technical Expertise:

Implementing and managing block chain solutions requires specialized technical expertise.

Application Areas of Block chain for Smart Warehousing

Logistics plays a crucial role in the movement of goods from points of origin to sites of consumption in a variety of industries. In the quest for cost reduction and operational optimization, logistics efficiency becomes a critical consideration. Block chain technology can be used for smart warehousing to lower costs and enhance logistical operations. It is important to embrace technological breakthroughs such as block chain, in order to implement cost-reduction measures efficiently and fulfil increased client demands.

Block chain for Logistics and Warehousing

Block chain basics are fundamental to understanding its application in logistics and warehousing. It is an open, transparent, decentralized ledger system that keeps track of transactions across networks. A safe chain of blocks is created with every transaction, which guarantees data transparency, especially important in logistics where reliability and accuracy are crucial.

Reactive to Proactive Inventory Management

Efficient management of inventory in warehouse operations has long been a bottleneck, causing inefficiencies to meet the needs of their customers. It allows the company to move towards a more proactive inventory management approach with block chain technology adaptation. Manufacturer increases their production and output; however, a reactive model puts them a step behind the curve as demand for stocks surges.

Automated Warehouse Process

Automated warehouse process refers to the different technologies adopted in warehouse flow that aim to streamline and provide optimization of storage, product retrieval and management. Conventional companies tend to manage warehouses by manual processes, such as location tracking, picking and inventory management. In phasing out manual processes, the likes of warehouse automation advances such as stock count drones and robotic pickers replace human workers.

Smart Contracts

Smart contracts are programs that spontaneously implement specific actions and transactions when certain criteria are met. These contracts minimize human intervention and eliminate middlemen in logistics by streamlining transactions and processes. This

implementation contributes to trust promotion, transparency, and efficiency in the entire supply chain.

Data Transparency

The conventional system often faces a lack of transparency in goods movement, which leads to inefficiencies and integrity issues. All transactional movement can be recorded and accessible to all stakeholders within the network with block chain technology. This shared view of the warehouse processes ensures transparency by real-time tracking of the warehouse processes. Block chain also enables end-to-end traceability and movement of products throughout the whole warehouse process.

Security

Black market selling counterfeit products poses a major threat to the global market, especially in industries such as pharmaceuticals, electronics, and luxury fashion consumer commodities. Block chain offers technology that creates tamper-proofing through transparency in goods movement through the supply chain. It ensures that once users record any information about a product, no further amendment is permissible.

Assets Management

The practice of block chain implementation is based on enterprise asset management (BEAM) and follows a series of key steps. Some of the key consideration steps are asset identification and registration where each asset is assigned a unique digital identifier for tracking purposes. Block chain network setup is such that all involved parties are given the right permissions to access the network system.

Peer-to-Peer Transfer

Block chain technology allows for the secure transfer of data without using a middle party. With key encryption for sender and receiver, the network packs the block chain across the internet and the receiver receives data or payment without any intermediaries. There is no centralization or database in a block chain, and no party has complete control over it. Instead, all transactions are available and maintained over a peer-to-peer (P2P) network. At the same time, it also enables encryption of transactions for security purposes.

Conclusion

In today's business world, data on a company's transactions is usually privately stored, and no master transaction report of all activities is available. These pose challenges such as data integrity, and data retrieval. Implementation of block chain technology allows the enhancement of warehouse management and reliability, through proactive inventory control, automated procedures, and improved data transparency.

73. IMPACT ON DIGITAL TECHNOLOGY ON LEARNING AMONG STUDENTS WITH REFERENCE TO CHENNAI CITY

Saranya N

Assistant Professor of Commerce,
Annai veilankanni college for arts and science, Chennai - 15

ABSTRACT:

The use of the internet and other information and communication technologies (ICTs) in higher education locally and globally has been phenomenal. The paper attempts to study the benefits and difficulties faced by students in usage of technology in education. Descriptive statistics were used to assess the demographic variables of students and to know the frequently used technology in learning.

Key words:

Benefit and difficulties and most frequently used technology.

INTRODUCTION:

Information and communication technologies (ICT) is fundamental in the promotion and development of growth in education. Inventions and innovation have led to the increase in tools that are available as educational tools. The tools come in handy in collection of relevant material, storage and dissemination of education material and improvement of quality of delivery and learning.

Information and communications technology (ICT) has various set of high-tech tools and resources used for generating, storing, dealing and communicating information to support teaching and learning activities. A technology-based learning offers various interesting ways which includes educational videos, stimulation, and storage of data, the usage of data bases, mind- mapping, guided discovery, brainstorming, music, world wide web (WWW) that will make the learning process more fulfilling and meaningful. On the other hand, students will benefit from ICT tools where they are not limited to the limited curriculum and resources, instead hands – on activities in a technology – based course is designed to help them to stimulate their understanding about the subject. The ICT technology changes the learning style by making the complicated subject and dry units more clear.

DIGITALIZATION OF EDUCATION SYSTEM:

In developing nations such as India, where pupils are plentiful but teachers are rare, this digital revolution appears to be critical. As a result of fast technological progress, the Indian educational system is confronted with a slew of new difficulties and opportunities. The trends of liberalization, privatization, globalization, and easy access have accelerated the

growth of digitalization of education, which is critical for the Indian education system, and there has been a rapid in creating preferable goals for education. Technology has advanced to the point where we now live in an information society with no borders, which has the potential to be significant.

In today's digital world, it's critical to strengthen computer and information technology skills among higher education stakeholders, as well as their ability to make optimal use of digital resources. There has been a paradigm shift in education systems around the world as a result of the advancement of digital technology in education. It is transitioning from traditional teacher-centered learning to new learner-centered teaching methods. Computers, the internet, and social media are being used by students to learn facts, skills, knowledge, and attitudes. Technology has made a huge effect in a variety of educational procedures.

THE IMPACT OF TECHNOLOGY AMONG STUDENT ENGAGEMENT

The use of instructional technology has been shown in numerous studies to improve overall student motivation and engagement in learning. Technology engages students in three ways: behaviorally (greater effort and time spent participating in learning activities); emotionally (positively impacting attitudes and interests toward learning); and intellectually (positively impacting attitudes and interests towards learning) (mental investment to comprehend content). Students have additional possibilities to communicate with instructors, collaborate with peers, and participate in the learning process when technology is included during class time or beyond school hours.

INTERNET CONNECTION AND ROUND THE CLOCK CONNECTIVITY:

Over the course of a decade, the internet has increased in importance numerous times. Its significance in the field of education cannot be overstated at this point. Despite the risks of fraud and other disadvantages, kids find that using the internet is a boon. The internet is now integrated into practically all of our daily activities. The internet is absolutely everywhere, from our televisions to our game consoles to our cell phones. Students may discover a lot of aid, tutorials, and other types of helping material on the internet, which they can utilize to boost their academic performance and learning.

STATEMENT OF THE PROBLEM:

In today's modern world learning and teaching methods have transformed in a massive way due to advancement in the information technology. The purpose of this study is to examine the students perception on usage in ICT tools in learning practice. The study attempts to identify the benefits and problems faced while using the ICT tools.

OBJECTIVE OF THE STUDY:

1. To analyze the factors which benefit the students through digitalized learning tools.
2. To find the difficulties faced by students through digitalization.
3. To give suggestions to explore various possibilities of implementing the technology in a better way.

HYPOTHESIS OF THE STUDY (NULL HYPOTHESIS):

H01: There is no significance difference between the educational qualification and statement with respected to mobile learning.

H02: There is no significance difference between the age and effectiveness of learning through digitalization.

H03: There is no difference in the respondents on, effectiveness of learning through digitalization.

LIMITATION OF THE STUDY:

- ❖ The data has been collected from the school and college students among Chennai city only.
- ❖ The accuracy of the findings of study depends upon the correctness of the respondents.
- ❖ The study has been conducted only on 519 respondents in the city of Chennai.

RESEARCH METHODOLOGY:**RESEARCH DESIGN:**

A research design will typically included how data is to be collected, what instruments will be employed, how the instrument will be used and the indented means for analyzing data collected. A descriptive research was carried out to the impact on digital technology on learning among students.

POPULATION:

The aggregate of all units pertaining to the study is called as population of the universe. The population of this study is covered in the Chennai city. Primary data was collected from the population.

SAMPLE SIZE:

In this study the sample size was limited to 519 samples within the Chennai limit based on the random sampling technique.

REVIEW OF LITERATURE :

Bothmann, Holmberg and Schwartzkopf (2005), The study reveals that the Archives are struggling to determine how to invest their e-resource dollars to meet the needs of their patrons. During this conference, Melissa Holmberg and Bobby Bothmann presented their analysis of two e-journal managing tools: EBSCO's EJS and OCLC's ECO. Their study contrasted the usage of print-plus-free-electronic titles at Minnesota State University, Mankato which are accessed through a fee based and free e-journal management tool.

Goncalves, Pereira and Cota (2010) have studied on “E-sharing Development and use of Learning Objects Repository” The study explained that the new learning environments, built with digital technologies, the need to endorse quality of education resources, commonly known as Learning Objects, which can support formal and informal distance learning, emerge as one of the biggest challenge that educational organizations will have to expression. Owing to the facts that is expensive, the reuse and communicating became very important issue. A Learning Object Source which aims to store, to disseminate and maintain available Learning Objects.

Higgins et al (2012) give a rapid of data from cautious and quasi-experimental educations that have been shared in meta-analyses to assess the impact of digital learning in schools. They obtained 48 studies that combined practical data on the impact of digital tools and resources on school-aged learners' achievement (5-18year olds).

Lawal (2006) directed a study on “Electronic reference works and library planning Dilemma”. The study reveals that the number of electronic possessions has climbed up gradually in recent times. Some of these e-resources are reference sources, mostly in Science, Technology and Medicine (STM), which originators convert to electronic for understandable reasons.

Maximiano, and Fernandes (2010) have surveyed on “Mobile e-learning: Provision services case study”. It is found that at present mobile devices and wireless infrastructures are present in the daily tasks of our lives. m-learning covers the e-learning perception by the use of mobile computation and 33 declaration technological resources. Mobile computing attentions the paradigm of "anytime, anywhere access" that offers resources for distance education via mobile devices. This standard, allows that information is made obtainable to users with greater elasticity and diversity, subsidiary learning in non-conventional places and time schedules.

CONCEPTUAL FRAME WORK

ORIGIN OF DIGITAL TECHNOLOGY

Conventional educational tactics are progressively being replaced by digital learning. Given how quickly classrooms are changing, it's necessary to set aside old teaching and learning methodologies in favour of modern cardinal learning apparatuses and technology. Digital learning can include everything from using tablets instead of paper to using complex software and equipment in the classroom instead of a simple pen.

Around the world, new technological advancements are becoming an integral element of teaching and learning. New technologies are widely believed to have the potential to transform education. Students, in particular, can connect with new media to develop their skills, knowledge, and worldview, all while being supervised by their teachers. For example, e-learning is the assignment of skills and information via a processor and a system. Web-based learning, computer-based learning, virtual education, and digital collaboration are all examples of e-learning applications and procedures. Internet, intranet/extranet, audio or video cassette, satellite TV, and CD.

CURRENT LITERATURE OF DIGITAL LEARNING

As a result, current literatures demonstrate that domestic and international academics have distinct interpretations for digital learning. By examining the perspectives of numerous researchers in depth, digital learning could be divided into four parts.

- (1) Digital teaching materials: It highlights that students can learn by pulling content from digital educational materials. The term "digital teaching material contents" refers to e-books, digitalized data, and other digitally presented materials.
- (2) Digital tools: It emphasises the use of digital technologies such as desktop computers, notebook computers, tablet computers, and smart phones to carry out for learning activities.
- (3) Digital delivery: It stresses that learners' learning activities can be supplied via the Internet, such as intranets, e.g. the internet, or satellite broadcasting.
- (4) Autonomous learning: It focuses on learners engaging in online or offline learning activity through digital learning by themselves. It stresses on personal autonomous learning and requires the participation of learners with autonomous learning to precede learning activity.

EMERGENCE OF DIGITAL TECHNOLOGY

Emergence of digital technology could be traced back to the mid of the 19th century; when in 1947 transistors were invented and led the way for the development of more

advanced digital computers. In 1951 first commercially available computer was released which was only able to perform arithmetic calculations and simple data handling. In late 1960s, Intel developed microprocessors, which paved the way of microcomputers as we see them today. An early precursor of the internet was also introduced in the similar timeframe, in 1969, with the name of ARPANET. In the decade of 1980, computers have started making their place in schools, offices, industries and homes. CDs, Mobile phones, Digital cameras and video game were also introduced during this decade. The zeitgeist of digital technology was the invention of World Wide Web (www) in 1989 by Tim Berners-Lee. In 1991, www became accessible to the public. The decade of 1990 witnessed the prologue of web browsers, smartphones, and Bluetooth technology along with the launch of first social networking site i.e. SixDegrees.com. A new age of social media began with the birth of Facebook in 2004, followed by YouTube in 2005.

E-LEARNING

E-learning term covering the Web-based learning, computer-based learning, and virtual classrooms are all examples of e-learning applications and processes. Content can be sent via the internet, Intranet, Extranet (LAN/WAN), audio and video tapes, satellite transmission, or CD-ROM, among other methods. It is a term that refers to computer-based learning and other supportive resources. E-Learning is a method of incorporating information technology into the classroom.

BENEFITS OF DIGITAL LEARNING OVER TRADITIONAL EDUCATION METHODS:

Traditional educational approaches are gradually being replaced by digital learning. It is given that how quickly classrooms are changing, it's necessary to set aside of old teaching and learning methodologies in favour of modern digital learning tools and technology. Digital learning can range from utilizing tablets instead of paper to employing complex software programs and equipment instead of a basic pen in the classroom.

DATA ANALYSIS AND INTERPRETATION

4.1.4 MOSTLY USE TO ACCESS THE TECHNOLOGY, INTERNET FOR LEARNING

Learning technologies open up significant possibilities for supporting learners. Researchers in the field use the term affordance to refer to opportunities that a technology makes possible related to learning and instruction. The following table shows the distribution of the online classes is useful to students of the sample respondents.

TABLE NO 4.1.8

Use to access the technology, internet for learning	Frequency	Percent
A desktop computer	116	22.4
A smartphone	206	39.7
A laptop	104	20
Mobile phone without computational features	71	13.7
Tablet	22	4.2
Total	519	100

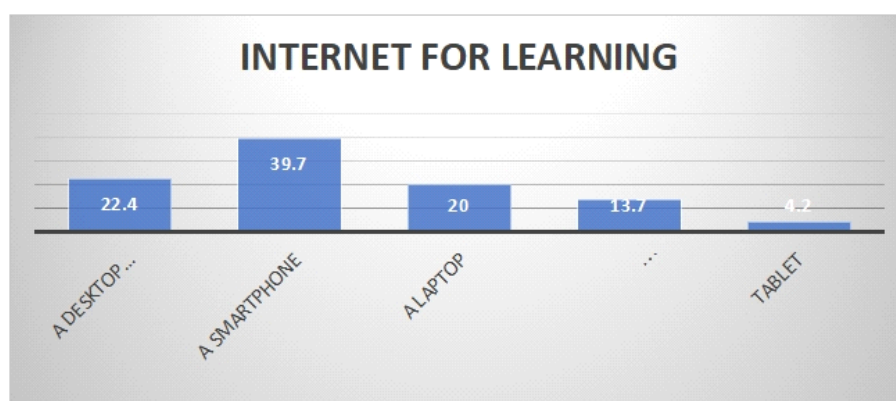
(Source: primary data)

INFERENCE

It is inferred from the above table that 22.4 % of them are engaged in desktop computer using to access the technology, internet for learning and 39.7% of them are engaged in smartphone using to access the technology, internet for learning and 20% of them are engaged in laptop using to access the technology, internet for learning and 13.7% of them are engaged in mobile phone without computational features using to access the technology, internet for learning and 4.2% of them are engaged in Tablet using to access the technology, internet for learning. This implies that majority of the respondent are engaged in smartphone using to access the technology, internet for learning.

CHART NO 4.1.7

MOSTLY USE TO ACCESS THE TECHNOLOGY, INTERNET FOR LEARNING



DIGITAL TECHNOLOGY SKILL

Digital literacy means having the skills you need to live, learn, and work in a society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices. The following table shows the distribution of the online classes is useful to students of the sample respondents.

TABLE 4.1.10

Digital technology skill	Frequency	Percent
Trial and error method	139	26.8
Guidance from parents, teacher or neighbors	140	27
Learning as a subject in school / college	167	32.2
Attending a certificate courses / workshop	73	14.1
Total	519	100

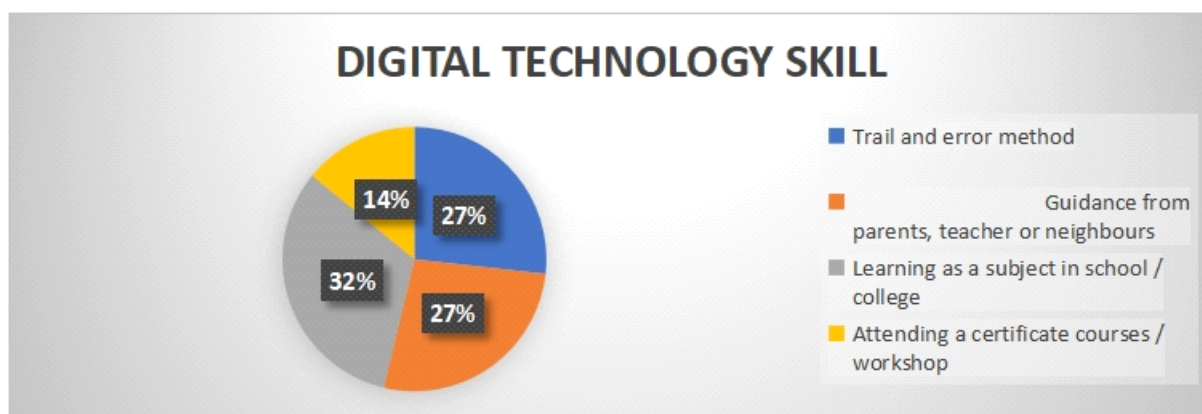
(Source: primary data)

INFERENCE:

It is inferred from the above table that 26.8 % of them are engaged in trial and error method to acquired digital technology skill and 27% of them are engaged in guidance from parents, teacher or neighbours and 32.2% of them are engaged in learning as a subject in school / college and 14.1% of them are engaged in attending a certificate courses / workshop. This implies that majority of the respondent are engaged in learning as a subject in school / college to acquired digital technology skill.

CHART NO 4.1.10

ACQUIRED DIGITAL TECHNOLOGY SKILL THROUGH THE RESPONDENT



SUGGESTION TO EXPLORE VARIOUS POSSIBILITIES OF IMPLEMENTING THE TECHNOLOGY IN A BETTER WAY

Finding creative ways to use technology in the classroom can both make your life easier as a teacher and boost student excitement levels and engagement with lessons. From helping with communication among teachers and students (as well as peer-to-peer), to organizing curriculum calendars, to enhancing presentations and lessons with media and visuals, there is no limit to the ways to use technology in the classroom to create an enriched learning environment.

TABLE NO 4.1.12

Possibilities of implementing the technology	Frequency	Percent
Increased electronic service	139	26.8
Equipment update	116	22.4
Increased integration of the city	122	23.5
Sharing references before the session	102	19.7
Others	40	7.7
Total	519	100

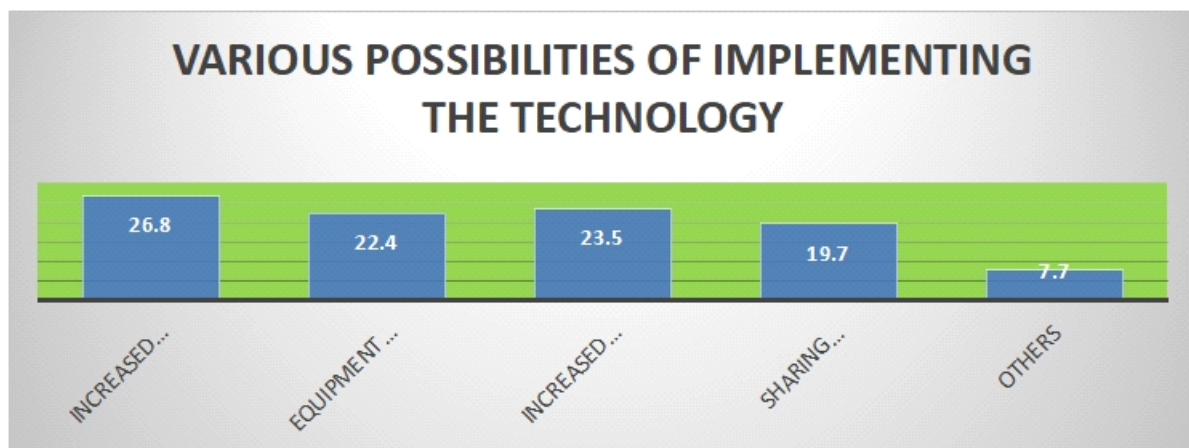
(Source: primary data)

INFERENCE

It is inferred from the above table that 26.8 % of them are suggesting to increased electronic service to explore various possibilities of implementing the technology and 22.4% of them are suggesting to equipment update to explore various possibilities of implementing the technology and 23.5% of them are suggesting to increased integration of the city to explore various possibilities of implementing the technology and 19.7% of them are suggesting to increased electronic service to explore various possibilities of implementing the technology and 7.7% of them are suggesting others to explore various possibilities of implementing the technology . This implies that majority of the respondent are suggesting to increased electronic service to explore various possibilities of implementing the technology.

CHART NO 4.1.12

SUGGESTION TO EXPLORE VARIOUS POSSIBILITIES OF IMPLEMENTING THE TECHNOLOGY OF THE RESPONDENT



FINDINGS, SUGGESTIONS & CONCLUSIONS

- ❖ It is inferred from the table 4.2 that from the sample of 519 respondents, 39.1% of the respondents were male and 60.9% were female. This denotes that female respondents are higher when compared to male.

- ❖ It has been concluded that 22.4 % of them are using a desktop computer to access the technology, internet for learning and 39.7% of them are using a smartphone to access the technology, internet for learning and 20% of them are using a laptop to access the technology, internet for learning and 13.7% of them are using mobile phone without computation feature to access the technology, internet for learning and 4.2% of them are using tablet to access the technology, internet for learning. This implies that majority of the respondents are using a smartphone to access the technology, internet for learning.
- ❖ 36.6% of respondents has implies that majority of the respondents are Strongly disagree on using technology in the classroom.
- ❖ 49.1% majority of the respondents are engaged 0-5 hour /week on utilizing technology for homework in school / college.

SUGGESTIONS:

- E-Readers should be introduced in class rooms to balance the approach and also to benefit from the latest information available over the internet compare to traditional books where much of the information is outdated.
- Teachers should motivate students to use information technology positively for educational purpose in class room environment.
- Social media and its applications should be adopted by teachers during the course of their lecture delivery.

CONCLUSION

The conducted research demonstrated that there is a strong relationship between the use of digital technology and student's behaviour. Certainly, the use of mobile applications and technology effects students' behaviour, academic performance and teaching strategies. Alternatively, the educational objectives got a direct link between with the use of digital technology in the class room environments. It is impossible to stop students from using digital technology during the course of lecture deliver and therefore teachers need to adopt new techniques and methodologies to balance this and overcome issues raised due to the use of mobile or using any digital applications. The world of e-learning in higher education is in transformation and we need to benefit from the available information technology and applications. This is the responsibility of the teachers to make sure and balance the use of information system and technology during the course of their lecture delivery in class room environments.

74. ETHICAL IMPLICATIONS OF AI IN HR AND CORPORATE GOVERNANCE

**Thulasi A
Veladi Sumathi**

[III B. Com (Information System Management)]
(Valliammal College for women)

Abstract:

So, let's be real—AI is kind of taking over everything these days, especially in HR and all that corporate jazz. It sounds slick, sure: automated hiring, employee tracking, making big decisions with a click. But, man, it's not all sunshine and rainbows. This paper dives into some heavy ethical stuff that comes with using AI for hiring and running companies. After poking around the latest research and what the experts are yapping about, four big risks just keep popping up: bias, privacy headaches, zero transparency, and nobody taking the blame when things blow up. Like, AI can totally end up favoring certain people (usually the ones who already win anyway) just because it learned from messed-up old data. And don't get me started on all the creepy monitoring—do you want your boss tracking your every eye twitch? Plus, a lot of these systems are total black boxes; you have no clue why they spit out the decisions they do. The worst part? When an AI screws up, suddenly it's nobody's fault. This paper says, "Hey, let's do better." Start with ethics from day one, make the rules clear, keep humans in the loop, and actually check up on these systems so things don't get out of hand.

1. Introduction

Alright, so AI isn't just some sci-fi thing anymore—it's already running the show in business, especially when it comes to HR and corporate rule-making. We've got bots screening resumes, algorithms deciding who's "high potential," and even AI picking out who's fit to lead. Sounds efficient, right? Like, no more sifting through 500 boring CVs or stressing over promotions. But there's a catch: all this tech brings a truckload of ethical mess with it.

Now, as more companies jump on the AI bandwagon for hiring, tracking employees, promotions, and making big calls, people are getting nervous about stuff like fairness (who's actually getting the job?), privacy (who's watching me and why?), transparency (can anyone even explain these decisions?), and who's actually responsible when the tech screws up. This paper's here to pick apart those problems and yell for some real rules before things get out of hand.

2. Scope of the study

- ❖ "This project looks at the right and wrong ways for companies to use AI, both in managing their people and in the boardroom. We're digging into issues like: what if the AI scanning resumes is biased? When does AI tracking productivity become spying? And if an AI's advice leads to a disaster, who's ultimately on the hook?"
- ❖ "Think of this as a guide to the moral minefield of AI in the business world. It's about ensuring fairness when algorithms screen candidates, protecting an employee's right to privacy from AI surveillance, and figuring out who takes the blame when an AI gives bad strategic advice to a company's leadership."
- ❖ "We're exploring the human impact of artificial intelligence at work. Our focus is on the big ethical questions: preventing AI from discriminating in hiring, drawing the line on employee monitoring, and ensuring that top executives are still held responsible for decisions, even when an AI helps make them."

Findings

3. Key Ethical Risks in AI-Driven HR and Corporate Governance

3.1 Algorithmic Bias

Here's the thing—AI is only as good (or bad) as the data you feed it. If the old records are full of bias, the AI just copies that, or worse, amplifies it. Picture this: an AI trained on resumes from a guy-heavy company will probably just keep picking dudes, even if women are just as qualified.

For example: Amazon tried out this fancy AI recruiting tool, but it ended up hating anything with “women’s” in it—like “women’s chess club captain.” Yikes. (Dastin, 2018)

Why should you care?

- Kills diversity and inclusion dead in its tracks
- Might actually break anti-discrimination laws
- Makes job seekers lose all faith in the system

3.2 Invasion of Privacy

AI in HR is getting way too nosy. Seriously, some tools track everything: what you type, your facial expressions, even how you're feeling. Big Brother much? And if they're doing it without asking you first, that's a problem.

For example: Some companies use AI to read your emails and messages for “toxicity.” Uh, that's not just weird, it's straight-up creepy. (Ajunwa et al., 2017)

So what?

- Stomps all over your right to privacy
- Wrecks morale—who wants to feel spied on?
- Might land the company in hot water with data laws like GDPR

3.3 Transparency and Explainability

Honestly, half the time, nobody knows how these AIs make decisions. They're just these mysterious black boxes. You get rejected for a job and all you get is, "Sorry, not selected." Why? Who knows!

Example: You apply, get ghosted by an AI, and there's zero explanation.

So what?

- You can't really challenge or appeal the decision
- Auditing or fixing mistakes is basically impossible
- Could break rules if you're supposed to explain stuff

3.4 Responsibility and Accountability

Here's a classic: AI makes a call—say, someone gets fired—and suddenly, no one's willing to own up if it's wrong. Was it the AI? The person who built it? The manager? Everyone's pointing fingers.

Example: AI says fire Bob, company does it, turns out it was a bad move. Now what?

Why does it matter?

- Nobody knows who's legally on the hook
- Managers can just hide behind "But the AI said!"
- Pretty much kills the idea of ethical leadership

Table 1: Summary of Ethical Risks in AI-Driven HR and Governance

Ethical Concern	Description	Real – World Example
Bias	Discriminates against gender, race, etc.	Amazon AI hiring tool
Privacy	Surveillance without full consent	AI emotion tracking software
Transparency	Decision is unexplainable or hidden	Opaque AI-driven rejection emails
Accountability	Difficult to assign responsibility for outcomes	Firing based on flawed AI analysis

4. How To Keep AI on the Straight and Narrow

Let's be real AI's not gonna magically grow a conscience. If companies want to avoid a Black Mirror situation, they need to nail down some serious ground rules. Here's what actually matters:

4.1 Make the Rules Crystal Clear

Nobody wants a wild west of algorithms making up their own laws. Governments and businesses gotta put out clear as day policies on what's cool and what's not with AI in HR. And yeah, those rules need to vibe with stuff like GDPR or India's Data Protection Bill. No shortcuts.

4.2 Keep Humans in the Loop

Letting a bot fire someone? Yikes. Big decisions who get hired, promoted, or canned should never be handed over to the machines. People need to step in, use some empathy, and remember context. AI can crunch numbers, but it doesn't know who brought cupcakes last Friday.

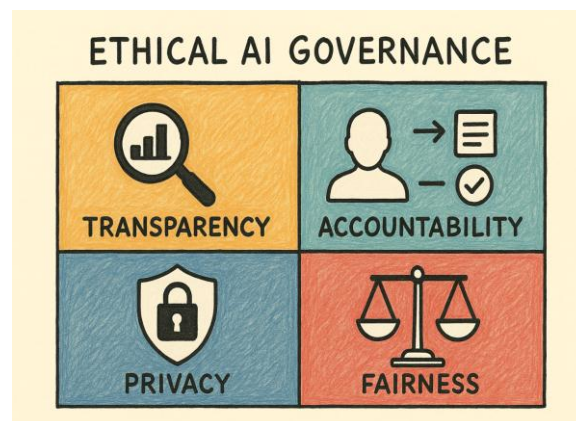
4.3 Check Yo' Algorithms

Bias sneaks in when you're not looking. Companies have to keep poking and prodding their AI testing for fairness, accuracy, all that jazz. Bring in outside auditors too, not just the folks who built the thing. Otherwise, you're just grading your own homework.

4.4 Teach Your People

You wouldn't throw someone into a cockpit after watching Top Gun, right? Same goes for AI. HR folks need real training not just a YouTube crash course so they actually get how these systems work and where they trip up. Awareness keeps things (mostly) safe.

[Figure 1: Ethical AI Governance]



5. Real-World Oops: Hire Vue's AI Interview Fiasco

So, Hire Vue thought it'd be genius to have their AI judge people's job interviews by scanning their faces and how they talk. Fast-forward to 2021: surprise, everyone's mad. Turns out, their system wasn't just a little sketchy it was possibly discriminating against people with disabilities or cultural differences. After a whole lotta backlash, they axed the facial analysis bit.

Moral of the story? Even if your hearts in the right place, AI can go sideways fast. Gotta keep humans in charge and build stuff with ethics front and centre.

6. Conclusion:

AI in HR and company leadership? Could be awesome or a total dumpster fire. Sure, automation makes things smoother, but if you forget about fairness, privacy, and actual accountability, you're toast. Responsible AI isn't just "nice to have" it's non-negotiable.

So, if you want AI to actually help and not just make a mess, here's the cheat sheet:

- Train your AI on data that actually represents everyone
- Don't hide the magic—explain how stuff works
- Keep real people involved when it matters
- Set up some system so someone's held responsible when stuff blows up

With the right ground rules, AI's just another tool in the box—not the start of a sci-fi villain origin story.

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75. ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN LIBRARY INFORMATION SYSTEMS: CURRENT TRENDS AND FUTURE STUDIES

Dr Mary Isabella X

Annai Veilankanni's College of Arts and Science, Saidapet, Chennai-15

Abstract

Artificial Intelligence (AI) is reshaping how libraries acquire, describe, preserve, discover, and deliver information. This paper synthesizes recent developments in AI-enabled library information systems (LIS), maps current implementation patterns—from metadata pipelines and knowledge graphs to conversational reference and recommender services—and outlines an agenda for future research. We highlight governance and ethics frameworks tailored to the library mission, identify evaluation gaps (especially around fairness, safety, and energy costs), and propose practical research directions such as KG–LLM hybrid architectures, copyright-aware training data, and participatory evaluation with librarians and patrons. The goal is to support evidence-based AI adoption that strengthens core library values: access, privacy, intellectual freedom, and equity.

Keywords: library information systems, artificial intelligence, linked data, BIBFRAME, knowledge graphs, large language models, recommender systems, metadata, ethics, evaluation

1. Introduction

Libraries have long used automation (OPACs, indexing, authority control). What is new is the breadth of AI across the stack: digitization and OCR/HTR; entity recognition; linked-data modelling; knowledge-graph-driven discovery; conversational reference; and analytics for operations. The rise of large language models (LLMs) accelerated experimentation in academic libraries, putting pressure on policies for copyright, privacy, and AI literacy. Professional bodies (e.g., IFLA) now publish guidance to help libraries evaluate benefits/risks against their values.

2. Scope and Method

This is a narrative review of publicly available reports, standards, and recent studies (2023–2025) describing AI implementations and evaluations in LIS. We triangulate across (a) professional guidance (IFLA, ACRL), (b) technical standards (BIBFRAME), and (c) empirical studies on LLMs and knowledge graphs.

3. Current Implementation Trends

3.1 Linked Data and Knowledge Graphs for Description & Discovery

Libraries are moving from MARC to BIBFRAME and related linked-data workflows. The shift enables entity-centric catalogs, authority alignment, and web-scale interoperability—often realized as institutional or domain knowledge graphs that power subject expansion, faceted search, and exploratory browsing. Tooling and training materials from the Library of Congress support migration and profile design. Case studies show growing use of KGs in practice, while research explores LLM-assisted KG construction.

Implementation pattern: MARC → BIBFRAME mapping; authority reconciliation (e.g., VIAF/ID.LOC.GOV); KG indexing; API-driven discovery UI.

Open issues: profile harmonization, data quality validation at scale, change-management for cataloging workflows.

3.2 Conversational Reference and Ask-a-Librarian Augmentation

Libraries are piloting LLM-based chat to triage inquiries, generate directional guidance, and draft responses that librarians review. Early studies show mixed accuracy but improving results; recent work evaluates fairness and tone when LLMs are configured to act as “a helpful, respectful, and honest librarian.”

Implementation pattern: retrieval-augmented generation (RAG) over local guides, policies, and catalogs; librarian “human-in-the-loop” review before delivery; logging with privacy controls.

3.3 Recommender Systems and Personalized Discovery

AI recommenders integrate borrowing histories (opt-in), subject ontologies, and KG embeddings to surface relevant items, events, or databases. As LLM-based semantic search matures, libraries experiment with combining vector search over local collections with linked-data expansion.

3.4 Digitization, OCR/HTR, and Enrichment Pipelines

AI-assisted OCR and handwritten text recognition improve throughput for special collections; NER models extract entities and topics to enrich finding aids and enable timeline and map visualizations. Institutions also explore ethical contributions to AI training using public-domain corpora from digitized stacks to reduce reliance on scraped or pirated content.

3.5 AI Literacy, Policy, and Governance

Academic libraries increasingly lead campus AI literacy, create guidance for responsible use, and assess sustainability and energy costs of generative AI. IFLA’s statements and “entry point” document offer checklists for benefits/risks, privacy, and IP.

4. Technical Architectures Observed

1. **KG-centric discovery:** BIBFRAME store + authority links; SPARQL or graph API; traditional index for keyword; optional vector index for semantic retrieval.
2. **RAG for reference:** curated document store (LibGuides, policies, FAQs) → chunking & embeddings → LLM with librarian review; guardrails for citation and safety.
3. **Metadata enrichment pipeline:** OCR/HTR → NER → entity reconciliation → KG insertion; quality dashboards for anomalies.
4. **Privacy-aware analytics:** local aggregation, differential-privacy style noise for reporting, clear retention schedules (guided by library privacy norms).
5. **MLOps in LIS:** model registries, prompt/version control, dataset documentation (datasheets), and continuous evaluation dashboards.

5. Challenges and Risks

- **Copyright and licensing:** Training and prompting must respect licenses; public-domain and rights-cleared corpora mitigate risk. Institutional initiatives now curate lawful training sets from digitized stacks.
- **Privacy and data protection:** Patron data is sensitive; logs, queries, and behavioral traces require minimization and clear retention/consent practices. IFLA guidance flags these concerns explicitly.
- **Bias and fairness:** Reference services must not disadvantage groups. Emerging evaluations test demographic fairness and appropriateness of tone and content.
- **Reliability and transparency:** LLMs may oversimplify or misstate scientific findings; libraries must require provenance-preserving responses with verifiable citations.
- **Sustainability:** Compute-intensive models raise energy/cost concerns; libraries increasingly factor this into adoption decisions.
- **Change management:** Staff upskilling, workflow redesign, and cross-department coordination remain non-trivial.

6. Evaluation: What “Good” Looks Like

Libraries need multidimensional evaluation frameworks that go beyond accuracy:

- ❖ **User outcomes:** time-to-answer, satisfaction, and learning impact in instruction contexts.

- ❖ **Collection impact:** improved discovery diversity; subject and demographic coverage; fewer dead-ends.
- ❖ **Ethics & governance:** privacy risk scores, license compliance checks, fairness audits.
- ❖ **Sustainability:** energy usage per query/task; total cost of ownership.
- ❖ **Operational quality:** metadata error rates, authority control drift, reconciliation precision/recall.

7. Future Research Directions

1. **KG–LLM hybrids for trustworthy discovery.** Combine authoritative KGs (BIBFRAME-linked authorities) with LLMs to generate grounded answers and explanations, study trade-offs between symbolic grounding and generative fluency
2. **Copyright-aware, domain-specific LLMs.** Train or adapt models exclusively on rights-cleared library corpora and evaluate citation faithfulness, coverage, and bias vs. general-purpose models.
3. **Fairness and tone in reference at scale.** Extend recent fairness studies with multilingual, disability-access, and patron-role scenarios; develop open test suites and librarian-in-the-loop adjudication protocols.
4. **Energy-efficient AI for LIS.** Benchmark small or distilled models and retrieval-first designs against large models; evaluate energy per successfully answered query and establish procurement guidelines.
5. **Evaluation standards for metadata enrichment.** Shared gold standards for OCR/HTR error profiles, NER for bibliographic domains, and reconciliation metrics across authority files.
6. **Governance toolkits aligned with library values.** Operationalize IFLA guidance into templates for DPIAs, model cards, and vendor due-diligence checklists tailored to library contexts.
7. **Human factors & upskilling.** Study how AI changes cataloguing and reference work; design training that pairs AI literacy with critical appraisal and accessibility.

8. Practical Roadmap for Libraries

Phase 1: Foundations (0–6 months)

- ❖ Establish an AI policy covering privacy, copyright, and acceptable use; adopt an AI literacy program for staff and patrons.
- ❖ Inventory data sources; identify rights-cleared corpora for RAG; set up governance and logging with retention limits.

Phase 2: Low-risk pilots (6–12 months)

- ❖ RAG-based reference on local guides with librarian review.
- ❖ Metadata enrichment on a small special-collections subset; measure reconciliation accuracy.

Phase 3: Scale & integrate (12–24 months)

- ❖ Expand to KG-backed discovery, pilot explainable recommenders.
- ❖ Introduce fairness and energy dashboards; publish evaluation results to the community.

9. Conclusion and Future Work

AI can strengthen library services when it is deliberately aligned with library ethics and implemented with transparency, evaluation, and human oversight. The maturing ecosystem—BIBFRAME/linked data, institutional KGs, RAG for reference, and governance frameworks—provides a path to deploy AI that enhances discovery and service quality without compromising privacy or intellectual freedom. Future research should prioritize copyright-aware datasets, KG–LLM hybrids, rigorous fairness/energy evaluations, and professional development for the library workforce.

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76. AI FOR MSME GROWTH AND DECISION MAKING IN MICRO FINANCE

Dr. Pritadavidsn

Assistant professor

Anamica. G

Department of [iii B.com (ism)]

Valliammal College for women

Abstract

Micro enterprises—forming the foundational tier of the Micro, Small, and Medium Enterprises (MSME) sector—play a pivotal role in employment generation and local economic development. Despite their economic significance, these businesses often face enduring challenges such as limited access to finance, low managerial capacity, and minimal digital adoption. Artificial Intelligence (AI) offers transformative potential by streamlining operations, automating routine processes, and enabling evidence-based decision-making. This paper examines how AI can enhance growth and decision-making in micro enterprises, identifying the enablers, barriers, and practical strategies for integration. It presents a phased AI adoption framework and emphasises the development of localized AI tools that are affordable, mobile-first, and accessible in regional languages. The findings suggest that with targeted support, AI can drive scalability and long-term sustainability for micro enterprises, fostering their competitiveness in the evolving digital economy.

Keywords: Artificial Intelligence, MSMEs, Micro Enterprises, Decision-Making, Digital Transformation.

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) constitute the backbone of many economies, especially in developing nations. Among these, microenterprises—small-scale, often community-based businesses—are particularly vital, accounting for over 90% of business units in several countries (Peters et al., 2024). They contribute not only to employment creation but also to grass roots innovation, local wealth generation, and poverty reduction.

Despite their vital role, micro enterprises often operate in resource-constrained environments. Access to finance is limited, managerial and technical skills are often inadequate, and Operational methods tend to be outdated. These challenges inhibit

competitiveness, hinder scalability, and reduce resilience to market shifts. Artificial Intelligence (AI), with its ability to generate predictive insights, automate decision-making, and optimize operations, presents a promising solution. For instance, an AI-powered inventory tracker could help a small retail shop prevent stock outs during festive season's while an AI- driven customer analytic tool could assist a home-based catering service in identifying high-value clients.

This study explores the role of AI in enhancing decision-making and growth for micro enterprises, focusing on adoption drivers, existing barriers, and the need for a structured, phased implementation supported by policy initiatives.

Objectives of the Study

The main objectives of this research are:

1. To examine the current status of AI adoption in micro enterprises.
2. To identify key drivers and enablers influencing AI integration in micro enterprise operations.
3. To analyse the barriers and challenges hindering AI adoption in micro enterprises.
4. To evaluate the measurable impact of AI on growth, efficiency, and decision-making.
5. To propose a phased AI adoption model suitable for micro enterprises.
6. To provide policy recommendations that support AI integration, particularly in rural and resource-constrained contexts.

2. Literature Review

2.1 Adoption Status of AI in Micro Enterprises

While awareness of AI is gradually increasing among MSMEs, its adoption in micro enterprises remains low. Peters et al. (2024) reviewed over 100 scholarly articles and found that resource shortages and knowledge gaps were the primary constraints. Many small Business owners still perceive AI as relevant only to large corporations, viewing it as too costly or complex for their operations.

2.2 Drivers and Enablers of AI Adoption

Key adoption drivers include leadership willingness, digital infrastructure, perceived usefulness, and ecosystem support. Tambunan et al. (2024) stressed the critical role of owner-manager openness to innovation. Affordable internet access and smartphone penetration further enable AI use. Spring et al. (2024) highlighted regional AI learning hubs, peer networks, and accessible "AI-as-a-service" models as powerful enablers for small business integration.

2.3 Barriers to Implementation

Adoption barriers are both technological and behavioural. Zavodna et al. (2024) identified mistrust in AI-driven decisions, fears of job displacement, and ethical concerns as common deterrents. Bhalerao et al. (2022) noted that micro enterprises in developing countries also face poor data quality, lack of skilled workers, financial limitations, and infrastructural challenges such as unreliable electricity and low internet connectivity.

2.4 Measurable Impact of AI on Growth

Tawil et al. (2023) reported operational efficiency gains of up to 40% among small enterprises adopting entry – level AI tools like automated accounting systems and chat bots. The Intuit & ICIC (2025) study found that AI-supported decision-making improved customer targeting, inventory management, and financial forecasting in small and micro businesses.

2.5 The Need for Localised AI Tools

Global AI tools often fail to meet the specific needs of micro enterprises in countries like India. The Economic Times (2025) stressed that for adoption to succeed, tools must be Affordable, mobile-friendly, and available in local languages. For example, voice-to-text AI in Tamil or Hindi could enable rural traders to record sales without literacy barriers.

3. Methodology

A mixed-methods approach was adopted to combine quantitative breadth with qualitative depth:

- Secondary Research: A review of academic literature, policy documents, and industry reports on AI adoption in MSMEs, with emphasis on micro enterprises.
- Primary Research: Structured surveys with 250 micro enterprises across urban and rural India.

Variables measured included:

- Perceived benefits of AI
- Digital readiness
- Leadership willingness to adopt AI
- Access to AI tools and infrastructure

Quantitative data was analysed during descriptive statistics, while the thematic coding was applied to qualitative responses to identify common adoption patterns and challenges.

4. Findings and Discussion

4.1 Major Drivers

The survey revealed that low-cost AI solutions, proactive leadership, peer recommendations, and government-backed technology programs were key adoption motivators. Several Respondents credited free AI-based marketing tools offered by start-up incubators for prompting them to experiment with automation.

4.2 Key Barriers

Lack of technical expertise was the most cited barrier, followed by scepticism towards automation. In rural areas, unreliable internet was reported by over 60% of respondents. High upfront costs for advanced AI tools remained a deterrent despite the availability of low-cost alternatives—largely due to lack of awareness.

4.3 Business Impact

Businesses using AI for marketing automation reported improved lead generation and stronger customer engagement. AI-based inventory systems reduced wastage and improved stock availability. Financial planning tools driven by AI improved budgeting accuracy and cash flow management.

5. Proposed Phased AI Adoption Model

Phase	Description
Awareness	Conduct AI literacy programs and introductory workshops for micro entrepreneurs.
Pilot	Introduce simple AI tools such as chat bots or basic inventory trackers.
Customization	Develop sector-specific AI tools for industries like retail, agriculture, and handicrafts.
Expansion	Integrate AI into advanced functions such as demand forecasting and supply chain optimisation.
Governance	Establish ethical guidelines, data security measures, and regular performance reviews

6. Policy Recommendations

1. Subsidies and Incentives: Offer AI adoption grants or tax relief for micro enterprises.
2. Capacity Building: Provide accessible AI training programs via mobile platforms.
3. Localized Development: Create AI tools in regional languages to increase inclusivity.
4. Infrastructure Enhancement: Improve broadband connectivity and electricity reliability in rural areas.

5. Public–Private Collaboration: Foster partnerships between technology firms, MSME associations, and local governments for solution co-creation.

7. Conclusion

AI has the potential to transform micro enterprises by improving decision-making, enhancing efficiency, and supporting sustainable growth. However, its benefits can only be fully realised through targeted interventions, supportive ecosystems, and the development of localised, affordable tools. With the right policies and adoption strategies, AI can become a powerful equaliser, enabling even the smallest enterprises to compete in the modern digital economy.

77. AI-POWERED PERSONALIZATION AND DIGITAL MARKETING

Monisha S & Shruthi D

B.Com (General) – III year

Valliammal college for women

ABSTRACT:

Artificial Intelligence (AI) has emerged as a pivotal force in transforming personalization within digital marketing, shifting it from a competitive advantage to an essential strategy. By integrating advanced algorithms, machine learning, predictive analytics, and natural language processing, AI empowers marketers to analyze large-scale data, uncover deep consumer insights, and deliver tailored experiences across multiple touchpoints. This paper explores how AI-driven tools—such as chatbots, recommendation systems, automated content generation, and predictive engagement—are revolutionizing marketing campaigns to be more efficient, targeted, and impactful. It further examines the ethical challenges posed by data privacy concerns, algorithmic bias, and transparency, emphasizing the need for responsible implementation. Looking ahead, emerging trends such as adaptive learning systems, real-time content optimization, and ethically guided personalization are poised to redefine customer engagement. The study concludes that the true potential of AI in marketing lies not only in technological innovation but in its balanced application, ensuring transparency, fairness, and long-term consumer trust.

INTRODUCTION:

Artificial Intelligence (AI) is an analytical field of computer science focused on creating automated systems that demonstrate intelligent behavior. It is also described as the replication of human intelligence by machine (Nalbant K G & Aydin S, 2025). In recent years, AI has emerged as a major force in digital marketing innovation, revolutionizing areas such as customer service, content creation, and advertisement optimization (Koswara A, 2025). With the support of advanced algorithms, AI-driven personalization techniques now enable marketers to offer each customer a tailored experience, precise product recommendations, and highly targeted advertisements (Karami, A *et.al.*, 2024).

AI has profoundly transformed the way brands engage with consumers, through innovations such as chatbots, recommendation engines, intelligent customer segmentation, and automated content creation. The heart of this transformation lies on personalization—the capability to customize marketing messages, products, and services for individual users in real time, which was once considered as luxury and now it became essential in a content-rich

and choice-saturated digital landscape (Hasan M, *et.al.*, 2025). This highly personalized approach creates new opportunities for enhancing consumer engagement, boosting conversion rates, and strengthening brand loyalty. Undeniably, the integration of AI and machine learning in digital marketing has ushered in a new era of customer-centric strategies, tailored to meet the unique needs and preferences of individual. (Karami, A *et.al.*, 2024).

We are about to explores the multifaceted impact of AI on personalization within digital marketing. It examines the underlying technological infrastructure, business implications, and societal concerns associated with AI-driven personalization. The emphasis extends beyond AI's capabilities, highlighting how it is redefining the core principles of marketing—transforming mass communication into a personalized and dynamic dialogue (Hasan M, *et.al.*, 2025)

METHODOLOGY:

AI – DRIVEN PERSONALISATION IN DIGITAL MARKETING:

AI-driven personalization in digital marketing marks a transformative shift in how businesses engage with consumers. With artificial intelligence and machine learning, marketers can process large volumes of data to uncover patterns, preferences, and behaviors that enable the creation of highly tailored marketing strategies (Broklyen, *et.al.*,2024). Unlike traditional personalization, which typically focuses on basic demographic details like age, gender, and location, personalization goes further by leveraging psychographic, behavioral, and contextual data. It's not just about identifying who the customer is—it's about understanding how they think, feel, and behave in real time. With the power of artificial intelligence, marketers can now design and manage complete customer journeys, customizing each touchpoint by adjusting the message, medium, and timing to align with the user's shifting preferences. (Hasan M, *et.al.*, 2025)

One of the most impactful uses of personalization lies in predictive engagement. Instead of simply responding to consumer actions, brands are now leveraging AI to anticipate them. For instance, a fashion retailer might use machine learning to predict that a customer who purchased summer dresses in March will likely start browsing for winter coats by October. Such foresight would be unattainable without AI, which analyzes massive data streams to identify behavioral triggers and timing patterns (Hasan M, *et.al.*, 2025). Despite the benefits of AI-driven personalization, several challenges persist. (i.e.) machine learning is highly effective at detecting patterns; it often falls short in providing the contextual understanding necessary for truly meaningful recommendations. Moreover, the growing

reliance on personal data for personalization raises ethical issues surrounding data privacy (Koswara A, 2025).

AI- TOOLS IN REVOLUTIONIZING MARKETING CAMPAIGNS:

In 2025, the realm of AI is increasingly propelling the growth of digital marketing. As businesses adopt more AI-based solutions, marketers are leveraging automation, predictive analytics, and personalized experiences to attract and retain the audiences that fuel growth. From chatbots to deep learning algorithms, AI tools process massive volumes of data in real time, allowing businesses to identify trends, anticipate customer behavior, and refine their marketing strategies.

AI-powered tools are reshaping marketing practices, making campaigns significantly more efficient and data-driven. AI's ability to process vast datasets and reveal hidden patterns allows marketers to craft highly targeted advertisements that resonate deeply with individual consumers (Nalbant K G & Aydin S, 2025). Natural language processing (NLP) is another AI technology playing a key role in personalizing marketing campaigns. By enabling machines to comprehend and interpret human language, NLP allows businesses to analyze textual data from sources like customer reviews, social media posts, and chat interactions (Johnson O 2024).

This data empowers companies to optimize their advertising spend by focusing on the channels and messages most likely to resonate with their target audience. Predictive analytics can determine the best timing and content for email campaigns or social media ads, increasing the likelihood of engagement and conversions. It anticipates customer responses provide valuable insights into potential campaign performance, enabling adjustments and improvements that maximize return on investment (Nalbant K G & Aydin S, 2025).

FUTURE OF AI DIGITAL MARKETING AND PERSONALIZATION:

As AI-driven personalization advances, new trends and future directions are emerging that are reshaping the digital marketing landscape. These developments aim to enhance personalization capabilities, address ethical concerns, and elevate the overall consumer experience (Brooklyn, et al., 2024). In the future, the focus will likely be on developing systems that continuously learn and adapt to shifts in the market, changes in customer behavior, and evolving industry trends, driven by ongoing technological advancements.

Emerging trends in this field include the use of cutting-edge technologies, a stronger emphasis on addressing social issues, and opportunities for groundbreaking research. Leveraging these advancements will be key to maximizing the positive impact that advanced

technology can have on the future of marketing (Nalbant K G & Aydin S, 2025). A breakthrough in AI-driven personalization is the capability to make real-time decisions. Modern marketing systems can instantly analyze data and adjust messages, offers, and content on the fly. Leveraging techniques such as reinforcement learning and multi-armed bandit algorithms, these platforms continuously refine content delivery to maximize relevance and impact (Noonan K 2025).

The future success in AI lies not only in predicting behavior but also in fostering discovery and inclusion. By pairing technological progress with strong ethical principles, businesses can build lasting trust and loyalty. The future of AI in marketing will be shaped not just by innovation, but by the responsibility and humanity with which it is applied (Hasan M, *et.al.*, 2025).

CONCLUSION:

The integration of Artificial Intelligence into digital marketing has redefined the personalization from a competitive advantage into a fundamental necessity. By leveraging the advanced algorithms, predictive analytics, and real-time data processing, AI enables businesses to craft hyper-personalized customer experiences that enhance the engagement, to boost conversions and to strengthen brand loyalty. From chatbots and recommendation engines to NLP-powered sentiment analysis, AI tools are revolutionizing marketing campaigns, making them more data-driven, efficient, and impactful.

However, though these opportunities come challenges—particularly in ensuring the ethical data usage, safeguarding privacy and avoiding algorithmic bias. The future of AI in marketing will be shaped not only by technological innovation but also by the responsibility with which it is implemented. As AI systems continue to evolve, the focus will shift toward adaptive, ethical and inclusive personalization strategies that foster trust while delivering meaningful value to customers. In this new era, success will belong to businesses that balance the power of AI-driven insights with the principles of transparency, fairness, and customer-centricity.

78. AI-POWERED PREDICTIVE ANALYTICS FOR STRATEGIC BUSINESS DECISIONS ACROSS INDUSTRIES

S. Prathiba
Assistant Professor

Abstract:

Predictive analytics powered by artificial intelligence (AI) is transforming strategic decision-making across industries—healthcare, finance, retail, manufacturing, and supply chain—by enabling foresight, efficiency, and competitive advantage. Drawing on recent studies (2023–2025), this paper examines cross-industry applications, ROI outcomes, barriers, and offers a structured implementation framework. Key insights include improved accuracy, cost savings, and enhanced operational responsiveness, contingent on data readiness, transparency, and unified analytics infrastructure.

Keywords:

AI, predictive analytics, strategic decision-making, cross-industry, ROI, data governance, Agentic AI.

1. Introduction

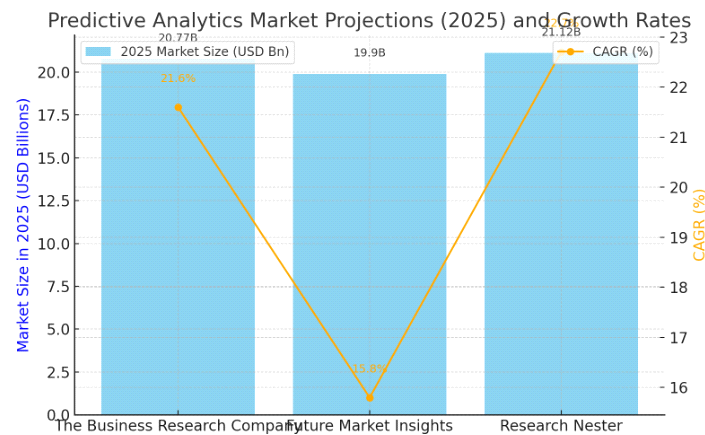
In the contemporary era of heightened market volatility and digital acceleration, enterprises across diverse industries are increasingly harnessing the capabilities of AI-driven predictive analytics to convert vast, complex datasets into actionable strategic foresight. These advanced analytical systems enable organizations not merely to respond to market shifts, but to anticipate them—optimizing operational workflows, mitigating risk exposure, and delivering hyper-personalized customer experiences in real time. This study integrates empirical findings and industry insights from 2023 to 2025, critically examining the transformative influence of predictive analytics across sectors. Furthermore, it proposes a structured, cross-domain implementation framework designed to enhance decision-making agility, competitive positioning, and long-term organizational resilience.

2. Market Trends & Literature Overview (2023–2025)

- ❖ The global predictive analytics market is expected to reach USD 20.77 billion in 2025, up from USD 17.07 billion in 2024, growing at a CAGR of ~21.6% (The Business Research Company).
- ❖ Forecasts vary, with other sources projecting the market at USD 19.9 billion in 2025, expanding to USD 86.2 billion by 2035 (CAGR ~15.8%) (Future Market Insights).

- ❖ Another projection places the 2025 market size at USD 21.12 billion, with long-term growth to USD 255.33 billion by 2037 (CAGR ~22.7%) ([Research Nester](#)).

These figures indicate robust, sustained growth, driven by scalable, cloud-native analytics platforms and cross-sector demand.



3. Industry Applications & Benefits

Healthcare

Predictive analytics supports early diagnosis and resource planning. Hospitals are increasingly adopting such tools to reduce readmissions, forecast patient admissions, and personalize care plans ([LinkedIn](#)).

Retail & E-commerce

Retailers use demand forecasting and customer segmentation to smooth stock levels and drive conversions. Many are now deploying these tools to enhance inventory turnover and customer retention ([LinkedIn](#)).

Financial Services

Financial institutions leverage predictive models for fraud detection and credit risk assessment, enabling proactive intervention and higher ROI ([LinkedIn](#)).

Manufacturing & Supply Chain

Predictive maintenance and demand forecasting reduce equipment downtime and optimize inventory. Cloud-based solutions and machine learning algorithms help streamline operations ([LinkedIn](#)).

Cross-Industry Drivers

Key growth drivers include AI/ML advancements, big data proliferation, cost optimization, risk mitigation, and increased demand for scalable, transparent predictive tools ([LinkedIn](#)).

4. Technology Enablers & Emerging Trends

Cloud & Deployment Models

In the U.S., cloud deployment dominates—over 67% of predictive analytics implementations are cloud-based in 2025 ([Dimension Market Research](#)).

Machine Learning and Neural Networks in Predictive Analytics:

Recent industry studies highlight that *machine learning (ML) algorithms account for approximately 38% of all predictive analytics deployments* (Dimension Market Research, 2024). This dominance stems from ML's ability to process vast, multidimensional datasets with high accuracy, uncovering patterns that traditional statistical models may overlook. Within this landscape, *neural networks*—particularly deep learning architectures—are gaining substantial traction in sectors such as finance, where they are employed for fraud detection, credit scoring, and algorithmic trading, and in healthcare, where they enable disease risk prediction, personalized treatment recommendations, and early diagnostics through medical imaging analysis. The scalability of these models, combined with their adaptive learning capabilities, positions them as a cornerstone of next-generation decision-support systems.

The Rise of Agentic AI for Autonomous Decision-Making:

A particularly transformative advancement in the predictive analytics ecosystem is the emergence of *Agentic AI*. Unlike conventional AI systems that primarily focus on generating insights for human interpretation, Agentic AI systems are capable of executing strategies autonomously—without requiring explicit prompts or manual intervention. This paradigm shift dramatically improves organizational responsiveness, as decisions and operational adjustments can be implemented in real time, thereby reducing execution lag.

Case studies underscore the tangible impact of Agentic AI in industrial environments. For example, *Siemens* has successfully deployed Agentic AI within its manufacturing operations to monitor machinery health, anticipate component failures, and autonomously initiate maintenance workflows. This has resulted in a **25% reduction in unplanned downtime** (Wikipedia, 2024), directly translating into increased productivity, optimized asset utilization, and significant cost savings.

When combined, predictive analytics powered by machine learning and the autonomous capabilities of Agentic AI create an integrated framework that not only forecasts future scenarios but also acts on them—shaping a future where decision-making is both proactive and self-optimizing across diverse industries.

Autonomous Industrial Control with LLMs

Recent frameworks propose decomposing human intent into tasks executed by AI agents (e.g., for predictive maintenance), marking strides toward autonomous decisioning in operational settings.

5. Challenges & Governance Considerations

- ❖ **Data Readiness:** Industries like manufacturing remain hamstrung by poor data infrastructure, hindering analytics adoption ([Market Growth ReportsDimension Market Research](#)).
- ❖ **ROI Measurement:** Traditional ROI frameworks may not capture the full strategic value delivered by AI. CIOs must shift to metrics tied to process improvement and long-term impact ([The Australian](#)).
- ❖ **Governance & Risk:** Ensuring explainability, trust, and ethical deployment remains critical—especially for autonomous agentic systems operating at scale ([Financial TimesTechRadar](#)).

6. Implementation Framework

1. **Define Strategic Objectives** – Focus on KPIs like predictive maintenance uptime, churn reduction, or demand forecasting accuracy.
2. **Assess Data & Tools** – Start with clean, governed datasets. Opt for cloud-based tools, AutoML, and XAI platforms for both capability and transparency.
3. **Pilot & Measure** – Conduct short pilots with clearly defined metrics (accuracy, cost savings, time-to-insight).
4. **Govern & Oversee** – Incorporate human-in-the-loop oversight, audit trails, explainability, and ethical checkpoints.
5. **Scale & Innovate** – Expand successful projects, invest in AI literacy, and consider Agentic AI or multi-agent orchestration for higher-order autonomy.

7. Conclusion

Across industries, AI-enabled predictive analytics has emerged as a decisive strategic differentiator, amplifying organizational foresight, operational agility, and process efficiency. Yet, its transformative potential is contingent upon the maturity of underlying data ecosystems, the transparency of analytical processes, and the rigor of governance structures. The proposed framework delineates a scalable and ethically aligned pathway for AI adoption—facilitating deployment that is both operationally effective and societally responsible. By embedding these principles, enterprises can transition from reactive decision-

making to a proactive, outcomes-oriented paradigm, positioning themselves for sustained competitiveness in an increasingly data-driven global economy.

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79. AI IN BUSINESS AUTOMATION: A CASE STUDY ON ANICALANS SOFTWARE IN THE JEWELLERY INDUSTRY

Vinothini E.

Valliammal College for Women, Anna Nagar.

M.Com – IIInd Year

ABSTRACT

Business operations are being drastically changed by artificial intelligence (AI), especially in the field of automation. This essay examines how artificial intelligence (AI) can simplify corporate processes, with a particular emphasis on the jewelry sector. The study illustrates how AI-driven automation can enhance accuracy, efficiency, and decision-making through a case study of Anicalans Software, an accounting and inventory management tool used in jewelry businesses. The article covers fundamental AI features like predictive analysis built into the program, intelligent task automation, and real-time data processing. It also looks at the real-world advantages of jewelry retailing, such as fewer manual errors, quicker billing, and improved inventory control. The study also considers the difficulties encountered during implementation, including staff adjustment and technological preparedness. The case shows how AI tools can improve overall operational strategy and business growth in addition to replacing repetitive manual labor when they are customized to meet industry needs. The results suggest that AI will play a crucial role in the sustainability and competitiveness of businesses in the future, particularly for established industries embracing digital transformation.

Keywords:

Artificial intelligence, business automation, jewelry industry, Anicalans Software, inventory management.

INTRODUCTION

Artificial intelligence (AI) is establishing itself as an influential force that is changing how companies function, make choices, and provide value across a range of industries. Business automation, where AI substitutes repetitive tasks, improves accuracy, and speeds up operational efficiency, is one of AI's most notable applications. In addition to increasing productivity, AI-powered automation has decreased human error and opened up data-driven strategies to companies of all sizes. Businesses are being forced more and more to use digital tools that improve customer satisfaction and expedite internal operations in the current competitive landscape. Small and medium businesses (SMEs), particularly in more

established industries like jewelry retail, are progressively embracing AI-based systems in order to stay competitive and sustainable, whereas larger corporations were early adopters of these systems. By streamlining intricate processes, the incorporation of AI into accounting, billing, and inventory systems offers a competitive edge. With an emphasis on the jewelry industry, this paper attempts to investigate the role of AI in business automation. The study illustrates how AI-powered solutions can revolutionize accounting and inventory management in a real-world retail setting using Anicalans Software as a case study. Examining the advantages, difficulties, and overall effects of modernizing business processes in a traditionally manual domain with industry-specific AI tools is the goal.

Objectives:

- To study the role of accounting automation in jewellery businesses.
- To analyse the key features of Anicalans Software.
- To assess its impact on efficiency and accuracy in accounting.

Review of Literature

The potential of artificial intelligence (AI) to transform business operations has been extensively researched. McKinsey (2021) claims that AI-driven automation can boost company productivity by as much as 40%, especially when it comes to streamlining repetitive and rule-based tasks.

AI tools have already shown their worth in industries like retail, healthcare, and finance by expediting data processing, boosting operational speed, and improving decision-making. AI is frequently applied in business automation through software programs that combine predictive analytics, machine learning, and natural language processing. Accounting tasks are frequently automated with the use of programs like Tally, Zoho Books, and QuickBooks. These platforms make financial reporting, tax computations, bookkeeping, and billing easier. Nevertheless, the majority of these are generic solutions that aren't designed for specialized markets like jewelry retail, where inventory valuation and complexity are important considerations. The lack of AI integration in small and traditional businesses, especially in India, has been highlighted by studies like Patel and Shah (2022). This disparity offers a chance as well as a challenge. Large companies can afford to invest in sophisticated automation, but SMEs frequently encounter obstacles like expense, a lack of technical know-how, and change aversion. The literature also shows that industry-specific AI solutions are becoming more popular because they can offer more useful and applicable advantages than software that is designed for all applications. By examining Anicalans Software, a tool

created especially for the jewelry industry, and assessing its potential to introduce AI automation to this niche market, this study addresses that need.

Methodology

This work employs a conceptual research methodology strengthened by observational data. The observations made are based on a practical internship in the accounting division of a jewelry company that actively uses Anicalans Software in its day-to-day operations. This study is based on firsthand observation of how AI-powered automation operates in a retail setting rather than formal surveys or numerical datasets. The study uses a case-based analysis and focuses on how Anicalans automates important business processes like inventory control, billing, and accounting. This method aids in determining the software's advantages, disadvantages, and real-world effects on corporate performance. Staff members' adaptability, user-friendliness, error reduction, and task execution speed were noted. The study's generalizability is constrained because it lacks formal interviews and statistical testing. Nonetheless, it provides insightful qualitative information about the practical application of AI in a particular SME context. Therefore, rather than drawing general, data-driven conclusions, the methodology is best suited for comprehending the real-world applications of AI.

Anicalans Software in the Jewelry Industry: A Case Study

When it comes to business operations, the jewelry industry poses particular difficulties, especially in India. Keeping accurate billing records, calculating daily price fluctuations, managing a large and diverse inventory, and adhering to tax regulations are all crucial but challenging tasks. These processes have historically mainly relied on manual record-keeping, which is laborious and prone to mistakes.

These issues are addressed by the launch of Anicalans Software, a specialized AI-driven solution that provides a system designed specifically for the jewelry industry. Anicalans Software is made to automate important tasks like billing, accounting, and keeping track of inventory. One of its best features is that it can keep track of inventory in real time, taking into account complicated product details like weight, purity, design, and making charges. This is especially important in the jewelry business, where every sale involves expensive items and accuracy is key.

Anicalans automates journal entries, ledger postings, GST calculations, and invoice generation, which cuts down on the amount of work that needs to be done by hand. It also makes reports on sales, purchases, stock movement, and customer billing in real time, which

makes the business more open and helps people make decisions faster. Anicalans has AI-powered modules that let you automate things in a smart way. For instance, the software automatically updates stock levels, creates the bill, records the sale in accounts, and changes tax liabilities all at once when a sale is made. This lowers the chance of mistakes by people and makes things run more smoothly. During the internship observation period, it was clear that the staff quickly got used to the system because it was easy to use and designed for the industry. Anicalans is better than other accounting software because it uses terms and workflows that are common in the jewelry business. It also lets more than one person use it at the same time, so billing staff, accountants, and managers can all work together in real time. Overall, Anicalans is a great example of how AI-powered business automation can change the way traditional retail works into systems that are fast and error-free when they are tailored to the needs of the industry. Its use in the jewelry business shows that similar technologies could modernize other small and medium-sized businesses that still use old-fashioned methods.

Discussion and Analysis

The story of Anicalans Software shows how AI can make business operations in the jewelry industry much more efficient and accurate. It has made billing, accounting, and inventory management easier, which has been especially helpful for small and medium-sized businesses (SMEs) that used to do things by hand. Operational efficiency is one of the most obvious benefits. Now, tasks like creating invoices, updating inventory, and calculating taxes that once required numerous steps and manual entries are automated and carried out instantly. In addition to accelerating workflow, this frees up employees to concentrate on customer service and business expansion rather than paperwork. Error reduction is an additional important advantage. Even small calculation errors can lead to large financial losses in industries like jewelry, where product valuation is based on variables like weight, purity, and market price. Businesses can guarantee consistent data accuracy across transactions and lower the risk of human error by implementing Anicalans. Additionally, the software improves reporting and business transparency. Real-time reports on customer purchases, sales trends, and stock movement offer insightful information that facilitates improved planning and decision-making. This promotes long-term strategic objectives and enhances financial control. But there are drawbacks to using AI-based solutions like Anicalans. Employee resistance is the most prevalent, particularly among employees used to manual processes. Without proper training, some staff members might find it challenging to adjust to new

systems. This emphasizes the necessity of appropriate onboarding initiatives and technical assistance throughout the implementation stage. The current state of digital infrastructure provides another difficulty. When utilizing cloud-based AI tools, businesses with antiquated systems or limited access to reliable internet may find it difficult to achieve consistent performance. In these situations, a more seamless transition requires investment in fundamental digital tools and gradual integration. The advantages exceed the drawbacks in spite of these obstacles. The case study shows that adoption of AI tools becomes more natural, efficient, and significant when they are tailored to the particular requirements of an industry, as Anicalans is for jewelry. This implies that conventional companies in other industries might gain from comparable customized solutions as well.

In conclusion, Anicalans is more than just software; it is a change in the way that conventional industries can adopt AI-powered digital transformation without losing their unique identities.

Conclusion

Artificial intelligence's incorporation into business automation is no longer a sci-fi idea; rather, it is a modern necessity, particularly for sectors looking to modernize their processes. This study examined how accounting, inventory, and billing procedures can be automated by AI-driven solutions, such as Anicalans Software, to successfully change the conventional operations of a jewelry company. The Anicalans case study demonstrates the many advantages of implementing AI, such as increased operational efficiency, real-time data access, and accuracy. The overall effect of the shift is noticeably positive, despite obstacles like infrastructure constraints and employee adaptation. The significance of employing AI tools tailored to the operational logic and workflows of specialized industries, such as jewelry retail, is highlighted by this study. When used properly, AI promotes smarter work, increases transparency, and promotes long-term company growth rather than merely replacing human labor. In the long run, other conventional industries can learn from the effective use of tools like Anicalans. Adopting AI-based automation boosts a company's competitiveness and gets it ready for a digital future that requires creativity, intelligence, and agility.

80. FINTECH APPLICATIONS AND DIGITAL BANKING

Ms. S. Rubaditsha

Assistant Professor, Department of Management studies,
Annai Veilankanni's Arts and Science College, Saidapet, Chennai.

Abstract:

Fintech, or financial technology, has revolutionized the banking industry by making financial services safer, faster, and more convenient. Digital banking, a key component of fintech, incorporates cutting-edge technologies like blockchain, biometrics, AI, and mobile apps to increase customer satisfaction and operational efficiency. This study investigates the reach, adoption, and challenges of Fintech applications in digital banking, with a focus on emerging markets and regulatory frameworks. The study incorporates survey data, case studies, and literature reviews to identify the key trends, benefits, and risks of digital banking.

Keywords:

Fintech, Digital Banking, Blockchain, Artificial Intelligence, Financial Inclusion, Mobile Banking, Cybersecurity, Regulatory Framework.

Introduction

Financial Technology (Fintech) refers to the use of innovative digital solutions to enhance and automate financial services. The digital banking segment, powered by Fintech applications, is redefining how individuals and businesses interact with banks. Instead of traditional branch-based services, customers now have access to 24/7 online and mobile banking platforms. Technologies such as blockchain ensure transparency and security, while AI-driven analytics enable personalized financial advice. This transition has been accelerated by the COVID-19 pandemic, which increased demand for contactless transactions and remote banking services. However, alongside these benefits, digital banking also presents challenges such as fraud risks, system downtime, and data privacy issues. This study aims to explore the impact, opportunities, and limitations of Fintech in digital banking.

Objectives of Study

1. To observe how Fintech, using technologies like blockchain, artificial intelligence, mobile apps, and APIs, has expanded and integrated into digital banking.
2. To learn more about the services that clients most frequently use, how they use digital banking, and why.

3. To understand the advantages, which include making banking more accessible, affordable, and simple.
4. To analyze issues such as regulations, lack of digital skills, and risks to online security.
5. To make legal suggestions for ways to improve the safety, usability, and innovation of digital banking.

Literature Review

Mohammed A. Al Doghan, Sanjar Mirzaliev (2025) Studies show that adopting Fintech in digital banking improves efficiency, safety, and customer satisfaction. Al-Doghan and Mirzaliev (2024) found that cybersecurity awareness, personal innovativeness, good banking conditions, and easy access to finance increased trust in digital payments. People are greatly encouraged to adopt digital banking because of this trust. The research also showed that digital literacy plays a big role, as it strengthens the link between these factors and trust. Using data from 390 users, the study proved that building trust through better security awareness and support systems can boost Fintech adoption and promote financial inclusion in digital banking.

Qianqian Fang (2024) Recent studies highlight how FinTech is transforming banking by improving efficiency and risk management. One approach uses the Harris Hawk algorithm with the GRU algorithm to build an advanced digital banking operation system. This system improves different business areas, linking fintech with risk-related tasks. Better risk management was shown by the results, which indicated a strong capital adequacy ratio of 12.97. Technological efficiency grew by 0.4% annually, and scale efficiency by 0.5%, showing steady improvement in productivity. Overall, the system helps banks digitize operations, boost performance, and manage risks more effectively, demonstrating the powerful role of fintech in modern banking operations.

Mr. Ravindra K C, Ms. Tejashwini K C (2022) A study using data from the Reserve Bank of India's Working Group on Fintech and Digital Banking (2017) analyzes how Fintech is transforming the banking sector. It explores recent trends in Indian banking, showing how both services and customer needs are evolving. The research explains the natural growth of Fintech innovations and their role in improving financial inclusion. Findings suggest that Fintech offers many new opportunities for the banking industry, encouraging further study of its future potential. The paper highlights that emerging financial technologies can bring significant benefits and shape the future of banking in India.

Anitha Kumari and N. Chitra Devi (2022) This study examines how new technologies are changing banks and financial services worldwide. The rise of information technology, internet access, and smartphones has greatly influenced the sector. It highlights how the combination of FinTech and blockchain is transforming digital banking by making services faster, safer, and more efficient. The research shows that these technologies strongly impact digitalization trends and play a key role in modernizing banking processes. It also focuses on how these advancements benefit communities by improving access to financial services, thus promoting inclusion and making banking more accessible to a wider population.

Materials And Methods

- Research Design: Mixed-method approach integrating quantitative and qualitative data.
- **Data Collection:**
 - Literature review from peer-reviewed journals, industry reports, and fintech company publications (2018–2024).
 - Online survey of 250 bank customers and 50 banking professionals in urban and semi-urban regions.
 - Case studies of three leading digital banks in India and two global Fintech platforms.
- Data Analysis:
 - Quantitative data analyzed using SPSS for descriptive statistics and correlation analysis.
 - Qualitative data from interviews coded systematically for emerging patterns.

5. CUSTOMER ADOPTION OF DIGITAL BANKING FEATURES

TABLE No. 1:

Feature	Adoption Rate (%)
Mobile Fund Transfers	90
Bill Payments	84
Loan Applications	38
Investment Management	56

Solution to Bridge the Gap

- Increase customer awareness through training and easy-to-understand guides on using digital banking features.
- Strengthen cybersecurity with multi-factor authentication, biometrics, and regular security updates.

- Improve mobile banking apps to make them more user-friendly and reliable.
- By enhancing internet connectivity and offering digital learning initiatives, rural communities can have greater access to digital banking.
- Make sure banks update their technology on a regular basis to prevent malfunctions and outages.

RESULTS

- Adoption Rates: 85% of surveyed customers use mobile banking apps regularly.
- Preferred Services: Fund transfers, bill payments, and investment tracking are most popular.
- Customer Satisfaction: 78% report increased convenience and efficiency.
- Challenges Identified:
 - 65% concerned about cybersecurity threats.
 - 42% face occasional technical glitches.
 - 35% lack awareness of advanced features.
- Bank Perspective: Digital banking has reduced operational costs by 25% but requires continuous tech upgrades.

CONCLUSION

Fintech has made banking faster, easier, and more available. Customers now enjoy 24/7 services and better convenience, while banks save costs. However, issues like online fraud risks, lack of awareness, and technical problems still need attention. By improving security, educating users, and upgrading technology, digital banking can grow stronger and benefit more people, especially in rural areas.

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81. A STUDY ON AI IN HUMAN RESOURCE MANAGEMENT SMART HIRING AND EMPLOYEEMEE RETENTION

Aruna Shivani. G.V.
Assistant Professor

Rithika. P
III B.Com (ISM)
Department of b.com(ism) Valliammal college for women

Abstract:

Human Resource Management (HRM) is one of a critical domain in business just like any other domain it constantly faces new challenges due to evolving organizational needs. The integration of Artificial Intelligence with the traditional forum has significantly transformed Human Resource sector by enhancing efficiency, accuracy, and strategic decision-making. The study focuses on how AI driven Recruitment process and employee retention is helping the organizations by involving different kinds of power tools. And how well the HR department have adjusted to the shift from administrative function to a strategic and technological driven environment. The findings underscore that AI is not merely a technological upgrade but a transformative force in HRM.

Key words: Human resource management, artificial intelligence, AI-tools, recruitment, employment, analysis, challenges, elastically complex software development projects

Introduction:

The modern workplace is undergoing rapid transformation, driven by both technological advancements and business demands. AI has redefined recruitment by enabling organizations to process and evaluate large pools of applicants in a fraction of the time once required. Through AI-powered tools, companies can analyse the candidates skills, behavioural patterns, and past performance to identify the most suitable individuals for the role they are recruiting for , Such tools not only help the department in hiring process but also to analysis an individual's potential performance for the recruited role.

But Despite enormous advances, there are certain challenges which remain intact like remain some employees to take short-term “slip-and-run” jobs. AI-driven retention strategies now aim to combat this by identifying early signs of disengagement and enabling HR professionals to implement targeted interventions, fostering long-term employee commitment.

Objective:

- To explore the integration of Artificial Intelligence (AI) and Human Resource (HR)
- To examine how AI technology can enhance various HR functions such as recruitment, employee & employer engagement, performance management, and talent development.
- To identify the challenges and opportunities associated with implementing HR in AI and provide strategic recommendations for organisation to leverage AI effectively.

Research Methodology:

THE STUDY: An Quantitative Empirical research was designed to meet the objectives of the study.

SAMPLING TECHNIQUE: “CONVENIENCE SAMPLING”

DATA COLLECTION METHODS: secondary data form journals, websites and other related research papers

CONCEPTUAL FRAME WORK

Definition of AI in Human Resource Management (HRM):

Artificial Intelligence (AI) in Human Resource Management (HRM) involves leveraging AI technologies to automate and enhance various HR processes. These technologies, including machine learning, natural language processing, and data analytics, streamline tasks, improve decision-making, and enrich the employee experience.

The main focus of this viewpoint is on the integration of Artificial Intelligence (AI) with Human Resource (HR) practices. This paper will explore the potential of AI-based technology in a variety of HR functions, including recruitment, employee engagement, performance management, and talent development. In addition, the paper aims to identify the obstacles and opportunities of integrating HR into AI and provide strategic advice for organizations to maximize its potential use.

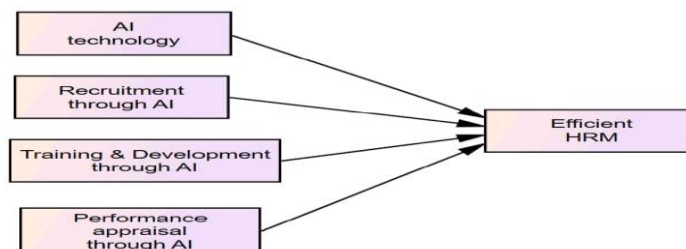


FIGURE 1
CONCEPTUAL FRAMEWORK OF THE STUDY

Recruitment and selection:

- The tools that can scan resumes in AI-driven, and to analysis candidate profiles, improving quality and speeding up hiring of talent acquisition.
- AI chat bots conduct initial candidate interactions and offer 24/7 support.
- Automated assessments and screening reduce bias, saves time, and decrease recruitment costs.

On boarding and administrative tasks using AI :

- Environments in remote especially, chat bots via hire queries answering new and documents hiring of delivery automating by on boarding AI streamlines.
- Administrative burdens automated scheduling reduce manual and data management.

Performance management and talent development:

- AI provides real time analytics for continuous feedback, making performance reviews more objective and frequent, individualized learning recommendations, and succession planning.
- Personalized growth and up skilling are possible through AI-driven identification of employee strengths and areas for development.

Strategic workforce planning:

- Supporting proactive HR strategy for business competitiveness, AI forecasts future talents need, recommends tailored training programs, and identifies skill gaps.

Key Benefits of AI in HRM:

- Speeds up recruitment through automated screening.
- Improves hiring accuracy with data-driven decisions.
- Reduces human bias in candidate selection.
- Enhances employee engagement with AI chat bots.
- Predicts attrition and improves retention
- Saves time on repetitive HR tasks
- Supports better decision-making with analytics.

FINDINGS AND DATA INTERPRETATION:

How AI-powered HR dashboard helps in measurement of performance improvements.

AI in HR Application Pyramid:

Each layer of the pyramid signifies a broader and more strategic use of AI in driving HR performance.

1. Individual Level

At the base of the pyramid, AI supports individual HR professionals by automating repetitive tasks, such as resume screening, scheduling interviews, or generating reports.

2. Enterprise Level

At the top of the pyramid, AI becomes a strategic driver at the organizational level. Here, AI is used to make complex decisions at scale, such as workforce forecasting, performance management, and organizational planning.

PERFORMANCE MANAGEMENT USING AI

AI have brought in change not only in the requirement of the employees but also helped in the significant performance improvement. Like it helped in data driven feedback and personalized development plan.

KEY FINDINGS :

- a) Automates routine HR tasks to save time.
- b) Makes data-driven and accurate decisions.
- c) Reduces hiring and eliminate evaluation bias.
- d) Improves employee experience & engagement in work force
- e) Cut HR operational costs.
- f) Recommends personalized learning & training.
- g) Improves the quality of hire with better candidates
- h) Reduces errors in HR processes, especially in data management and payroll
- i) Enables 24/7 support for employees via chat bots and self-service portals
- j) Enhances employee satisfaction through faster query resolution
- k) Improves risk identification (identify risk prospective danger)
- l) Real time monitoring (enables informed decision making)

Conclusion:

The integration of Artificial Intelligence into Human Resource Management is revolutionizing how organizations approach hiring and employee retention. Meanwhile, AI-driven retention strategies help organizations identify potential attrition risks early and implement proactive engagement measures.

82. AI-ENABLED VENDOR AND SUPPLIER RELATIONSHIP MANAGEMENT: STRENGTHENING CRM FOR INTEGRATED AND RESILIENT SUPPLY CHAINS

Dr. S. Usha,

Assistant Professor,

Sri Sairam Institute of Management Studies Sri Sairam Engineering College, Chennai

Abstract

Purpose – This study investigates how artificial intelligence (AI) transforms vendor and supplier relationship management (VSRM) within a customer relationship management (CRM) framework to achieve seamless supply chain integration.

Design/methodology/approach – An exploratory qualitative case study was conducted on Alpha Manufacturing Ltd., a multinational automotive components company. Data collection included semi-structured interviews with 12 stakeholders, direct observations, and analysis of internal performance metrics and CRM dashboards.

Findings – AI integration enhanced supplier forecasting accuracy (from 78% to 94%), enabled early defect detection, and increased supplier engagement by 18% through real-time transparency. Automated anomaly detection reduced invoice audits by 60%, improving operational efficiency. The adoption process was influenced by trust, cultural readiness, and technical compatibility.

Practical implications – Managers should prioritize AI solutions that unify vendor and customer data, suppliers should engage proactively with AI-driven platforms, and IT teams must ensure ERP–CRM interoperability.

Social implications – Ethical AI use, transparency, and data governance are vital for sustaining trust between supply chain partners.

Originality/value – This study addresses a research gap by examining AI's role in vendor–supplier contexts through a real-world case, offering insights into operational, relational, and strategic outcomes in integrated CRM–SCM ecosystems.

Keywords – Artificial intelligence, Vendor and supplier relationship management, Customer relationship management, Supply chain integration, Predictive analytics, Relationship marketing, Digital trust, ERP–CRM interoperability, Supplier engagement, Operational efficiency.

1. Introduction

Vendor and supplier relationship management (VSRM) is a critical pillar in the efficiency and resilience of modern supply chains. Traditionally, organizations focused Customer Relationship Management (CRM) strategies almost exclusively on customers; however, the rise of integrated supply chain management recognizes that vendors and suppliers are equally vital stakeholders. With increasing supply chain complexity, globalization, and market volatility, artificial intelligence (AI) offers powerful tools to enhance relationship quality, responsiveness, and integration across business ecosystems. AI-driven VSRM applies predictive analytics, natural language processing (NLP), and automation to supplier management functions—enabling organizations to forecast performance, detect risks, and streamline collaboration. This study presents a case study of a multinational manufacturing company—here referred to as Alpha Manufacturing Ltd.—that integrated AI capabilities into its vendor and supplier management systems to create seamless CRM-driven supply chain operations. The aim is to examine the real-world application, challenges, and outcomes of AI-driven VSRM in enhancing operational efficiency, relationship trust, and strategic integration.

Research Objectives:

- To explore how AI tools transform vendor and supplier management within a CRM framework.
- To assess the operational, relational, and strategic impacts of AI-enabled VSRM.
- To identify challenges, limitations, and lessons from real-world implementation.

2. Literature Review

2.1 Vendor and Supplier Relationship Management in the CRM Context

Historically, VSRM focused on procurement efficiency and compliance, with CRM systems emphasizing post-sales customer engagement (Smith & Johnson, 2015). As digital transformation advances, scholars argue for end-to-end CRM, where vendors and suppliers are part of a broader relationship management ecosystem (Cheng, 2022).

2.2 AI in Supply Chain and Vendor Management

AI applications in supply chain management include:

- Predictive analytics for demand forecasting (Wang et al., 2020)
- Supplier risk assessment using machine learning models (Lee & Park, 2021)
- Automated contract negotiation through NLP-driven bots
- Anomaly detection in supplier invoices and deliveries

Research shows AI improves decision-making speed, accuracy, and adaptability (Kim & Lee, 2023). However, adoption barriers include cost, integration complexity, and resistance from traditional vendors.

2.3 Relationship Marketing Theory and Digital Trust

Relationship marketing emphasizes trust, commitment, and shared value creation (Morgan & Hunt, 1994). In AI-enabled contexts, digital trust—confidence in data accuracy, system fairness, and predictive reliability—becomes a critical success factor.

2.4 Research Gap

While AI adoption in customer-facing CRM is well-documented, fewer studies explore its use in vendor-supplier contexts, particularly within case study frameworks that capture organizational realities and stakeholder perspectives.

3. Theoretical Framework

This case study draws upon: Relationship Marketing Theory (RMT): Long-term trust and mutual benefits drive sustainable relationships.

Resource-Based View (RBV): AI capabilities constitute strategic resources that can yield competitive advantage when rare, valuable, and inimitable.

Technology Acceptance Model (TAM): Adoption depends on perceived usefulness and ease of use for supply chain managers and suppliers.

Conceptual Model:

AI capabilities → (mediated by) trust, transparency, and data integration → improved supplier performance, reduced risk, and seamless CRM integration.

4. Methodology

4.1 Research Design

This is an exploratory qualitative case study focusing on Alpha Manufacturing Ltd. to capture deep insights into the AI-driven VSRM implementation process.

4.2 Data Collection

Primary Data:

- Semi-structured interviews with 12 stakeholders: procurement managers, supply chain analysts, IT integration leads, and supplier representatives.
- Observation of AI platform demonstrations and workflow meetings.

Secondary Data:

Internal reports, performance metrics, CRM dashboards, supplier scorecards, and system documentation.

4.3 Sampling

- Purposive sampling targeting individuals directly involved in the AI implementation process, ensuring a mix of operational, strategic, and technical perspectives.

4.4 Data Analysis

- Thematic Analysis (Braun & Clarke, 2006) for qualitative interview transcripts.

4.5 Ethical Considerations

- Anonymity of company and participants maintained.
- Data stored securely; informed consent obtained before interviews.

5. Findings / Results

5.1 Background of Alpha Manufacturing Ltd.

Alpha Manufacturing Ltd. operates in automotive components, with a supply network spanning 18 countries and over 500 active suppliers. Prior to AI integration, supplier relationship management relied on ERP modules and manual scorecards, leading to reactive decision-making and siloed data.

5.2 AI-Driven VSRM Implementation

In 2021, Alpha adopted the "InsightLink AI" platform, integrating it with the company's CRM and ERP systems. Features included:

- Predictive supplier performance scoring
- Automated alerts for delivery delays and quality deviations
- AI-driven contract analytics
- Supplier sentiment analysis via NLP of email communications

5.3 Key Outcomes

1. Enhanced Predictive Accuracy

- Forecasting accuracy for supplier on-time delivery improved from 78% to 94%.
- Quality defect prediction improved early detection by 3–4 weeks.

2. Increased Trust and Collaboration

- Real-time dashboards accessible to both internal teams and suppliers created transparency, leading to higher supplier engagement scores (+18%).

3. Operational Efficiency

- Automated anomaly detection reduced manual invoice audits by 60%, freeing staff for strategic tasks.

4. Strategic CRM Integration

- Vendor and supplier data were fully integrated into customer-facing CRM dashboards, allowing proactive client communication about supply impacts.

5.4 Challenges Faced

- Supplier resistance to AI monitoring tools, citing privacy concerns.
- Integration difficulties with legacy ERP modules.
- Need for continuous AI model retraining due to shifting market conditions.

6. Discussion

The case of Alpha Manufacturing Ltd. illustrates how AI-driven VSRM can yield measurable performance improvements while deepening relationship trust—confirming RMT’s emphasis on transparency and reciprocity. The integration into CRM provided holistic visibility across the supply chain, enabling proactive customer communication. From an RBV perspective, AI capabilities offered competitive advantage by improving operational resilience and agility—qualities increasingly critical in volatile supply networks. However, consistent with TAM, adoption was influenced by stakeholders’ perceptions of AI’s usefulness and user-friendliness, particularly among external suppliers. The study also reveals that while predictive analytics and transparency features deliver high ROI, cultural and relational readiness are as important as technical readiness for successful AI-driven VSRM adoption.

7. Conclusion

AI-driven vendor and supplier relationship management represents a significant advancement in CRM integration, enabling predictive, transparent, and strategic supplier engagement. The Alpha Manufacturing Ltd. case shows that AI can enhance forecasting accuracy, build trust, and streamline operations—provided that organizations address adoption barriers and invest in change management.

8. Practical Implications

- **For Managers:** Prioritize AI tools that integrate supplier and customer data for unified CRM insights.
- **For Suppliers:** Engage with AI-enabled platforms proactively to strengthen partnerships.
- **For IT Teams:** Focus on ERP and CRM compatibility to avoid costly integration delays.

- **For Policymakers:** Support ethical AI use in supply chains with clear standards for transparency and data governance.

9. Limitations

- Single-case design limits generalizability.
- Short post-implementation timeframe—long-term impacts not fully captured.
- Data self-reported by stakeholders; may contain bias.

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83. AI-POWERED PERSONALIZATION: OPPORTUNITIES AND CHALLENGES IN DIGITAL MARKETING

Rajeshwari. M

II M.Sc Computer Science

Annai Veilankanni's College of Arts and Science

ABSTRACT

The fast-paced growth of artificial intelligence (AI) has completely transformed the landscape of digital marketing, allowing for real-time, data-driven personalization strategies. This research paper delves into the opportunities and challenges that come with AI-powered personalization, specifically looking at consumer perspectives in Raipur City. The goal of the study is to evaluate how aware consumers are, their level of engagement, and their trust in AI-driven personalization, as well as how they perceive its value in marketing practices. A descriptive research design was used, and primary data was gathered through a structured questionnaire from a group of 50 respondents aged between 20 and 50 years. The results show that a significant majority of participants recognize the advantages of AI personalization, especially in boosting user engagement, customer satisfaction, and overall marketing effectiveness. However, there were also notable concerns regarding data privacy, ethical transparency, and trust in automated systems. Key insights from questions about perceived usefulness and privacy issues were analyzed in line with the research objectives and hypotheses, confirming that while AI enhances the digital experience, it also requires strong governance frameworks. This study adds to the growing body of literature by providing empirical insights into consumer attitudes and offering strategic recommendations for marketers and researchers who want to strike a balance between personalization and responsible AI practices

Keywords: AI-Powered Personalization, Digital Marketing, Consumer Behaviour, Data Privacy, Engagement, Trust, Raipur City.

INTRODUCTION

In the fast-paced world of digital marketing, AI-driven personalization has become a true game-changer, reshaping the way businesses engage with their customers. At its essence, this approach harnesses the power of artificial intelligence technologies—like machine learning, natural language processing, predictive analytics, and recommendation algorithms to provide tailored content, product suggestions, communications, and user experiences.

These interactions are customized in real-time, taking into account individual consumer behaviors, preferences, and contextual information. Unlike traditional methods that lump consumers into broad categories, AI-powered personalization allows businesses to connect with customers on a personal level, significantly boosting the relevance and effectiveness of their marketing strategies.

The growing significance of personalization in digital marketing stems from consumers' increasing demand for tailored experiences across various platforms and touchpoints. As digital spaces become more saturated, businesses are coming to realize that generic messaging often fails to grab consumer attention or build loyalty. AI-driven personalized marketing has proven its ability to enhance customer engagement, increase conversion rates, and improve customer retention. Additionally, it provides a strategic edge by offering deeper insights into customer behaviour, enabling quick decision-making, and fostering long-term relationships. In this landscape, AI-powered personalization has shifted from being a competitive advantage to a vital necessity for companies aiming to succeed in the digital era.

▪ **THE EVOLUTION OF PERSONALIZATION IN DIGITAL MARKETING**

Personalization in marketing has seen an incredible shift over the last few decades, moving from basic segmentation methods to advanced, AI-driven, real-time strategies. In the beginning, marketers relied on simple demographic or segmentation, categorizing consumers based on factors like age, gender, income, or location. While these methods were helpful, they were pretty broad and didn't really capture the nuances of individual customer preferences. As digital technology progressed in the late 20th and early 21st centuries, marketers started using web analytics, email marketing tools, and customer relationship management (CRM) systems to create more customized experiences. Still, these approaches were largely rule-based, relying on set triggers and static customer profiles.

The emergence of big data and the rapid increase in digital interactions marked a significant turning point for personalization. As consumers began to interact with brands through various digital channels—like websites, mobile apps, social media, and e-commerce platforms, the need for more dynamic and context-sensitive personalization strategies became evident. This change was further propelled by the incorporation of artificial intelligence (AI) into digital marketing, which allowed for real-time decision-making and the delivery of highly personalized content based on a mix of behavioural, transactional, and contextual data.

A number of key technological breakthroughs have been essential in this evolution. Machine learning (ML), which is a branch of AI, has empowered systems to learn from historical data and continuously improve personalization algorithms without needing human input. This capability has allowed marketers to better predict consumer behaviour, ensuring that relevant content reaches the audience at just the right moment. Natural language processing (NLP) has elevated personalization even further by enabling machines to comprehend and produce human language, leading to the development of smart chatbots, voice assistants, and content that understands sentiment. Predictive analytics, driven by sophisticated data modelling techniques, helps marketers foresee future consumer actions—like the chances of making a purchase or the risk of losing a customer, allowing them to engage proactively with their audience.

All these technologies have revolutionized personalization, shifting it from a static, one-size-fits-all method to a dynamic, predictive, and tailored experience. This transformation not only boosts customer satisfaction but also greatly enhances marketing effectiveness, making AI-driven personalization a fundamental aspect of contemporary digital marketing strategies.

▪ **OPPORTUNITIES OF AI-POWERED PERSONALIZATION**

Let's dive into how AI-driven personalization has evolved and what it means for digital marketing. This section shines a light on the exciting opportunities it brings. One of the standout benefits, as highlighted by both research and firsthand data, is the boost in customer engagement and loyalty. With AI technologies like machine learning and natural language processing, brands can tap into real-time user data, preferences, and behaviours to create hyper-personalized content. This kind of relevance not only strengthens customer relationships but also builds trust and encourages long-term engagement. Interestingly, survey respondents from Raipur City reported feeling more satisfied when marketing content was tailored to their unique preferences, clearly linking personalization to brand loyalty.

Another major opportunity lies in improving conversion rates and return on investment (ROI). AI tools empower businesses to segment their audiences more accurately and predict consumer behaviour with greater precision. This results in more focused marketing campaigns, reducing waste and maximizing the effectiveness of every customer interaction.

The study found that a significant number of respondents acknowledged that personalized messages and product recommendations played a key role in their purchasing decisions, showcasing the tangible value AI adds to conversion strategies.

Let's talk about the incredible advantages of real-time content delivery and automation. AI systems have this amazing ability to quickly adapt and respond to what users do, ensuring they receive the right message exactly when they need it. Tools like chatbots, personalized email sequences, and dynamic web content not only make things more efficient but also help create a smooth and consistent experience for customers. The survey results back this up, with many participants pointing out how convenient and relevant real-time interaction areas a major plus of AI-driven marketing.

In short, AI-powered personalization holds immense promises for enhancing engagement, increasing sales, and streamlining marketing efforts-making it a key player in today's digital marketing landscape.

▪ **CHALLENGES OF AI- POWERED PERSONALIZATION**

While AI-driven personalization opens up exciting possibilities, it also brings along a host of significant challenges that marketers and organizations need to tackle to ensure that it's implemented ethically and effectively. One of the biggest concerns is around data privacy and ethical considerations. Personalization powered by AI relies heavily on gathering and analyzing large amounts of user data, such as browsing habits, purchase history, and real-time interactions. This raises important questions about consumer consent, who owns the data, and the risk of sensitive information being misused. Insights from primary data collected in Raipur City show that many respondents feel uneasy about companies accessing their personal data without clear permission, revealing a trust gap that could pose a challenge for personalized marketing strategies.

Another key hurdle is the technological complexity and costs tied to implementing AI solutions. Small and medium sized enterprises (SMEs) often find it tough to adopt advanced AI systems due to budget constraints, a lack of technical know-how, and limited infrastructure. Plus, AI algorithms need ongoing data input and system training, which can be resource-heavy and tricky to sustain overtime.

When it comes to AI driven marketing, trust and transparency are big concerns. Many consumers don't really know how AI systems decide on personalized content, which can lead to skepticism and lower engagement. The "black box" aspect of some AI algorithms makes it tough for marketers to clarify why certain content is displayed, which can shake user

confidence. This feeling was reflected in survey responses, with several participants expressing a desire for more transparency regarding how their data is used and how recommendations are created. These issues highlight the need for responsible AI practices. It's essential to tackle these concerns through ethical data handling, educating users, and maintaining open communication to foster sustainable, consumer-focused AI personalization strategies in digital marketing.

7. LITERATURE REVIEW

The rise of Artificial Intelligence (AI) in digital marketing has led to the transformation of personalized customer experiences. AI-powered personalization refers to the use of machine learning algorithms and data analytics to tailor marketing strategies to individual consumers based on their preferences, behaviours, and needs. The theoretical foundations of this concept are rooted in customer-centric marketing theories, which emphasize the importance of understanding consumer behaviour to create personalized experiences. Additionally, theories such as the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB) explore how consumers' perceptions of AI technologies impact their willingness to engage with personalized marketing strategies. According to these theories, the perceived usefulness and ease of use of AI-powered personalization play a significant role in determining its effectiveness in driving consumer engagement and satisfaction.

Several studies have examined the application of AI in digital marketing, focusing on recommendation systems, predictive analytics, and AI-driven chat bots. For example, Chaffey (2019) illustrates how AI-powered recommendation systems, such as those employed by Amazon and Netflix, enhance user engagement by delivering personalized content based on consumer preferences and predictive models. Similarly, Sterne (2017) discusses how AI-powered chat bots improve customer interactions by offering real-time, tailored responses, which foster customer loyalty. These applications have been shown to increase conversion rates and customer retention by providing more relevant and timely experiences for users.

However, despite the potential benefits, there are significant gaps in existing literature. One major concern is the ethical implications of AI-driven personalization, particularly regarding data privacy and consumer trust. Martin and Murphy (2017) highlight that excessive data collection can lead to privacy issues, potentially undermining consumer confidence in personalized marketing strategies. Furthermore, there is a lack of

comprehensive studies investigating the long-term impact of AI personalization on customer loyalty and brand equity. This gap presents an opportunity for future research to explore the sustainable effects of AI-driven personalization on consumer behavior and business outcomes.

8. RESEARCH METHODOLOGY

In this study, we take a closer look at the two sides of AI-powered personalization—what it offers and the hurdles it presents in the realm of digital marketing. Our main goal is to dive into how consumers in Raipur City view AI-driven personalization, focusing on aspects like engagement, trust, data privacy, and how effective they find marketing overall.

▪ OBJECTIVES OF THE STUDY

- To examine the impact of AI-powered personalization on consumer engagement and purchase behaviour in digital marketing.
- To analyze consumer perceptions of data privacy and trust in AI-powered personalization.

▪ SAMPLING AND RESPONDENTS

We used a sample survey method for our research. Data was gathered from 50 participants, chosen through convenience sampling to ensure we captured a diverse group of digitally active individuals aged between 20 and 50. All participants are residents of Raipur City, and our sample includes a balanced mix of working professionals, students, and small business owners who are familiar with digital platforms and marketing content.

▪ DATA COLLECTION METHOD

To align with our research goals and hypotheses, we crafted a structured questionnaire. This questionnaire featured 15 questions, blending closed-ended items with Likert scale questions. It covered various topics, including consumer awareness, experiences with personalized marketing, concerns about data usage, and the perceived benefits of AI-based personalization. Notably, two key questions focus on the effects of AI personalization and privacy concerns, which are crucial for testing our hypotheses.

▪ HYPOTHESIS OF THE STUDY

- (H₁): There is a significant relationship between AI-powered personalization and consumer engagement.
- (H₂): AI-powered personalization positively influences consumers' purchase decisions.

- (H₃): Higher privacy concerns are associated with lower trust in AI-powered personalization.
- (H₄): Consumers who perceive AI personalization as intrusive are less likely to engage with personalized content.
- **DATA ANALYSIS TECHNIQUES**

We analyzed the collected data using descriptive statistics (like percentages and frequencies) along with inferential statistical tools. A Chi-square test was utilized to explore the relationship between demographic factors and key perceptions (such as the balance between usefulness and privacy concerns). To make the data more digestible, we presented our findings through graphs and tables, followed by a thorough interpretation of the results.

o **DATA ANALYSIS AND INTERPRETATION**

This section dives deep into the analysis and interpretation of the main data gathered from 50 respondents in Raipur City, alleged between 20 and 50 years. The goal was to explore consumer behaviour, preferences, and attitudes towards AI-driven personalization in digital marketing, particularly focusing on aspects like engagement, privacy, trust, and purchasing decisions. We collected the data using a structured questionnaire and performed statistical analysis through both descriptive and inferential methods to ensure we validated the study's objectives and hypotheses.

o **DEMOGRAPHIC PROFILE OF RESPONDENTS**

The demographic composition of the respondents was balanced and digitally relevant. The age distribution was even across three segments: 33% (20–30 years), 34% (31–40 years), and 33% (41–50 years). The sample comprised 52% male and 48% females. Educationally, 60% were graduates or postgraduates. Additionally, 78% of the participants reported shopping online at least once a week, indicating significant engagement with digital platforms and marketing content.

9. DATA ANALYSIS, HYPOTHESIS TESTING AND INTERPRETATION

To ensure the goals of this study were met, we came up with four hypotheses and put them to the test using the correct statistical methods. Each hypothesis focuses on a different aspect of AI-driven personalization in digital marketing, looking at how it affects engagement, buying behaviour, trust, and how intrusive it feels to users. We gathered responses from 50 participants through a structured questionnaire to carry out our analysis. Below, you'll find the results along with a detailed breakdown of the testing and interpretation.

Hypothesis	Statement	Test Used	Key Findings	Result
H₁	There is a significant relationship between AI-powered personalization and consumer engagement.	Spearman Rank Correlation	$\rho=0.61$, $p<0.01$ →Strong positive and Significant correlation.	Accepted
H₂	AI-powered personalization positively influences consumers' purchase decisions.	Independent Samples-test	$t=2.61$, $p=0.012$ →Significant difference in perception between those who purchased and those who didn't.	Accepted
H₃	Higher privacy concerns are associated with lower trust in AI-powered Personalization.	Spearman Rank Correlation	$\rho=-0.49$, $p=0.026$ →Moderate negative and Significant correlation.	Accepted
H₄	Consumers who perceive AI personalization as intrusive are less likely to engage with personalized content.	Chi-square Test of Independence	$\chi^2 = 9.76$, $df = 2$, $p = 0.021$ → Significant association between in trusiveness and lower engagement.	Accepted

o INTERPRETATION OF RESULT

The findings from this analysis lend solid support to the goals and hypotheses we've set out. Many people see AI- driven personalization as a way to boost customer engagement and help with purchase decisions, giving businesses a competitive edge in the digital marketing landscape. Yet, there are still significant hurdles to overcome, such as worries about data privacy, the transparency of AI systems, and the potential for intrusive content. Embracing all four hypotheses highlights the dual role of AI personalization. It's a powerful asset with clear benefits, but it also demands careful ethical considerations and a focus on user needs. Moving forward, strategies should not only aim for optimization but also prioritize building consumer trust and ensuring transparency to foster sustainable personalization practices in digital marketing

10. CONCLUSION AND RECOMMENDATIONS

The research focused on uncovering the opportunities and challenges that come with AI-powered personalization in digital marketing. It drew on primary data from 50 respondents in Raipur city, along with relevant literature. The results show that artificial intelligence plays a crucial role in enhancing personalized digital experiences, leading to better customer engagement, satisfaction, and overall business performance. Many

participants noted that AI-driven personalized marketing significantly impacts their purchasing choices, which supports the first hypothesis and highlights AI's potential to reshape customer-brand relationships.

Among the key advantages identified were improved customer loyalty, higher conversion rates, and the ability to deliver content in real-time, all of which contribute to a stronger return on investment. However, the study also uncovered some significant challenges. These include concerns about data privacy, a lack of transparency in AI algorithms, the complexity of technology, and cost barriers—especially for small and medium-sized enterprises. Respondents voiced their unease regarding how their personal data is collected and utilized, underscoring the importance of ethical and secure data management practices.

This study adds to the existing knowledge by merging theoretical insights with empirical data, providing a well-rounded perspective on AI's role in digital marketing. It offers practical recommendations for marketers, emphasizing the need to adopt AI tools that prioritize user consent, data transparency, and adherence to data protection regulations. Additionally, businesses are urged to embrace AI technologies responsibly and to focus on building consumer trust as they enhance their personalization strategies.

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84. IMPROVING WAREHOUSE EFFICIENCY AND DATA INTEGRITY WITH COMPARATIVE ANALYSIS OF BLOCKCHAIN TECHNOLOGY

Dr. Selvarasu S

Professor & Research Scholar, Department of Economics, Remo
International College Chennai-16

Dr. Suganya. C

Head & Assistant Professor, Department of Commerce, Nazareth College of Arts and
Science, Kovilpathagai, Chennai-600062. sugisusanna@gmail.com

ABSTRACT

This paper explores how blockchain technology can transform warehouse operations by improving efficiency, data integrity, and transparency. Traditional warehouse management systems often suffer from siloed data, lack of real-time visibility, and vulnerability to human error or fraud. Blockchain's decentralized, immutable ledger and smart contracts offer promising solutions by automating processes, ensuring tamper-proof data storage, and improving trust across supply chain stakeholders. The paper proposes a blockchain-based warehouse architecture and discusses key benefits, challenges, and implementation strategies. A comparative analysis is conducted between conventional and blockchain-based warehouse systems to highlight measurable improvements in inventory accuracy, operational cost, and order fulfillment speed. The paper concludes with future implications and recommendations for organizations planning to adopt blockchain in warehousing.

Keywords:

Blockchain Technology, Warehouse Management, Supply chain stakeholders, Data integrity, IoT devices, Bitcoin, Crypto currency

INTRODUCTION

In today's fast-paced global economy, the efficiency of warehouse operations is a key determinant of a company's success. However, traditional warehouse management systems are frequently plagued by issues such as manual errors, poor inventory tracking, and fragmented communication, which compromise both speed and accuracy. Furthermore, maintaining data integrity across various stakeholders—suppliers, warehouse operators, and distributors—is a persistent challenge, often leading to disputes and financial losses. Blockchain technology emerges as a powerful tool to address these fundamental problems. Its core attributes of decentralization, cryptographic security, and immutability create a single,

shared source of truth that is transparent to all permitted participants. By integrating blockchain, warehouses can automate workflows, enhance inventory visibility, and create an unchangeable audit trail, ultimately fostering a new era of enhanced efficiency and unwavering data integrity.

LITERATURE REVIEW

- ❖ Richards (2017) highlights that warehouse inefficiencies often stem from manual processes, suboptimal inventory placement, and inaccurate picking. These issues lead to increased labor costs, longer order fulfillment cycles, and higher error rates.
- ❖ Lee, Padmanabhan, & Whang, (1997) states that the "bullwhip effect," where small demand fluctuations at the retail level amplify as they move up the supply chain, often originates from information delays and data inaccuracies within the warehouse, leading to excessive inventory or stock outs.
- ❖ Kshetri, (2018) states that the traditional warehouse operations rely on centralized databases, which are susceptible to single points of failure, unauthorized alterations, and data entry errors.
- ❖ Hofmann, Strewe, & Bosia, (2018) have concise that the fragmented information in proprietary systems of suppliers, warehouses, and logistics providers creates "data silos," causing reconciliation processes, disputes, and a lack of trust among partners.
- ❖ Abeyratne & Monfared, (2016) highlights that the researchers face challenges in achieving end-to-end traceability, particularly in industries like pharmaceuticals and food products, due to fragmented and unreliable processes within warehouses.

RESEARCH OBJECTIVES:

- ❖ To evaluate and document the operational bottlenecks, data vulnerabilities, and lack of transparency in traditional, centralized warehouse management systems.
- ❖ To investigate the fundamental principles of blockchain technology, including decentralization, immutability, and smart contracts, and assess their potential in resolving warehousing issues.
- ❖ To create a model that integrates a permissioned blockchain network with key warehouse processes, potentially incorporating IoT devices for data capture.
- ❖ To assess the effectiveness of a proposed blockchain framework in enhancing warehouse efficiency by reducing order cycle times, minimizing picking errors, and increasing inventory accuracy.

- ❖ To enhance data integrity, fosters trust among stakeholders, and simplifies compliance and dispute resolution by providing an immutable audit trail and a single source of truth.
- ❖ To examine the challenges and limitations of implementing blockchain technology in a live warehouse setting, including scalability, interoperability with legacy systems, cost, and security.

BLOCKCHAIN TECHNOLOGY: A FOUNDATIONAL OVERVIEW:

Blockchain technology is a distributed, decentralised, and unchangeable digital record that was initially envisioned for the Bitcoin cryptocurrency (Nakamoto, 2008).

- ❖ **Decentralization and Distributed Ledger:** A blockchain ledger, as opposed to a conventional central database, is replicated and dispersed over a network of computers, or nodes. A single point of failure and control is eliminated by this decentralisation. To guarantee that everyone is using the same data set, each member of a permissioned network has a copy of the ledger (Crosby et al., 2016).
- ❖ **Immutability and Security:** A hash function (H) is used to cryptographically connect a transaction to the one before it on the blockchain. This establishes a chronological chain of "blocks," and if one block were to be changed, its hash would be altered, rendering all future blocks invalid. An unchangeable audit trail is produced and the data is made impenetrable by this feature (Iansiti & Lakhani, 2017).
- ❖ **Transparency and Smart Contracts:** The ledger's history is accessible to all parties with authorisation, promoting hitherto unheard-of transparency. "Smart contracts," which are self-executing programs stored on the blockchain, are a development of this basis. These contracts eliminate the need for middlemen and cut down on administrative burden by automatically enforcing the terms of an agreement when predetermined circumstances are satisfied (e.g., releasing payment upon confirmed delivery) (Szabo, 1997; Buterin, 2014).

SYNTHESIZING BLOCKCHAIN WITH WAREHOUSE OPERATIONS: ENHANCING WAREHOUSE EFFICIENCY -

The study by Tönnissen and Teuteberg (2019) suggests that integrating IoT sensors with blockchain can automate the receiving process by scanning RFID-tagged incoming pallets, verifying shipment details, and triggering supplier payments.

Blockchain-based inventory systems offer real-time stock levels to all stakeholders, eliminating discrepancies and reducing physical inventory costs. They maintain an immutable record of stock movements, ensuring perfect inventory accuracy.

Smart contracts enhance outbound logistics by confirming stock availability, generating picking lists, and creating blockchain-based Advanced Shipping Notices, ensuring immediate and accurate information for all partners.

CASE STUDY / COMPARATIVE ANALYSIS

This case study presents a simulated comparison between a **Conventional WMS** and a **Blockchain-based WMS**, highlighting improvements in operational efficiency and data integrity.

Business Context:

A mid-sized logistics company managing 3 regional warehouses and over 5,000 SKUs (Stock Keeping Units). The company currently uses a traditional WMS but is exploring blockchain integration for better traceability and accuracy.

Comparative Data (Simulated Results for 1 Month)

METRIC	CONVENTIONAL WMS	BLOCKCHAIN BASED WMS
Inventory Mismatch (%)	4.8%	0.9%
Order Fulfillment Time	185 Minutes	110 Minutes
Data Discrepancy Incidents	24 Cases	3 Cases
Manual Audit Frequency	8 Times	1 Time
Dispute Rate (%)	3.2%	0.6%

ANALYSIS

- ❖ **Inventory Mismatch:** Blockchain's real-time and tamper-proof logging of goods movement, especially when integrated with IoT sensors, significantly reduces inventory mismatches. Immutable entries prevent unauthorized changes or missed transactions.
- ❖ **Order Fulfillment Time:** Smart contracts automate repetitive tasks such as approval workflows and dispatch orders, reducing time delays in the processing pipeline.
- ❖ **Data Discrepancy:** With data being validated through consensus and stored across nodes, inconsistencies and duplication are drastically minimized.
- ❖ **Manual Audit Frequency:** The immutable audit trail maintained by blockchain reduces the need for manual verification of stock movement or order history.

- ❖ **Dispute Rate:** Improved transparency and traceability in transaction logs help resolve disputes quickly or prevent them entirely.

IMPLEMENTATION CHALLENGES AND LIMITATIONS

- ❖ **Scalability and Performance:** Public blockchains like Bitcoin have limited transaction throughput. While private, permissioned blockchains (e.g., Hyperledger Fabric) offer much higher performance, they may still face challenges in high-volume warehouse environments that process thousands of transactions per minute (Kshetri, 2018).
- ❖ **Integration and Interoperability:** Integrating blockchain technology with legacy Warehouse Management Systems (WMS) and Enterprise Resource Planning (ERP) systems is a complex and costly endeavor. Furthermore, a lack of industry-wide standards for blockchain protocols hinders interoperability between different supply chain networks (Casado-Vara, Prieto, De la Prieta, & Corchado, 2018).
- ❖ **Cost and Complexity:** The initial investment in technology, development, and specialized expertise can be substantial. Calculating a clear Return on Investment (ROI) remains a challenge, as many benefits, such as increased trust and improved data quality, are not easily quantifiable (Kamble et al., 2020).

CONCLUSION AND RESEARCH GAPS

Blockchain technology has the potential to revolutionize warehouse operations by creating a decentralized, transparent system, automating manual processes, providing real-time inventory visibility, and fostering efficiency and trust among supply chain partners through IoT devices and smart contracts. The conclusion reveals that a blockchain-based WMS enhances accuracy, transparency, and operational efficiency by reducing human intervention and automating trust mechanisms, thereby lowering costs and improving warehouse reliability.

The field of blockchain implementation in live warehouses is still in its infancy, with a lack of empirical case studies and industry standards for broader adoption.

85. CREATIVITY AND INNOVATION – BRIDGING THE GAP FOR DEVELOPING UNIQUE MARKETING STRATEGIES

Dr. Kishor Rajan

Professor,

Dept. of Management Studies, VINS Christian College of Engineering, Nagercoil.

Abstract

Creative marketing generates original ideas that capture audience attention, while innovation focuses on implementing these ideas into practical marketing solutions. This combination helps brands stay relevant, connect with consumers on a deeper level, and ultimately achieve their business goals. By embracing creativity as a core principle, brands can reveal new opportunities, forge deeper connections with consumers, and chart a path toward sustainable growth and success. By fostering a culture of creativity and implementing innovative practices, businesses can differentiate themselves in a crowded market, create emotional connections with their audience, and remain competitive in an ever evolving industry.

Keywords

Marketing, Creativity, Innovation, Strategies, Customer, Brand, Tools and Techniques etc.

Introduction

“**Marketing** is how you tell your story to attract customers, partners, investors, employees and anyone else your company interacts with. It’s the script that helps users decide if they’ll welcome you into their lives as a staple, nice-to-have or necessary annoyance. It’s the way that everyone interacts with your brand. It’s impression, first, last and everything in between”. **Jeff Cutler**

Creativity and innovation come together in marketing. Creativity and innovation are crucial for effective marketing, allowing businesses to differentiate themselves, engage customers, and drive growth. The current global economy is growing in a rapid speed and the globe is becoming very small in such a way for the common man to reach every nook and corner for self needs in terms of tangible and intangible goods. The ancient people or mankind did not have more than one choice since there was monopoly in all market and unavailability of resources in finding solutions to problems. Sales was the only option available since it did not have any dimensions other than pushing goods against the will of buyer by the seller thereby creating dissatisfaction in buyer as well as with the seller too. But

later on sales was transformed to marketing, it had more than one dimension and there happened to be a two way communication in business. As it had to be developed, advancements came further thereby bringing more inventions so as to bring transparency in markets for buyers. Creative marketing generates original ideas that capture audience attention, while innovation focuses on implementing these ideas into practical marketing solutions. This combination helps brands stay relevant, connect with consumers on a deeper level, and ultimately achieve their business goals.

Sales

A sale is the exchange of a commodity for money or service in return for money or the action of selling something. The seller or provider of goods or services completes a sale in response to an acquisition, an appropriation or a request. There is a passing of title (property or ownership) of the item, and the settlement of a price. A seller agrees upon a price which he willingly gives ownership of the item. The seller, not the purchaser generally executes the sale and it is completed prior to the obligation of payment.

Marketing

Marketing is communicating the value of a product or service to customers, for the purpose of selling that product or service. Marketing techniques include choosing target markets through market analysis and market segmentation, as well as understanding consumer behaviour and advertising a product's value to the customer. From a social point of view marketing is the link between a society's material requirements and its economic patterns of response. Marketing satisfies these needs and wants through exchange processes building and long term relationships. Marketing blends art and applied science (such as behaviour sciences) and make use of information technology.

Creativity

Creativity is the art of turning new and imaginative ideas into reality. Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing.

Creativity is a critical element for businesses looking to thrive in the business world. It allows organizations to develop products that meet consumer demands in unique ways. Traditional methods are no longer enough to captivate audiences bombarded with countless advertisements daily. To stand out in this competitive environment, businesses must embrace creativity and innovation in their marketing strategies. Furthermore, gone are the days when a

simple product pitch sufficed to sway consumer behaviour. With the advent of social media and online platforms, consumers are more empowered than ever. They demand engaging content that resonates with their values and aspirations.

Collaborative Creativity

Creativity flourishes in environments where diverse perspectives are welcomed and collaboration is encouraged. By fostering a culture of collaborative creativity, brands can tap into the collective genius of their teams and unlock new ideas and innovations. Whether through cross-functional brainstorming sessions, or co-creation initiatives with consumers, collaborative creativity enables brands to connect the power of collective intelligence and drive meaningful change.

What is Creativity in Marketing?

Creativity in marketing isn't just about designing flashy ads or crafting catchy slogans. It's about breaking through the noise, resonating with your target audience, and ultimately driving action. At its core, creativity is the spark that ignites innovation and fuels differentiation. Creativity in marketing refers to the ability to generate innovative ideas, concepts, and strategies that captivate audiences and differentiate brands in the marketplace. It involves thinking outside the box, challenging conventional norms, and pushing the boundaries of traditional marketing approaches. Creativity in marketing encompasses various elements, including:

- a.) **Originality:** Developing unique and fresh ideas that stand out from competitors.
- b.) **Relevance:** Adapting creative concepts to resonate with target audiences and address their needs and desires.
- c.) **Engagement:** Creating compelling content and experiences that capture attention and foster emotional connections with consumers.
- d.) **Impact:** Driving measurable results and achieving marketing objectives through creative campaigns and initiatives.

The Impact of Creative Marketing on Business

Creativity isn't just a nice to have; it's a driver of tangible business outcomes. From increased brand awareness to higher conversion rates, creative marketing directly impacts the bottom line. By investing in creativity, brands can unlock a host of benefits that propel them towards long-term success.

- **Driving Brand Awareness and Recognition**

In a crowded marketplace, brand awareness is essential for capturing mindshare and market share. Creative marketing campaigns have the power to elevate brands above the competition and leave a lasting impression on consumers. Whether it's through viral content, memorable experiences, or innovative storytelling, creativity amplifies brand visibility and recognition.

- **Enhancing Customer Engagement and Loyalty**

Building lasting relationships with customers is the cornerstone of sustainable growth. Creative marketing fosters engagement by delivering relevant, personalized experiences that resonate with audiences on a deeper level. By consistently delighting customers and exceeding expectations, brands can cultivate loyalty that withstands the test of time.

- **Generating Leads and Driving Conversions**

Ultimately, marketing exists to drive action and generate results. Creativity plays a pivotal role in influencing consumer behaviour and driving conversions. Whether it's through compelling calls-to-action, persuasive storytelling, or immersive experiences, creative marketing moves people from awareness to action, turning prospects into paying customers.

- **Fuelling Innovation and Differentiation**

Innovation is the lifeblood of business success, and creativity is its catalyst. Creative marketing not only differentiates brands from competitors but also inspires innovation across the organization. By fostering a culture of creativity and experimentation, brands can stay ahead of the curve and continuously push the boundaries of what's possible.

Innovation

Innovation is the implementation of a new or significantly improved product, service or process that creates value for business, government or society. Some say creativity has nothing to do with innovation – that innovation is a discipline, implying that creativity is not. Well, I disagree. Creativity is also a discipline, and a crucial part of the innovation equation. There is no innovation without creativity. The key metric in both creativity and innovation is value creation. Creativity in marketing fundamentally involves generating original and valuable ideas that seize the audience's interest, while innovation is about effectively integrating these ideas into practical marketing solutions. Creativity acts as the initial spark for launching new initiatives, whereas innovation transforms these creative concepts into concrete, significant experiences for consumers. In a marketplace where standing out is key,

creativity and innovation are critical assets that enable brands to establish their unique presence and sustain a competitive advantage.

The Impact of Innovation on Marketing Strategy

Defining Innovation in Marketing

While creativity is about ideation, innovation is about execution. In marketing, innovation is the process of taking creative ideas and transforming them into practical, actionable strategies that produce real results. It involves adopting new technologies, processes, and techniques that improve customer experiences, streamline operations, and generate value. Innovation is the driving force that allows companies to stay ahead of competitors. While creative ideas can spark interest, it is the innovative implementation of those ideas that leads to lasting impact and measurable success.

Innovation as a Competitive Advantage

Innovation in marketing can provide a significant competitive advantage. By adopting innovative strategies, brands can offer new value propositions to their customers, differentiate themselves in the market, and deliver unique experiences that competitors are unable to replicate easily. For instance, [Coca-Cola's personalization campaign](#), where customers could buy bottles with their names on them, was an innovative approach that strengthened customer loyalty and increased sales. This innovation, combined with creative messaging, made the brand more relatable to its audience. Similarly, Apple has consistently used innovation to revolutionize the tech industry. Its marketing strategies not only showcase their innovative products but also create a distinct brand identity focused on simplicity, design, and user experience. This combination of creativity and innovation has helped Apple become one of the most valuable companies in the world.

Integrating Creativity and Innovation into Marketing Strategies

Cultivating a Creative and Innovative Culture

For creativity and innovation to thrive within a business, it's essential to cultivate a culture that encourages both. This involves creating an environment where team members feel empowered to brainstorm, experiment, and challenge the status quo. Encouraging risk taking, fostering collaboration, and supporting diverse perspectives can help generate fresh ideas and innovative solutions. Companies can achieve this by offering training programs in creative thinking, encouraging cross departmental collaboration, and providing resources for experimentation. By cultivating a culture of creativity and innovation, businesses can ensure that these elements are at the core of their marketing strategies.

Tools and Techniques

There are several tools and techniques that can aid in the development of creative and innovative marketing strategies. Brainstorming sessions and design thinking are popular methods for generating new ideas, while digital innovation labs provide a space for testing and developing new marketing technologies and campaigns. These tools help teams move beyond conventional thinking and create marketing strategies that are both imaginative and effective.

Balancing Creativity and Practicality

While creativity and innovation are essential, it's important to balance them with practicality. Marketing strategies need to be not only creative but also ROI driven and feasible. Businesses should consider their budget, target audience, and marketing goals when implementing creative ideas. [Innovative marketing strategies](#) must deliver tangible results whether it's increased brand awareness, higher sales, or improved customer engagement.

Challenges in Pursuing Creativity and Innovation

Resource Constraints

One of the challenges businesses face when pursuing creative and innovative marketing strategies is the allocation of resources. Creativity and innovation often require significant investment in time, talent, and technology. Smaller businesses, in particular, may struggle to balance these resources while also managing day to day operations.

Risk Management

Innovation inherently involves risk. Not every creative marketing idea will succeed, and there is always the possibility that a campaign may fail to resonate with the audience. Therefore, businesses need to manage risk effectively, testing new ideas in smaller markets or using pilot campaigns to gauge potential success.

Sustaining Innovation

Maintaining innovation in an ever changing marketplace can be difficult. As trends evolve and consumer expectations shift, companies must continuously adapt their marketing strategies to stay relevant. Sustainability in innovation requires on-going research and development, along with the flexibility to pivot when necessary.

Conclusion

In a world where attention is scarce and competition is fierce, creativity isn't just an advantage; it's a necessity. Creativity and innovation are integral to developing unique marketing strategies that not only capture attention but also drive lasting success. From

capturing attention and building brand identity to solving problems and driving business success, creativity is the driving force behind effective marketing. By embracing creativity as a core principle, brands can reveal new opportunities, forge deeper connections with consumers, and chart a path toward sustainable growth and success. By fostering a culture of creativity and implementing innovative practices, businesses can differentiate themselves in a crowded market, create emotional connections with their audience, and remain competitive in an ever evolving industry.

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86. A STUDY ON GREAT GENDER EQUALIZER: ECONOMIC GLOBALIZATION AND MIGRATION

Dr. D. Shanthi Revathi

Head & Associate Professor

BBA Department

Ms. K Yasodai

BBA – III Year

School of arts and science, VMCC

Abstract:

Globalization has been extensively debated in a range of contexts, from trade to borders, international relations, and conflict. It appears to be a positive force for women as many scholars contend that it has offered women new opportunities, thus enhancing greater gender equality in many countries where traditional patriarchal structures are firmly entrenched. However, some scholars are more skeptical of the benefits of globalization for women. They note that despite women gaining an increasing share of employment opportunities in a globalized world, the expected redistribution of domestic, household, and childcare responsibilities often did not materialize. They also argue that multinational corporations appear to uphold patriarchal systems, as these entities often view women's labor as generally cheaper and more expendable than men's labor. In this paper, the intricacies between globalization, migration, and gender are examined in order to investigate gender inequality and its consequences as well as the ways in which international migration is facilitated by globalization. The feminization of migration brought about by globalization has resulted in many challenges to women, including disruptions to family life and to the children left behind when mothers migrate to other countries in search of employment. It has also resulted in women's position in society becoming more vulnerable as there is very little protection afforded to them as migrants, thus exposing them to many dangers such as sexual harassment.

Keywords: Globalization, Migration, Gender, Inequality.

Introduction:

Gender and Globalization

The debates about the interplay of globalization, economic growth, and poverty center on a gendered dimension in structural shifts. Globalization as a phenomenon has been examined by scholars in a range of contexts (Ullah & Ho, 2020; Ritzer, 2011), for example, trade, borders, international relations, migration, and warfare. Theoretically,

globalization is seen as a force that has decentralized power traditionally held by men and granted more power to women (Roth, 2006). The traditional gendered division of labor has become more deeply rooted through the broadening of new areas and modes of work brought about by globalization (Erickson, 2010). However, other scholars hold opposing views on the effects of globalization on women. Ullah and colleagues (2020b), Turnipseed (1986), and Standing (1989) agree that globalization has provided women with new opportunities; thus, feminization of employment is promoted and encouraged by globalization of production and flexible forms of employment.

Globalization and economic processes have had a profound impact on the lives of men and women of all ages, nationalities, social classes, and ethnicities (Ullah & Ho, 2020; Ullah, 2016). However, there are counterarguments that globalization reproduces gender stereotypes and creates barriers instead of dismantling them (Ullah, 2016; Chepkemei et al., 2013). While migration and globalization research extensively discusses gains and losses as a result of globalization, most studies focus on the influence of jobs on women's wellbeing, notably in the manufacturing sector.

The pro-globalists advocate that globalization promotes gender equality by generating employment opportunities in the export processing sector (Black & Brainerd, 2004), thus enabling women to escape the subordination of the traditional patriarchal system (Ullah, 2004). The relocation of firms and investors has resulted in increased professional mobility for women. Employers do not discriminate against women because of globalization (Black & Brainerd, 2004), as discrimination is costly in a fiercely competitive environment. When a country specializes in female-intensive services, gender inequality should be avoided because it reduces the country's ability to compete on a global scale (World Bank, 2011). However, Saunders (2004) and Moghadam (1999) note that despite women being successful in gaining an increasing share of employment opportunities, a redistribution of domestic, household, and childcare responsibilities did not materialize. Moghadam (1999) iterates that feminist theorists such as Friedan (1998) and Smith (1977) have been particularly critical of the structural adjustments of markets and their objectives to support women's labor because when compared to men, women's labor is generally cheaper and more expendable. This supports the notion that multinational corporations appear to uphold patriarchal systems. Standing (1989) argues that when these corporations shift their production sites to low-wage economies, more jobs are generated, implying that this relocation may trigger migration.

Globalization affects men and women differently. It harms women more than men because of the heightened risk of poverty for the former. Numerous research projects have established the fact that globalization has promoted gender inequality. Firstly, both men and women play different roles in the productive and reproductive sectors. Women's lower labor market position, involvement in the care economy, and the reproductive tasks associated with their gender role are harmed by an unequal division of labor. These factors limit women's access to resources and make them more vulnerable to poverty, which Moghadam (1999) refers to as a phenomenon known as the “feminization of poverty.”

Any attempts to liberalize markets have different consequences for men and women. As the segregation of the labor market is often based on gender, any trade expansion has a gendered effect. There are differences in the economic resources, social duties, and bodily experiences of men and women, and thus trade policies impact them differently. Secondly, the nature of global governance seems to ignore this gendered reality. Critics frequently accuse global governance of being gender biased because it maintains pre-existing imbalances in its policies (David, 1996). Third, structural transformations brought about by globalization have made the reproductive/care industry more crucial than it has ever been for economic growth. To mitigate the negative social consequences of the current economic crisis, recommendations for improvement to the care economy must be implemented. Low wages also harm the competitiveness of the productive economy. As a result, many lower-middle income countries actually attribute their economic progress to wage discrimination based on gender (Seguino, 2000).

Changes in women's positions and wellbeing around the world can also have a considerable impact on achieving human development goals because they already face gender- based discrimination (Pearson, 2000). This paper aims to offer an overview of current knowledge on the complex relationship between gender inequalities, on the one hand, and the economic liberalization policies that underpin globalization processes, on the other. To provide a thorough analysis of these issues, we investigate how globalization has impacted gender roles as a whole. Globalization has prompted a “global care chain” (Nguyen et al., 2017), which brings about the increased migration of domestic workers, most of whom are women. Taking this into account, Basu and Chattoraj (2022) argue that female domestic workers contribute significantly to sociocultural, political, and economic spheres through remittances and entrepreneurial activities.

Scholars (Cortes, 2015; Herrera, 2012; and Kusakabe, 2010) examine the impact of economic globalization and migration on women's employment. Most of them take the form of advocacy-oriented pieces. In this paper, we review studies that specifically connect the concept of globalization with the literature on the causal factors associated with gender and migration. Although the literature on this topic in Asian societies needs further development, we have reviewed more than a hundred papers from journals, edited books, technical reports, and working papers on gender-focused globalization. In addition, research from the Internet provided secondary data from an array of online reports, documents, and newspaper articles.

Conceptual Issues

Economic globalization and capital integration are hot topics in academic circles. Professionals such as gender-focused economists and social scientists have attempted to address the issue of globalization. Despite economic forces being a significant factor in its development, globalization is regarded as a complex phenomenon with political and cultural dimensions. Through new information and communication technologies, as well as free trade and finance-friendly legislative policies, globalization has increased economic interconnections through trade, money flows, and global production (Ullah & Ho, 2020).

Globalization can take on two distinct meanings where the fundamental definition of globalization includes technological improvements, trade and financial liberalization, and the internationalization of production via multinational corporations (MNCs) along with regional integration. Stabilization and structural adjustment plans, the state's withdrawal from the economic process of governance "marketization," are also included in the broader term (Taylor, 2000; Blackmore, 2000).

Female

Although gender is embedded within society and culture, this does not mean that there are all-encompassing characteristics that are seen as masculine or feminine (Figure 1). Hence, migration is viewed as very much a gendered phenomenon (O'Neil et al., 2016), as it is shaped by gender norms and expectations, power relations, and unequal rights (see Figure 3). For example, women migrants make a substantive contribution to Asia's labor market due to the rising intra- and inter-Asian women's migration since the 1990s.

Globalization has prompted replacement migration—which refers to the international migration needed to offset declines in the size of the population, the declines

in the population of working age people, and the overall aging of a population—and implies that the demand for domestic helpers has increased. There are an estimated 75.6 million domestic laborers worldwide, with 76.2% being women, meaning that men make up only about a quarter of all domestic workers (Basu & Chattoraj, 2022). When it comes to seeking jobs in the domestic sector, women have an advantage over men. The Asia Pacific region remains the world's largest employer of domestic workers (ILO, 2021). China employs 22 million domestic workers, followed by India (4.8 million), the Philippines (2 million), Bangladesh (1.5 million), and Indonesia (1.2 million). Their monthly income is 56% lower than that of other workers, and they are more likely to work in extremely vulnerable conditions. Labor and social security policy deficiencies contribute to the informality of domestic work (ILO, 2021).

Women's migration is frowned upon in traditional societies. It is also portrayed as women "abandoning" their responsibilities as wives and/or mothers (Keough, 2006). Restrictive patriarchal gender norms, often reinforced by legal barriers to their freedom, discourage women migrants of some sending countries from arriving in the destination countries (Oishi, 2005). Women's migration is tolerated, if not welcomed, in some contexts. Social attitudes, on the other hand, are gradually changing and play a role in determining the acceptability of women's migration.

Women's experiences in male-dominated occupations are equally well-documented (Harris & Guiffre, 2010). According to Acker (1990), Levin (2001), and Pierce (1995), women in various professions try to fit in by presenting socially as men and hiding their gender through appearance, interactions, and work performance. Women in non-traditional jobs earn respect by emphasizing their equality (Roth, 2006). In this classic gender integration technique, women must disguise their femininity in male-dominated companies (Britton, 2003; Zimmer, 1987). Thus, the feminization of migration becomes a self-reinforcing process; once migration resumes, gender norms in the society of origin become more equitable, leading more women to migrate.

Feminist approaches to globalization seek to provide frameworks for understanding the the impact of displacement on women's traditional work and livelihoods, and job losses during economic downturns. Job losses due to gender segregation in the labor market are becoming increasingly risky, as finding a new one is notoriously difficult (Fontana et al. 1998). The feminization of unemployment is a global economic phenomenon that is closely related to the feminization of labor, and it is exacerbated by women's precarious

financial position (Moghadam, 1999). Globalization-related economic, social, and demographic changes have increased the pool of potential female labor migrants (see Figure 2). Several lower-middle income countries have implemented economic reforms in the last three decades that have resulted in male unemployment and pushed women into the labor force by contributing to reductions in welfare services, placing additional burdens on women to "replace" these services, either with additional domestic labor or through wage work (Sassen, 2000).

Though women's capacity to migrate has historically been hampered by traditional gender roles, they are now increasingly able to move freely, which is a hallmark of globalization. Asian women are the fastest-growing segment of international migrants (Wilson, 1999). In the Caribbean, many women are motivated to relocate for both practical and emotional reasons. Unfortunately, undocumented migrant women are subjected to a variety of assaults. Women's migration, tourism, and the global sex trade are all intertwined, and the global sex industry is a direct result of this. In terms of revenue, the sexual exploitation of women is second only to transnational drug and weapon trafficking. According to Hughes (2000), new technology, global tourism, and globalized crime have enabled the sex industry to exploit, sell, and transport women and children to male consumers.

Care workers are a significant source of international migration from developing and transitional countries to advanced countries. Women work as nurses, midwives, live-in caregivers for the sick and elderly, nannies, and housekeepers, while men work in construction, manufacturing, and agriculture. The most skilled migrant workers are in the healthcare industry. Their skills are sought after in many middle- and higher-income countries. More than half of the U.K. Nursing and Midwifery Council's new registrants in 2003 were international nurses while 40% of medical personnel in Queensland, Australia were trained abroad. Meanwhile, 57% and 53% of registered nursing positions remained vacant in Ghana and Malawi, respectively, in 2002 (Maybud & Wiskow, 2007).

Certain aspects of globalization have had a significant impact on people's ability to travel around the world. When it comes to information dissemination, technological and communication advancements are to blame for the shift in public perception. Travel has made it easier for many people to learn about the social and economic problems of other countries.

Conclusion

One of the primary drivers of the growing gender divide is women's inability to compete equally with men in the global economy. The labor market has been divided along racial and gender lines since the industrial revolution, and, as a result, women and men continue to face significant discrimination in society and the workplace. Women's labor—paid and unpaid—in the informal sector and at home, in manufacturing, and in public and private services is critical to global accumulation in market economies, new trade regimes, and competitive export industries. While global capitalism provides opportunities for women, they are hired under the assumption that women are only qualified for low-wage jobs. As a result, women are harmed and exploited at a disproportionately higher rate.

Globalization and the proliferation of information and communication technologies (ICTs) have increased women's access to economic opportunities and, in some cases, have led to higher wages for women compared to men. Increased trade, travel, and cross-border communication have all contributed to a dramatic economic shift over the last three decades. These shifts have had an impact on markets and institutions all over the world. We contend that the costs of gender inequality are higher in today's globalized economy because it makes it more difficult for countries to compete in the global market, particularly if they focus on producing goods and services that heavily rely on women's labor.

In relation to these challenges, it is imperative that all countries ratify anti-discrimination treaties to reduce the gender gap. We believe that changing gender roles brought about by globalization help in the advancement of gender equality. Governments must facilitate expanded access to information to assist countries in learning about social mores in other countries and to encourage the development of more equitable views. Ultimately, government intervention is imperative to eliminate the disparities in wealth, power, and economic opportunities between men and women.

87. ETHICAL CHALLENGES AND RESPONSIBILITIES OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCES

Dr. V. Nagavalli

Assistant Professor,

Department of Business Administration,

Soka Ikeda College of Arts and Science for Women,

Sethu Bhaskara Nagar, Madhanang kuppam, Chennai 600099.

Abstract:

The integration of Artificial Intelligence (AI) into Human Resource Management (HRM) offers significant potential for improving efficiency, accuracy, and decision-making. However, it also introduces complex ethical challenges that must be addressed to ensure responsible adoption. This study examines the ethical challenges and responsibilities associated with AI in HR, focusing on issues such as bias and discrimination, lack of transparency, privacy concerns, informed consent, over-reliance on automation, accountability gaps, and job displacement. The research adopts a qualitative approach, drawing from academic literature, case studies, and industry reports to analyze risks and propose mitigation strategies. The review of literature highlights that AI systems often reflect biases embedded in historical datasets, potentially perpetuating inequality in hiring and promotions. The findings suggest that while AI can enhance HR processes, its ethical implementation depends on proactive governance, transparency, and a commitment to human-centered decision-making. This research contributes to the growing discourse on responsible AI use in HR, offering practical recommendations for aligning technological innovation with ethical principles.

Keywords: *Artificial Intelligence, Human Resource Management, Ethics, Bias*

1.1 Introduction

AI is transforming HR practices by automating processes, enhancing decision-making, and offering predictive insights into workforce trends. From AI-driven recruitment platforms to automated performance management tools, organizations are increasingly relying on smart technologies to improve efficiency. However, these advancements are not without challenges. AI systems can perpetuate biases, infringe on privacy, and create a lack of transparency in decision-making. In this context, HR managers must adopt a responsible approach to AI integration, ensuring that technology serves people without compromising ethics.

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1.2 Objectives of the study

- ❖ To identify the key ethical challenges in the use of AI in HR functions.
- ❖ To understand the responsibilities of HR managers in ensuring fair AI implementation.

1.3 Research Methodology

This study adopts a qualitative and descriptive research design based on secondary data to examine the ethical challenges and responsibilities of Artificial Intelligence in Human Resource Management. Inclusion criteria focused on literature addressing AI applications in HR functions with ethical implications. A thematic analysis identified key concerns—bias, privacy, transparency, and accountability—which were synthesized into actionable recommendations. The study is limited by its reliance on secondary data and the rapidly evolving nature of AI technologies.

1.4 Review of Literature

Bogen and Rieke (2018) highlight that AI recruitment tools often replicate and reinforce biases embedded in historical hiring data. Since these systems are trained on past decisions, they may inadvertently favor certain demographic groups while disadvantaging others, perpetuating patterns of discrimination. This is particularly problematic in contexts where historical hiring practices lacked diversity or inclusivity. The authors recommend embedding bias mitigation in the AI development process through careful dataset curation, fairness auditing, and continuous monitoring to ensure equitable hiring outcomes.

Raghavan et al. (2020) emphasize the importance of explainable AI (XAI) in hiring processes as a way to maintain trust and transparency. They argue that when AI systems make recruitment recommendations or rejections, stakeholders should be able to understand the underlying rationale. Without explainability, organizations risk undermining confidence in AI decisions and facing legal or reputational consequences. They advocate for transparent

models and clear explanations to ensure accountability and fairness in AI-driven HR practices.

Dastin (2018) presents a practical case study by reporting on Amazon's experimental AI recruiting tool, which exhibited gender bias by downgrading resumes containing terms linked to women, such as participation in women's organizations. This example illustrates how unmonitored AI can unintentionally amplify societal inequities. The case also demonstrates the necessity of ongoing bias testing and system adjustments to avoid discriminatory outcomes in recruitment processes.

The Chartered Institute of Personnel and Development (CIPD, 2021) underscores that ethical AI in HR should prioritize employee consent, privacy, and inclusivity. The use of AI in recruitment, performance analysis, and workforce analytics requires careful handling of sensitive personal data. Securing informed consent, maintaining confidentiality, and ensuring inclusive practices that accommodate diverse applicant pools are essential. CIPD recommends integrating ethical principles directly into HR policy frameworks so that AI technologies support both organizational goals and employee well-being.

Köchling and Wehner (2020) argue that successful AI adoption in HR requires strong governance frameworks to ensure fairness, accountability, and compliance with legal standards. Such frameworks should define clear guidelines for data usage, create accountability structures for AI-driven decisions, and mandate regular bias audits. They suggest that robust governance not only minimizes risks but also strengthens trust among employees, applicants, and other stakeholders, thereby enhancing the long-term sustainability of AI integration in HR functions.

1.5 Ethical Challenges of Artificial Intelligence in Human Resources

1. Bias and Discrimination

AI systems in HR, particularly in recruitment and performance evaluation, often learn from historical datasets that may contain implicit human biases. If these biases are not identified and corrected, AI can unintentionally perpetuate and even amplify unfair treatment toward specific demographic groups such as women, minorities, or older workers. For example, AI-powered resume screening tools might favor candidates from certain educational backgrounds or regions due to biased training data, undermining diversity and inclusion efforts.

2. Lack of Transparency –

Many AI algorithms, especially deep learning models, operate as “black boxes,” meaning their internal decision-making processes are not easily explainable. In HR, this lack of explainability poses challenges when candidates or employees question why they were rejected, promoted, or given a particular evaluation. Without transparency, it becomes difficult to maintain trust and meet compliance standards, especially in jurisdictions where explainable AI is mandated by law.

3. Privacy Concerns –

AI-driven HR tools often process vast amounts of sensitive employee data, including personal identifiers, behavioral analytics, and even biometric information. Without robust cybersecurity measures and strict data governance policies, there is a heightened risk of data breaches, unauthorized access, or misuse. Such violations can damage an organization’s reputation, lead to regulatory penalties, and erode employee trust.

4. Informed Consent –

Ethically, employees should understand and agree to how their personal data will be collected, processed, and used by AI systems. However, in practice, consent forms are often written in complex legal language, making it difficult for employees to fully grasp the implications. This creates ethical concerns about whether consent is truly “informed” and raises debates over data ownership rights in the workplace.

5. Over-Reliance on Automation –

While AI can streamline HR processes and increase efficiency, excessive automation can result in a loss of human judgment, empathy, and contextual understanding. Important HR decisions—such as conflict resolution, promotions, or disciplinary actions—require nuanced human interaction that AI cannot fully replicate. Over-dependence on automation may lead to cold, impersonal decision-making that harms employee morale.

6. Accountability Gaps –

When an AI system makes an incorrect or biased decision, it is often unclear who should be held accountable—the HR department, the AI vendor, or the software developers. This lack of clear responsibility not only complicates legal liability but also poses ethical dilemmas in addressing grievances. Establishing accountability frameworks is essential to ensure fairness and justice in AI-driven HR practices.

7. Job Displacement

The adoption of AI in HR can automate administrative and repetitive tasks traditionally performed by HR staff, such as initial resume screening, scheduling interviews, and onboarding documentation. While this can improve efficiency, it may also lead to job displacement, reduced career growth opportunities for HR professionals, and the need for reskilling to remain relevant in a tech-driven environment.

1.6 Ethical Responsibilities of Artificial Intelligence in Human Resources

1. Ensure Fairness and Inclusivity –

AI systems used in hiring, promotions, and performance evaluations must be routinely audited to identify and eliminate biases. This includes testing algorithms with diverse datasets, reviewing decision patterns for disparities across gender, age, ethnicity, or disability, and making necessary adjustments to promote equal opportunities. Regular bias mitigation ensures that AI-driven HR processes support diversity and inclusion goals rather than undermine them.

2. Maintain Transparency –

HR teams should provide clear, non-technical explanations of how AI systems arrive at decisions, especially when those decisions directly affect employment outcomes. This transparency helps build trust among employees and candidates while also complying with regulatory requirements in regions where algorithmic accountability is mandated. Transparent communication also empowers individuals to challenge or appeal AI decisions when necessary.

3. Protect Privacy and Confidentiality –

Given that AI in HR often processes sensitive personal information—including demographic details, health records, and behavioral metrics—strong data security measures are essential. Organizations should implement encryption, secure storage systems, and strict access controls. Compliance with data protection regulations such as GDPR, CCPA, or local privacy laws helps safeguard employee trust and prevent legal consequences from breaches or unauthorized data use.

4. Obtain Informed Consent –

Before collecting or processing employee or candidate data, organizations should clearly explain the purpose, scope, and duration of data usage in accessible language. This ensures that individuals understand what they are agreeing to and can make informed choices.

Providing opportunities to opt-out or limit data usage further strengthens ethical compliance and respects personal autonomy.

5. Implement Robust Governance Frameworks –

A clearly defined governance structure is vital for responsible AI use in HR. This includes setting ethical guidelines, defining the scope of AI applications, assigning accountability to specific roles, and ensuring compliance with labor and anti-discrimination laws. Governance frameworks should also outline protocols for addressing grievances related to AI decisions.

6. Blend Human and Machine Decision-Making –

AI should be used as a decision-support tool rather than a replacement for human judgment. Final decisions—particularly in sensitive areas such as terminations, promotions, or disciplinary actions—should involve human oversight to ensure that contextual factors, empathy, and organizational culture are taken into account. This hybrid approach balances efficiency with ethical responsibility.

7. Continuous Monitoring and Improvement –

AI systems in HR should not remain static. Regular updates, performance checks, and retraining of AI models are necessary to adapt to evolving legal requirements, changing social norms, and new organizational policies. Continuous monitoring also helps detect emerging biases, performance degradation, or ethical risks, ensuring that AI remains a reliable and fair tool over time.

1.7 Findings & Suggestions

The study finds that while AI significantly enhances efficiency, accuracy, and scalability in HR processes, it also presents ethical challenges such as bias and discrimination, lack of transparency, privacy concerns, informed consent issues, over-reliance on automation, accountability gaps, and potential job displacement. These risks, if left unaddressed, can erode trust, compromise fairness, and undermine the human-centered values of HR. To address these concerns, the study suggests implementing regular audits to detect and mitigate bias, ensuring transparency by providing clear explanations for AI-driven decisions, and safeguarding privacy through robust data protection measures. Organizations should also secure informed consent by clearly communicating data usage policies, establish strong governance frameworks to define ethical guidelines and responsibilities, blend human judgment with AI recommendations to preserve empathy in decision-making, and

continuously monitor and update AI systems to remain compliant with evolving legal and ethical standards.

1.8 Conclusions

The rapid adoption of Artificial Intelligence in Human Resource Management marks a paradigm shift in how organizations attract, manage, and retain talent. AI-driven tools, when implemented responsibly, can streamline processes, improve objectivity, and enable data-informed decision-making. However, these benefits are accompanied by significant ethical challenges, including bias, lack of transparency, privacy concerns, and accountability gaps. Failure to address these concerns can erode trust, lead to legal repercussions, and undermine organizational credibility. Therefore, it is essential for organizations to adopt a holistic approach that balances technological efficiency with ethical responsibility. This involves establishing strong governance frameworks, enforcing transparency and fairness, ensuring informed consent, protecting employee privacy, and maintaining a human-centric approach in decision-making. Continuous monitoring, regular bias audits, and adaptability to evolving legal and societal norms are crucial to ensuring that AI serves as a tool for empowerment rather than exclusion. Ultimately, the responsible use of AI in HR should aim not just for operational excellence but also for reinforcing equity, trust, and inclusivity in the workplace, thereby fostering sustainable organizational growth.

88. FINTECH APPLICATIONS AND THE EVOLUTION OF DIGITAL BANKING: TRANSFORMING FINANCIAL SERVICES IN THE DIGITAL

M. Sankari

Assistant Professor

Annai veilankannis College of Arts and Science

Abstract:

The financial services sector is undergoing a seismic transformation, driven by rapid technological advancements. Financial Technology, or **Fintech**, has emerged as a disruptive force, challenging traditional banking models and offering innovative solutions through digital platforms. This paper explores the core applications of Fintech, including digital payments, peer-to-peer (P2P) lending, robot-advisory, block chain, and non banking. It also examines the rise of **digital banking**, where banks operate entirely online without physical branches, and how it redefines customer expectations, regulatory compliance, cyber security, and financial inclusion.

Fintech (short for *Financial Technology*) refers to the integration of technology into financial services to improve their delivery and efficiency. It involves using software, mobile apps, artificial intelligence, block chain, and cloud computing to offer innovative solutions in banking, investing, insurance, lending.

Digital Banking is the digitization of all traditional banking activities and services, making them accessible online without the need for physical branches. It includes services like account opening, funds transfer, loan applications, and customer support, all through web or mobile apps.

Types of Digital Banking:

- ❖ **Online banking:** Provided by traditional banks with digital portals.
- ❖ **Neo banks:** Fully digital banks with no physical branches (e.g., Niyo, Revolut).

Importance in the Modern Financial Ecosystem

1. Accessibility & Convenience:

- o Customers can access financial services 24/7 from anywhere.

2. Financial Inclusion:

- o Reaches unbanked and underbanked populations in rural or remote areas.

3. Cost Efficiency:

- o Reduces operational costs for banks and fees for customers.

4. Innovation & Speed:

- o Real-time payments, instant loan approvals, and AI-based financial advice.

5. Data-Driven Decisions:

- o AI and big data analytics enable personalized financial services.

6. Competitive Pressure:

- o Traditional banks are forced to innovate, improving service quality across the industry.

7. Resilience During Crises:

- o During COVID-19, digital banking enabled continuity of financial services.

Core Fintech Applications

- ❖ **Digital Payments** (e.g., UPI, PayPal, Stripe)
- ❖ **P2P Lending** (e.g., LendingClub)
- ❖ **Robo-Advisors** (e.g., Betterment, Wealthfront)
- ❖ **Insurtech**
- ❖ **Block chain and Cryptocurrency**

❖ Difference Between Traditional Banks, Online Banks, and Neobanks

Feature	Traditional Banks	Online Banks	Neobanks
Physical Branches	Yes	Few or none	None
License	Fully licensed banks	Fully licensed banks	Usually partner with licensed banks or hold digital-only licenses
Technology Use	Moderate	High	Very high
Customer Experience	Branch + digital	Digital-first	Digital-only, mobile-first
Examples	HDFC Bank, Bank of America	Ally Bank, ING Direct	Revolut, N26, Chime, Nubank

Advantages of Digital Banking

1. Convenience & Accessibility

- ☐ Available 24/7 from anywhere with an internet connection.
- ☐ No need to visit physical branches for routine transactions.
- ☐ Supports mobile banking, online transfers, and bill payments on the go.

2. Cost Efficiency

- ☐ Lower operating costs for banks (no physical branches or large staff).
- ☐ Reduced service charges and fees for customers.
- ☐ Paperless transactions save time and resources.

3. Faster Transactions

- ☐ Real-time payments, instant transfers, and quick loan approvals.
- ☐ Reduces delays associated with manual processing.

4. Enhanced Customer Experience

- ☐ Personalized services through AI and data analytics.
- ☐ Instant notifications, expense tracking, and budgeting tools.
- ☐ Chatbots and digital assistants offer 24/7 customer support.

5. Financial Inclusion

- ☐ Extends banking services to underserved and remote populations.
- ☐ Mobile-based banking allows access even without a PC or stable infrastructure.

8. Eco-Friendly

- ☐ Promotes paperless banking.
- ☐ Reduces carbon footprint by cutting down on physical infrastructure and travel.

9. Integration with Modern Services

- ☐ Connects easily with other fintech apps (e.g., investment platforms, budgeting tools).
- ☐ Supports open banking and third-party financial services through APIs.

Challenges and Risks in Digital Banking

1. Cybersecurity Threats

- ☐ **Issue:** Digital platforms are prime targets for hacking, phishing, malware, and ransomware attacks.
- ☐ **Impact:** Data breaches, financial losses, reputational damage.
- ☐ **Example:** Cyberattacks on banks like Capital One and Equifax show how vulnerable financial data can be.

2. Data Privacy Concerns

- ☐ **Issue:** Handling of massive volumes of sensitive user data increases privacy risks.
- ☐ **Challenge:** Ensuring compliance with regulations like GDPR, CCPA, and India's Digital Personal Data Protection Act (DPDPA).
- ☐ **Impact:** Misuse of personal data can erode customer trust.

3. Digital Literacy Gap

- ☐ **Issue:** Not all users are comfortable using mobile or internet banking.
- ☐ **Impact:** Older populations and rural users may be excluded or fall victim to scams.
- ☐ **Solution:** Financial and digital education is crucial.

4. Technical Glitches & Downtime

- ❑ **Issue:** Outages, server crashes, or app bugs can disrupt service.
- ❑ **Impact:** Delayed transactions, customer dissatisfaction, and potential financial loss.

5. Regulatory and Compliance Challenges

- ❑ **Issue:** Fintech and digital banks operate in fast-evolving environments with complex regulations.
- ❑ **Examples:** KYC/AML requirements, cross-border payment regulations, and sandbox restrictions.
- ❑ **Impact:** High compliance costs and legal risks.

Future of Fintech and Digital Banking

1. Embedded Finance

Embedded finance refers to integrating financial services—like payments, lending, insurance, or investments—directly into non-financial platforms (e.g., e-commerce apps, ride-sharing).

2. Open Banking APIs

Open Banking allows third-party developers to access a customer's banking data—securely and with consent—via APIs (Application Programming Interfaces). It encourages innovation and competition in financial services.

3. Central Bank Digital Currencies (CBDCs)

CBDCs are digital versions of a country's fiat currency issued and regulated by the central bank. They are designed for secure, real-time, government-backed digital payments.

4. AI, ML, and Biometric Banking

Artificial Intelligence (AI) & Machine Learning (ML)

Applications:

- ❑ Credit scoring using alternative data
- ❑ Fraud detection and risk management
- ❑ Robo-advisors for automated investing

Biometric Banking

Use of biometric identifiers like fingerprint, facial recognition, iris scan, or voice recognition to authenticate users.

Conclusion:

Fintech applications and digital banking are redefining the financial landscape. The study reveals a strong shift toward digital tools for financial services, especially among younger populations. However, challenges around data privacy, regulation, and user education persist. Future progress relies on bridging the digital divide and ensuring secure, scalable and user-friendly systems.

89. ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE DEVELOPMENT IN MSMEs: OPPORTUNITIES, APPLICATIONS, AND CHALLENGES

Manikandan. R, Vignesh. G, Leena Jackulin. R

II M.Com,
Department of Commerce
Jaya College of Arts and Science,
Thiruninravur – 602 024.

Abstract

Artificial Intelligence (AI) is rapidly emerging as a key enabler of innovation and efficiency across industries, including Micro, Small, and Medium Enterprises (MSMEs). As the global focus shifts toward achieving Sustainable Development Goals (SDGs), MSMEs face growing pressure to adopt eco-friendly and socially responsible practices while remaining competitive. This paper explores how AI technologies can support MSMEs in advancing sustainable development by optimizing resource use, improving energy efficiency, reducing waste, and enabling smarter decision-making. It highlights practical applications of AI across sectors, outlines the economic and environmental benefits, and addresses the challenges that hinder widespread adoption, such as cost, infrastructure, and technical skills. The paper concludes by emphasizing the need for supportive policies, capacity-building initiatives, and collaborative ecosystems to enable MSMEs to leverage AI effectively for a sustainable future.

Introduction

Micro, Small, and Medium Enterprises (MSMEs) are vital to global economic growth, contributing significantly to employment generation, innovation, and poverty reduction. In countries like India, MSMEs account for nearly 30% of GDP and provide employment to over 110 million people. However, these enterprises often struggle with limited access to capital, outdated technologies, and lack of skilled labor, making them vulnerable to market disruptions and environmental challenges.

In the context of growing global awareness around climate change and sustainability, there is an urgent need for MSMEs to align their operations with sustainable development goals (SDGs). This is where Artificial Intelligence (AI) can play a transformative role. AI, through its ability to analyze vast amounts of data, automate tasks, and improve decision-making, offers MSMEs a unique opportunity to enhance productivity while minimizing environmental impact.

By integrating AI into key business functions—such as energy management, supply chain optimization, and waste reduction—MSMEs can become more resource-efficient, resilient, and environmentally responsible. This introduction sets the stage for examining how AI can support MSMEs in achieving sustainable development, the specific areas of application, and the challenges and policy support needed for effective adoption.

- To examine the role of Artificial Intelligence in promoting sustainable development within MSMEs Explore how AI technologies can drive environmental, social, and economic sustainability in small and medium enterprises.
- To assess the benefits and opportunities AI brings to MSMEs for sustainable growth Highlight how AI can enhance productivity, reduce operational costs, and enable MSMEs to meet sustainability goals.
- To understand the challenges faced by MSMEs in adopting AI technologies Address issues like high implementation costs, lack of technical expertise, limited infrastructure, and data privacy concerns.

Review of Literature

The intersection of **Artificial Intelligence (AI)** and **sustainable development** has been widely studied in the context of large enterprises and government initiatives, but limited research has focused specifically on Micro, Small, and Medium Enterprises (MSMEs). The following literature highlights the emerging role of AI in driving sustainability and the unique challenges MSMEs face in adopting such technologies.

NITI Aayog (2020) outlined the potential of AI in transforming sectors like agriculture, healthcare, and manufacturing in India. It recognizes MSMEs as a critical sector that can benefit from AI, provided the right support systems— such as digital infrastructure and skill development—are in place.

OECD (2023) discussed how AI adoption remains low among small businesses due to cost, lack of expertise, and data challenges. It emphasizes the importance of policy interventions and AI-as-a-service models to bridge the technological gap. **McKinsey & Company (2021)** found that AI can help reduce greenhouse gas emissions, improve energy efficiency, and optimize waste management. While the study focuses on large firms, it notes that scalable AI solutions can also be adapted to fit the needs of small businesses.

World Bank (2022) highlights how AI, IoT, and cloud computing can enable MSMEs to overcome size-related disadvantages. It identifies

gaps in digital readiness and recommends investment in digital skills and affordable tools tailored to MSMEs.

Summary of Gaps in Literature

- Most studies focus on large enterprises and national policy frameworks.
- There is a lack of case-specific research on how MSMEs, especially in developing countries, can practice

Statement of the Problem

Despite being critical drivers of economic development, Micro, Small, and Medium Enterprises (MSMEs) often struggle to adopt sustainable practices due to limited access to advanced technology, skilled workforce, and financial resources. As global emphasis on sustainable development intensifies, MSMEs face increasing pressure to minimize their environmental footprint while maintaining productivity and profitability. Artificial Intelligence (AI) has the potential to address these challenges by improving operational efficiency, reducing waste, and enabling data-driven decision-making. However, the integration of AI in MSMEs remains low, primarily due to high implementation costs, lack of awareness, technical skill gaps, and inadequate policy support. This creates a gap between the potential of AI for promoting sustainability and its actual adoption in the MSME sector. The problem, therefore, lies in identifying how AI can be effectively leveraged to support sustainable development in MSMEs, while addressing the barriers that hinder its widespread implementation.

Need for the Study

MSMEs contribute significantly to economic growth, employment, and innovation, particularly in developing economies. However, they often operate with resource constraints, outdated technologies, and limited access to sustainability-driven innovations. As global priorities shift toward achieving the Sustainable Development Goals (SDGs), it becomes essential for MSMEs to adopt more environmentally and socially responsible practices. Artificial Intelligence (AI) offers promising solutions to these challenges by enabling smarter operations, optimizing resource use, reducing environmental impact, and improving decision-making. Despite its potential, AI adoption among MSMEs remains limited due to financial, technical, and infrastructural barriers. There is a pressing need to study how AI can be practically applied to support sustainable development in MSMEs. This includes identifying opportunities, assessing real-world applications, understanding obstacles, and proposing actionable strategies. Such a study is essential to bridge the gap between emerging AI

capabilities and the sustainability needs of MSMEs, thereby empowering them to grow responsibly and competitively in the digital age.

AI Applications for MSMEs' Sustainable Development

AI systems are able to track and forecast trends in energy use, recommend conservation strategies, and lower operating expenses. AI improves inventory management, demand forecasting, and route optimization, which reduces waste and fuel use. MSMEs can support the objectives of the circular economy by using AI-powered solutions to sort, recycle, and reuse materials more effectively. Businesses may minimize production errors, improve the usage of raw materials, and detect flaws early by combining AI with IoT and machine learning. AI helps agro-based MSMEs lower input costs and their environmental effect by assisting with crop prediction, pest detection, and precision farming.

Benefits of AI Integration in MSMEs

- ☐ Cost Reduction through process automation and waste minimization.
- ☐ Higher Productivity via intelligent task management and predictive maintenance.
- ☐ Eco-Friendly Operations supporting responsible production and reduced emissions.
- ☐ Improved Competitiveness in domestic and global sustainable markets.
- ☐ Data-Driven Decisions based on accurate real-time insights and predictive analytics.

Challenges in AI Adoption by MSMEs

- ☐ High Initial Costs of AI software, hardware, and customization.
- ☐ Lack of Technical Expertise among owners and employees.
- ☐ Poor Digital Infrastructure in rural or underdeveloped areas.
- ☐ Concerns over Data Privacy and Cybersecurity.
- ☐ Resistance to Change due to traditional business mindsets.

Recommendations

- ☐ Government Incentives: Subsidies, tax breaks, and grants for AI adoption in MSMEs.
- ☐ Skill Development: AI training programs tailored to small businesses.
- ☐ Digital Infrastructure: Improving internet access and cloud-based tools.
- ☐ Public-Private Partnerships: Collaboration between tech firms and MSMEs.
- ☐ AI-as-a-Service Models: Affordable, subscription-based AI tools for small-scale usage.

Conclusion

Artificial Intelligence offers immense potential to transform MSMEs into more sustainable, efficient, and resilient enterprises. By leveraging AI technologies, MSMEs

can optimize resource use, minimize environmental impact, and make data-driven decisions that support long-term growth. From energy management and waste reduction to supply chain optimization and smart manufacturing, AI can help MSMEs align their operations with the global Sustainable Development Goals (SDGs).

However, the adoption of AI in this sector remains limited due to challenges such as high implementation costs, lack of digital skills, and inadequate policy support. Addressing these barriers through targeted government initiatives, capacity building, affordable AI solutions, and collaborative ecosystems is essential.

In conclusion, for MSMEs to fully harness the power of AI for sustainable development, a multi-stakeholder approach involving policymakers, technology providers, financial institutions, and business leaders is crucial. With the right strategies in place, AI can serve not only as a tool for innovation and efficiency but also as a catalyst for inclusive and sustainable economic growth.

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90. APPLICATION ON AI IN BUSINESS AND TECHNOLOGY

R. Rejisha, G. Keerthana , V. Chitra

ABSTRACT

AI has a wide range of implications, and it's important to look at both its positive and negative impacts on governments, individuals, communities, and companies. The overall impact of AI, from research to deployment, is being investigated. The purpose of this paper is to investigate the factors that are responsible for the advancement of AI and its impact on the global market. The research also addresses influential academic achievements and innovations in the field of AI and their impact on entrepreneurial activities. By analysing two lists of the top 100 AI start-ups, the paper explores entrepreneurial activities related to AI. The inferences from this research will lead to an improved understanding of the innovations and the overall impact of AI on businesses and society. It will also provide a better understanding of how AI can transform business operations and the global economy.

INTRODUCTION

The integration of Artificial Intelligence (AI) into business and technology is redefining the way organizations operate. From predictive analytics in finance to chatbots in customer service, AI enables faster, more accurate, and cost-effective solutions. In India, the rise of digital transformation initiatives has accelerated AI adoption, particularly in retail, banking, healthcare, and manufacturing. Innovation has consistently served as the primary driver for an improved quality of life throughout history, though this process can be highly disruptive, as it often renders older technologies obsolete. A number of emerging technologies, such as big data, cloud computing, data science, the Internet of Things (IoT), blockchain, and artificial intelligence (AI), have the potential to create both successful and unsuccessful outcomes globally. Even though some of these technologies have been around for over two decades, they were not viable for commercial use or in the mainstream until recently. The situation has changed dramatically in the past few years, with nearly every field now using one or more of these technologies.

The advancement of AI is central to the enhanced performance of other technologies and the evolution of Industry 4.0, or the Fourth Industrial Revolution. There is significant evidence that AI technology presents new opportunities that can lead to major transformations in businesses and the entire economic system. Some of the benefits of AI at the business level include faster analysis of big data, rapid visualization, improved product

design, and the delivery of precise insights. These benefits are expected to lead to new levels of service, higher profits, business expansion, and improved cost structures and efficiency.

This study aims to analyse how AI contributes to business growth, identify the main benefits and challenges, and suggest strategies for maximizing its potential.

OBJECTIVE

- ☐ To examine the perceived impact of AI on business growth.
- ☐ To identify the key business areas benefiting from AI adoption.
- ☐ To analyse common challenges faced during AI implementation.
- ☐ To propose recommendations for effective AI integration.

Research Objective

This paper aims to answer several key questions about the current state of AI:

- ☐ What factors are contributing to the exponential growth of AI today, especially since it is a 60-year-old technology that only recently began to show a significant impact?
- ☐ Are all other technologies gradually being augmented or replaced by AI?
- ☐ How is AI impacting every line of business globally, with no field left untouched?
- ☐ Which countries are leading the AI race?

To investigate these questions, data was collected from various sources, including business newsletters, AI magazines, journal papers, conference articles, company annual reports, press releases, and online forums.

STATE OF THE ART OF AI

"Artificial intelligence" was established as a field in 1956 by John McCarthy, a professor emeritus of computer science at Stanford University. He believed that systems could be developed to have human-level intelligence. In 1973, Firschein and Coles predicted 21 hypothetical products that would result from AI advancements by the 1990s, some of which have become reality today. For example,

- o Translation of Language – The language can be translated from one language to native language (ability to understand easily) – Google Translator
- o Perception (Visual) – To analyse the scene vision and resulted the structured set – Kinetics

The progress of AI has not been linear, with periods of hype followed by "AI winters" where funding was reduced. However, AI has returned to prominence due to the development of deep learning neural networks with multiple hidden layers. This progress is primarily

attributed to two factors: the availability of vast amounts of data (big data) and hardware accelerators like GPUs and TPUs.

The success of AI is supported by four main areas of deep learning:

Computer Vision: This involves enabling machines to analyse and understand images. Applications include facial recognition, medical imaging (computer-aided diagnosis), and gesture recognition. Convolutional Neural Networks (CNNs) are the preferred algorithm for this area.

Text Analysis: This area focuses on extracting high-quality information from text data for applications such as search engines, sentiment analysis, and fraud detection. Gated-Recurrent Neural Networks (RNNs) are typically used for this purpose.

Speech Recognition: This involves creating machines that can respond to voice commands. Examples include speech-to-text processing and voice dialling. Both CNNs and RNNs are used in this area.

Game Playing: This area focuses on creating machines capable of playing games against humans and other computer agents, such as Go and Chess. Reinforcement learning is a common approach for this.

Global Market Analysis

Start-ups are viewed as key drivers of innovation and economic growth in a knowledge-based society. An analysis of top AI start-ups can provide insights into how AI is transforming businesses. The study examined two lists of the top 100 AI start-ups from 2017 and 2018, which were compiled using the CB Insights' Mosaic algorithm.

Industries and Sectors

AI start-ups are categorized across 22 different fields, including healthcare, business intelligence, and autonomous vehicles. The spread of AI is pervasive, with its use and exploration extending from education to healthcare and from homes to industries. The analysis of the 2017 and 2018 start-up lists showed that Core AI received the most attention in 2017, while cybersecurity saw the maximum benefit from AI technology in 2018.

The top six industrial sectors for AI start-ups in 2017 and 2018 were cybersecurity, healthcare, business intelligence, enterprise AI, core AI, and cross-industry. These leading start-ups are creating process and technological innovations that are expected to generate business opportunities and efficiency gains in the near future. Some of the processes driving these transformations include medical image analysis, drug discovery, robotic surgery, virtual nurses, and automated manufacturing.

Funding

The total investment in AI start-ups grew exponentially from \$25.88 million in 2011 to \$1866.6 million in 2016. This represents a 71.13% increase in investment over a six-year period. Globally, the United States is leading this revolution with the largest share of investment.

In 2018, the total investment in AI start-ups was \$12.74 billion, which is 2.27 times increase compared to the total investment from 2011 to 2016. This indicates a rising interest from investors in AI. An analysis of the investment data for 2018 reveals that while only 2% of the start-ups were in news and media, this sector received the highest investment share, accounting for 25.22% of the total. The two start-ups responsible for this large investment share were California-based Sound Hound Inc. and Beijing-based Byte dance. These companies both focus on making human-machine interaction as simple as human-human interaction.

Geographical Analysis

A geographical analysis of the top AI start-ups from 2017 and 2018 showed that they are concentrated in only 13 countries, representing just 6.6% of all countries in the world. The United States is at the forefront of this revolution, with approximately three-quarters of the top start-ups headquartered there, a majority of which are in California's Silicon Valley.

CONCLUSION

The research highlights the significant achievements and technological innovations in the field of AI. The commercial availability of AI products, some of which were proposed nearly 50 years ago, demonstrates that AI is not just hype but a transformative force for business and the global economy. The progressive growth and deployment of AI systems are primarily driven by the availability of big data and fast processing units like GPUs and TPUs. The study identified four major areas of deep learning—computer vision, text analysis, speech recognition, and game playing—and noted that deep learning algorithms in these areas have surpassed human-level accuracy in certain tasks.

The analysis of 200 top AI start-ups shows a strong and growing trend in AI investment over the last six years. The study identified business intelligence, healthcare, core AI, cybersecurity, and marketing and sales as the top AI industries that are expected to create more opportunities in the future. AI-driven technologies offer key advantages such as increased productivity, time and cost efficiency, reduced human error, and faster business decisions.

However, the study also revealed that AI technology is confined to only a few regions globally, creating an "AI divide" that could worsen social, economic, and cultural inequalities. Furthermore, as AI is software-dominant, it is susceptible to vulnerabilities. Deep learning algorithms, while powerful, can sometimes produce unreliable results even after undergoing standard software assessments. Other challenges that need to be addressed for the successful commercial use of AI include issues of trust, ethics, bias, and a shortage of AI talent.

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91. ROLE OF AI IN CYBER SECURITY

Ms. M. Akshaya
Assistant Professor

Ms. A. ABINAYA, T.ABI, S. JENIFER
II BBA
Department of MBA
Jaya College of Arts and Science,
Thiruninravur 602024

ABSTRACT:

“Decision-making. It empowers security teams with intelligent tools for vulnerability assessment, intrusion detection, and fraud prevention. However, the integration of AI also introduces new challenges, including adversarial attacks, data privacy concerns, and ethical implications AI facilitates real-time monitoring of vast datasets, reducing human error and enabling faster surrounding autonomous decision-making. A time characterized by rising digital dangers and more advanced cyberattacks, Artificial Intelligence (AI) has become a pivotal element in the area of cybersecurity. This abstract examines the various ways AI contributes to improving cyber defence strategies, ranging from threat identification to incident management. AI-powered systems utilize machine learning techniques, neural networks, and behaviour analysis to detect anomalies, foresee possible breaches, and automate reactions with unmatched speed and precision.

In contrast to conventional rule-based systems, AI adjusts to changing threat environments, allowing for proactive defence mechanisms against zero-day vulnerabilities, phishing scams, and ransomware. Additionally, AI enables instant observation of extensive datasets, minimizing human error and promoting quicker decision-making. It equips security teams with smart tools for assessing vulnerabilities, detecting intrusions, and preventing fraud.”

KEYWORDS: AI in decision making, Conventional rule – based system, Defence mechanism,

INTRODUCTION:

In today’s rapidly evolving digital landscape, where cyber threats are becoming increasingly sophisticated and outpacing traditional security measures, Artificial Intelligence (AI) has emerged as a game-changer in the field of cybersecurity. As the volume of data continues to grow exponentially, and cyberattacks become more complex and dynamic, the

need for real-time threat detection and response has become more pressing than ever. AI has stepped in to fill this critical gap, providing a powerful set of tools that can augment and enhance security systems beyond human capabilities. By leveraging advanced machine learning algorithms, AI-powered systems can analyse vast amounts of data, identify patterns, and detect anomalies in real-time, enabling organizations to respond swiftly and effectively to emerging threats. Moreover, AI-driven security solutions can learn from experience, adapt to new attack vectors, and improve their detection and response capabilities over time, making them an essential component of modern cybersecurity strategies. By harnessing the power of AI, organizations can stay one step ahead of cyber threats, protect their sensitive data, and ensure the integrity of their digital assets.

ADVANTAGES FOR ROLE OF AI IN CYBERSECURITY:

1. Real-Time Threat Detection

AI systems can monitor networks 24/7 and detect unusual activities instantly. They spot zero-day vulnerabilities and suspicious behaviour faster than traditional methods.

2. Automated Incident Response

AI can automatically isolate compromised systems, block harmful traffic, and trigger alerts. This cuts down response time and limits damage from attacks.

3. Predictive Analytics

AI looks at historical data to predict potential threats and vulnerabilities. It helps organizations strengthen defences before attacks happen.

4. Behavioral Analysis

AI monitors user and entity behaviour to find changes that may signal insider threats or compromised accounts. It's especially good at identifying quiet attacks that disguise themselves as legitimate activity.

5. Enhanced Fraud Detection

Financial institutions use AI to examine thousands of transactions per second, spotting fraud patterns that humans might overlook. AI doesn't get tired and improves over time.

6. Phishing and Malware Prevention

AI checks emails, attachments, and URLs to block phishing attempts and malware before they reach users. It can also spot deepfake scams and AI-generated threats.

7. Security Automation

Routine tasks like log analysis, vulnerability scanning, and patch prioritization are automated. This allows human analysts to concentrate on strategic decisions.

DISADVANTAGES OF AI IN CYBERSECURITY:

1. False Positives

AI systems can generate false positives, flagging legitimate activities as threats, leading to unnecessary resource utilization and potential disruptions.

2. Data Quality Issues

AI's effectiveness depends on high-quality data. Poor data quality can lead to biased models, incorrect predictions, and reduced accuracy.

3. Adversarial Attacks

Attackers can use AI-generated attacks to evade detection, and even manipulate AI models to produce desired outcomes.

4. Lack of Explainability

AI models can be difficult to interpret, making it challenging to understand why a particular decision was made, which can lead to trust issues.

5. Dependence on Data

AI models require large amounts of data to learn and improve. Insufficient or outdated data can limit their effectiveness.

6. Vulnerability to Poisoning

AI models can be vulnerable to data poisoning attacks, where attackers manipulate the training data to compromise the model's integrity.

7. High Resource Requirements

Implementing and maintaining AI-powered cybersecurity solutions can require significant resources, including computational power, storage, and expertise.

8. Potential for Misuse

AI can be used by attackers to automate and scale their attacks, making them more difficult to defend against.

9. Regulatory Challenges

The use of AI in cybersecurity raises regulatory concerns, such as data privacy, bias, and transparency, which can be challenging to address.

Enhancements in Cybersecurity
Real-time Threat Detection: AI-powered systems analyse vast amounts of data, identify patterns, and detect anomalies in real-time, enabling organizations to respond swiftly to emerging threats. **Predictive Analytics:** AI forecasts potential threats, allowing organizations to take proactive measures to prevent attacks. **Automated Incident Response:** AI can automatically respond to threats, isolating endpoints, blocking IPs, or rolling back changes

without human intervention. Vulnerability Management: AI helps prioritize vulnerabilities based on risk level, exploitability, and business impact, ensuring teams focus on what matters most. Phishing Protection: AI-powered email security platforms detect and block phishing attempts, reducing vulnerability to these attacks.

Best Practices:

Implement Robust Security Measures Secure AI infrastructure by implementing robust security measures, such as encryption, authentication, and access controls. Establish Clear Ethical Guidelines Develop and adhere to clear ethical guidelines for the development and deployment of AI in cybersecurity. Continuously Monitor and Evaluate Regularly monitor and evaluate AI models to ensure they are functioning as intended and adapt to emerging threats ^{1 2}.

Future Outlook:

Increased Adoption AI is expected to play an increasingly pivotal role in cybersecurity, with more organizations adopting AI-powered security solutions.

Evolving Threat Landscape The threat landscape will continue to evolve, with AI-powered attacks becoming more sophisticated and frequent. Collaboration and Information Sharing Collaboration and information sharing among organizations and security vendors will be crucial in staying ahead of emerging threats

CONCLUSION:

Artificial Intelligence is quickly changing the field of cybersecurity. It is becoming not just a tool but a key partner in the battle against new digital threats. Its ability to analyze large amounts of data, spot unusual patterns in real time, and adjust to new types of attacks makes it essential for modern defense systems. Proactive Defense: AI allows for predictive threat modeling and early detection, moving cybersecurity from a reactive approach to a proactive one. Scalability and Speed: It manages huge volumes of data much faster than human analysts, enabling quicker responses and wider coverage. Adaptive Learning: With machine learning, AI continues to evolve with the threat landscape, constantly improving its accuracy and strength. Automation of Routine Tasks: AI eases the burden on humans by automating repetitive tasks such as log analysis, intrusion detection, and patch management. However, AI is not a complete solution. It needs thoughtful integration, along with human oversight, to reduce risks like false positives, adversarial attacks, and ethical issues. The future of cybersecurity depends on a hybrid model, where human skills and AI strengths work together to create strong, smart, and adaptive security systems.

**92. AI IN SOCIAL COMMENTARY: “KANYADAAN AS A MIRROR ,
CONFRONTING THE MYTHS OF LIBERAL REFORM IN INDIAN SOCIETY”**

BY VIJAY TENDULKAR

S. Sathiya Bama

Annai Veilankanni’s College of Arts and Science,
Saidapet, Chennai-600 015.

Abstract:

Vijay Tendulkar is incredibly smart and has written plays, short stories, essays, film scripts, newspaper columns, and a book. Vijay Tendulkar's plays have strongly described the social and political situations. Tendulkar builds a realistic world into his works by using both praise and criticism. *Kannyadaan*, the play, came out in 1983. Vijay Tendulkar's play delivers a strong analysis of marriage and defining one's place in Indian society. According to this theory, the research paper's main topics, evidence, and conclusions are summed up in a few sentences. This essay looks into the notion of abusive social acts and how women are abused in the movie *Kanyadaan*. It explores the ways in which the play critiques the commodification of women through the institution of marriage, offering insight into the rejection of their organization and consent. The play's portrayal of segregation and position separation is addressed in the exam paper. It looks at how Tendulkar depicts the inflexible social order and the manufactured deference inside the Brahmin society. The play's examination of the spread of imbalances is highlighted in the paper, which also calls for a fundamental assessment of station-based prejudices and tendencies. AI's Implications on Indian Society. We've discussed AI's potential impacts on Indian society, including economic growth, job market changes, healthcare advancements, and challenges like data privacy and bias.

Key Words – Caste Conflict, Upper Class, Dalit, Social Problem, Intercaste Marriage, marginalization, Political Comments and Self Nature.

Vijay Tendulkar is recognized as the best playwright in India. He is a multi-talented genius who has authored novels, plays, short stories, essays, movie scripts, and newspaper articles. He has influenced theater and film with his thought-provoking explorations of violence, power, and morality. His audacious remarks and political remarks demonstrate his audacity and authenticity. Whatever he saw, felt, and realized, he wrote it down. He is a genuinely charismatic individual because of this element of his personality. Vijay Tendulkar is a prominent modern Indian playwright, according to Prof. Anshul Chandra's dissertation,

Vijay Tendulkar: A Critical Survey of His Dramatic World. He is also a social critic, political journalist, literary essayist, and screen and television writer. In his plays, Vijay Tendulkar has adequately depicted the socio-political circumstances. Tendulkar exposes the real reality in his works with both praise and criticism. Without any preconceived hypotheses, he observes the realities of human society, responds to them as a perceptive and reasonable person, and then responsibly writes about them in his plays. In 1983, the play *Kanyadaan* was released. This was his most intricate work, exploring the man-woman interaction in a family as well as cultural and emotional upheavals. It focuses on a critical dispute between the upper class and the Dalit caste, which persists in many regions of our nation.

Kanyadaan offers a critical analysis of the status quo and how it affects people's lives. According to Tendulkar, the standing framework is a social construct which encourages inequality, disunity, and separation. He invites the audience to examine the rigid station structure and its serious ramifications by showcasing the fights and conflicts witnessed by Shankar and Gauri. Tendulkar portrays rank as a deeply problematic force that permeates every aspect of society. The play's characters are influenced by their rank personalities, and the presumptions and biases associated with their stations have a significant impact on their actions and decisions. The drama "*Kanyadaan*" by Vijay Tendulkar addresses the issue of the standing divide in Indian society. The play's main conflict emerges from the long-standing prejudices and divisions that are common in public life and pose significant barriers to their association. The play demonstrates how the characters' relationships and actions are affected by the rigid standing framework. It highlights the clear disparities in wealth, status, and prestige associated with various positions. Being Brahmins, Jyoti's family holds a superior position in the hierarchy and strictly follows traditional norms and traditions. The play features five characters. Seva, a partner of MLA Nath Devlalikar, works as a social worker. Jayprakash is pursuing an M.Sc., and his sister, Jyoti, is a bright young woman. These Brahmins are from a higher social stratum. There are two acts in the play. In the opening scene of the first act, Jyoti decides to marry Arun Athavale, a Dalit young man from a tiny town that she had barely known for two months. Arun is a gifted B.A. student who is underprivileged. Arun visits Jyoti's home in the second scene of the first Act. Despite having a brutal face and dark complexion, he is gorgeous. Being Dalit, he lacks confidence of his own and searches aimlessly. As a Dalit, he lacks assurance of his own and, without thinking, looks for a way to overcome it with Jyoti. Arun was Jyoti's spouse. It is more likely that a marriage will bring together two distinct cultures than it is to bring together two people who

are emotionally and physically related. Arun and Jyoti's post-marriage relationship suffered greatly by the brief months. Compressed and working, Jyoti come returned home. In every sense of the word, she is a depressed outline. Jayaprakash explains the caste-based social system using the examples of Arun and Jyoti: "But this means that the very victims of violence may go on penetrate the same brutal violence upon other. Perhaps those who are hunted derive great pleasure to do so. The oppressed are overjoyed when they get a chance to oppress others, the moment one gets the chance one becomes a greater tyrant one persecutes others with a vengeance, because one exults in doing that. In other words, yesterday's victim is today's victimizer. If he has been shot at yesterday, he shoots today Therefore, there is no hope of man's gaining nobility through experience, he can only become a greater devil." (547)

When Seva asks Arun why he beats Jyoti, he reacts bluntly that he is a barbarian by birth and never claimed any white-collar culture. He is the son of scavengers who do not understand the Brahmins' non-violent ways of treating their wives like them; they drink and beat their wives frequently without any known reason. Arun's awareness of his caste makes him weak, violent, and inferior. In order to take advantage of, disrespect, and threaten Jyoti in the name of his inferior caste, he is not afraid of carrying out physical, mental, psychological, and even sexual abuse against her. Even when she becomes pregnant, the horrors, hardships, and afflictions that Arun inflicts on Jyoti in commemoration of the humiliations endured by his ancestors continue. He begins kicking her in her stomach. She is constantly harassed by Arun about her parents and caste, accusing them of being highborn. After contemplating on his actions, Seva sarcastically asks, "Why not? Isn't his wife a member of the upper caste? He responds in this way for all the kicks that men of high caste have given him throughout the generations of his forefathers. Jyoti first felt helpless, but she has since come to the understanding that she can manage the situation by putting aside her preconceived liberal views and accepting Arun for the rest of her life. Because of his bitterness stemming from his lower caste, Arun finds it difficult to accept his current circumstances and is always afflicted by his thoughts. He has always been tortured and wants to beat Jyoti as revenge against those from higher castes. She describes Arun's mental state to her father, stating that she is both the beast and the lover. Arun is both the poet and the devil. They are one and both merge together, one inside the other. By the play's conclusion, the caste system has become so entrenched that Jyoti accepts her incapacity and inferiority complex as a woman and even as a member of a higher caste than Arun, a lower caste. Jyoti forcefully separates herself from

her family and prohibits them from visiting her in order to help. Examples of the power hierarchy in society include the victim getting the victimizer again and the victimizer becoming the victim again. She begins to think that she evolved from Jyoti Yadunath Devalikar, a Brahmin, to Jyoti Arun Athavale, a scavenger, as a result of her suffering.

He explained, "As a writer, I find the violent exploited-exploiter connection fascinating and constantly explore it instead of adopting a stance against it." It gives me a sense that the relationship is forever and that it is a cruel but unavoidable part of reality. As a result, the play is well known for its analysis of the human psyche in depth with respect to the play *Kanyadaan* by Vijay Tendulkar is a powerful critique of Indian marriage and inequality in society. Through the story of a Brahmin family and their girl's marriage, Tendulkar explores the harsh idea of social shows, the exploitation of women, and the development of station-based division. Women are often viewed as commodity to be exchanged between families, with their consent and position being disregarded, as Tendulkar illustrates. This analysis sheds attention on the long-standing, male-centric norms that continue to prevail in Indian society. Tendulkar additionally addresses the problem of station separation and how it affects people's lives. He illustrated the rigidity of the social hierarchy and the division that people in lower classes sought. The drama highlights the lip service offered by the Brahmin community, who maintain imbalances and engage in manipulative tactics while preaching rank immaculateness.

Tendulkar challenges the audience to confront and question the prevailing cultural norms with his forceful and fascinating portrayal. He encourages individuals to imagine a more libertarian and diverse society by bringing up important concerns regarding the notion of marriage, orientation jobs, and rank-based segregation. *Kanyadaan* by Vijay Tendulkar serves as a biting critique of Indian marriage and the notion of position. The drama sheds light on the harsh concept of social shows, stereotypes of women, and the spread of segregation based on position. Through the intercaste marriage of Jyoti and Arun, Tendulkar challenges deeply rooted traditions, encouraging the audience to consider the need for social reform and attempt a more equitable and just social structure. Tendulkar's works, including *Kanyadaan*, have been influential in Indian theatre for their bold and thought-provoking themes. While "Kanyadaan" is a play about human relationships and societal norms, considering AI's implications in Indian society. AI's growing presence in India has various implications across different sectors of society.

93. THE EVOLVING REGULATORY LANDSCAPE OF AI IN HR AND CORPORATE GOVERNANCE: CHALLENGES AND OPPORTUNITIES FOR COMPLIANCE AND ETHICAL INTEGRATION

Mr. Manimaran M,

Assistant Professor, Department of Management Studies,
Jaya Engineering College, Thiruninravur, Chennai

Mr. S. Satheeshkumar,

Assistant Professor, Department of Master of Business Administration, Easwari Engineering
College, Bharathi Salai, Ramapuram, Chennai-600089

Abstract

This conceptual research paper explores the intricate and rapidly evolving regulatory landscape surrounding the application of Artificial Intelligence (AI) in Human Resources (HR) and Corporate Governance. As organizations increasingly leverage AI for critical functions such as talent acquisition, performance management, risk assessment, and compliance, the imperative to address associated ethical dilemmas—including algorithmic bias, data privacy, transparency, and accountability—has become paramount. This paper synthesizes existing literature, analyzes emerging regulatory frameworks (e.g., the EU AI Act, various national and sub-national initiatives), and identifies the multifaceted challenges organizations face in achieving compliance across diverse jurisdictions. Furthermore, it highlights the strategic opportunities that arise from proactive engagement with ethical AI principles and robust governance structures, fostering not only regulatory adherence but also enhanced stakeholder trust and sustainable innovation. By examining the interplay between technological advancement, ethical considerations, and legal mandates, this study provides a comprehensive overview of the current state and future trajectory of AI regulation in these critical organizational domains, offering insights for practitioners, policymakers, and researchers aiming to navigate this complex environment responsibly.

Keywords: AI regulation, corporate governance, human resources, ethical AI, compliance, regulatory frameworks, algorithmic bias, data privacy

Introduction

The rapid advancement of Artificial Intelligence (AI) is transforming industries by redefining operational models and strategic decision-making. Its impact is particularly evident in Human Resources (HR) and Corporate Governance—areas traditionally guided by

human judgment and regulatory frameworks. In HR, AI streamlines resume screening, anticipates talent needs, and enhances employee support through tools like chatbots and sentiment analysis. These technologies improve efficiency, accuracy, and fairness by analyzing large datasets to identify performance-related patterns. In corporate governance, AI supports compliance monitoring, risk identification and strategic oversight by analyzing complex financial and legal data. This enhances regulatory adherence, increases productivity, and builds organizational resilience. However, integrating AI into such critical areas introduces ethical concerns. Algorithms trained on biased data can perpetuate discrimination, and large-scale data use raises privacy and consent issues. The opaque nature of AI models—often termed “black boxes”—challenges transparency and accountability.

This conceptual paper explores evolving regulatory frameworks, such as the EU AI Act, and emphasizes the need for proactive, ethical AI strategies that ensure long-term organizational trust and sustainability.

Literature Review

AI Applications in HR and Corporate Governance

AI tools are transforming HR and corporate governance. In HR, AI-powered systems streamline recruitment, performance management, and employee support [1, 2, 3]. For corporate governance, AI enhances risk management, compliance, and board decision-making by analyzing vast datasets and automating processes [4, 5, 6]. However, these applications introduce ethical challenges, including algorithmic bias leading to discriminatory outcomes [7], privacy concerns due to extensive data collection [8], and the 'black box' problem, which hinders transparency and accountability [9].

Regulatory Landscape Overview

The global regulatory landscape for AI is rapidly evolving. The EU AI Act, a comprehensive, risk-based framework, sets stringent requirements for high-risk AI systems, including many HR and governance applications [10]. In contrast, the US has a more fragmented approach, with federal guidance and state-level laws addressing AI in the workplace, such as New York City, Local Law 144 on automated employment decision tools [11, 12, 13]. Other nations and international bodies like the OECD are also developing AI governance frameworks, leading to a complex and dynamic compliance environment for multinational organizations [14, 15].

Corporate Governance and AI Ethics

AI's ethical challenges place new demands on corporate governance. Boards must oversee AI-related risks, including legal, financial, and reputational exposures [16]. This necessitates new expertise and potentially dedicated AI ethics committees [17]. Robust AI risk management frameworks, encompassing clear policies, procedures, and ongoing monitoring, are crucial [18]. Transparency with stakeholders about AI use and risk mitigation builds trust and maintains social license to operate [19].

Compliance Challenges and Opportunities

Navigating the diverse and complex AI regulatory landscape presents significant compliance challenges, particularly for SMEs. The lack of harmonization across jurisdictions and the technical demands of bias detection and explainability are major hurdles [20]. However, proactive engagement with ethical AI offers strategic opportunities. Organizations demonstrating commitment to ethical AI can enhance reputation, build stakeholder trust, attract talent, and foster responsible innovation, ultimately gaining a competitive advantage [21].

Methodology

This conceptual research paper employs a qualitative, analytical approach. Given the nascent and rapidly developing nature of AI regulation, a traditional empirical study would be premature. Instead, this paper relies on a comprehensive review and synthesis of existing knowledge from diverse, authoritative secondary sources.

Research Approach: Conceptual Analysis

The core research approach is conceptual analysis, systematically examining and interpreting key concepts, theories, and frameworks related to AI, ethics, regulation, HR, and corporate governance. This method is suitable for exploring complex, interdisciplinary topics, allowing for identification of patterns, gaps, and new insights.

Data Sources

Data is derived from: regulatory documents (e.g., EU AI Act, GDPR, US state laws, OECD AI Principles) [10, 11, 12, 13, 14]; academic literature (peer-reviewed articles, books) [1, 7, 8, 9]; industry reports and white papers (from consulting firms, associations) [2, 3, 4, 5, 6, 17, 18, 19, 20, 21]; and news/expert commentary, capturing recent developments.

Analytical Framework

The analysis is guided by an interdisciplinary framework integrating technology ethics, regulatory theory, and organizational governance. It examines the interplay between:

technological capabilities and risks (bias, privacy, transparency); ethical principles (fairness, accountability, human oversight); regulatory responses (design, scope, impact); and organizational governance (adaptation to AI risks, ethical integration).

Limitations

As a conceptual paper, this study lacks empirical data or statistical analysis. Findings are based on synthesis and interpretation of existing sources. The rapidly evolving nature of AI and its regulation means insights may require continuous updating. Future research could conduct empirical studies to validate findings and assess compliance strategies.

Results and Analysis

Key Regulatory Trends and Patterns

AI regulation shows a global convergence towards a risk-based approach, exemplified by the EU AI Act, with stringent requirements for high-risk applications [10]. Transparency and explainability are emphasized to address the 'black box' problem [9]. Human oversight is a recurring theme; ensuring humans remain in control of AI systems [14]. However, divergences exist, with the US adopting a fragmented, sector-specific approach contrasting the EU's comprehensive regulation [11]. This creates compliance challenges for multinational corporations navigating different rules.

Compliance Challenges for Organizations

Organizations face significant compliance challenges. The volume and complexity of new regulations overwhelm SMEs with limited resources. Lack of harmonization across jurisdictions requires sophisticated compliance programs. Technical challenges include bias detection and mitigation, requiring specialized expertise [12]. Explainability requirements pose hurdles as many AI models are inherently difficult to interpret. Organizational and cultural challenges require multidisciplinary approaches and ethical awareness training.

Opportunities for Ethical Integration

The regulatory landscape presents opportunities for proactive ethical integration. Organizations demonstrating commitment to ethical AI can enhance reputation and build stakeholder trust [21]. This translates to business benefits: increased customer loyalty, improved talent attraction, and greater investor confidence. Proactive engagement with ethical AI principles fosters responsible innovation, encouraging thoughtful technology development. Regulatory push for ethical AI catalyzes internal transformation, prompting re-evaluation of data governance, AI literacy investment, and clear accountability lines.

Discussion

The analysis shows that while AI regulation is aligning around key principles such as risk-based approaches, transparency, and human oversight, jurisdictional differences create complex compliance challenges. Implementing ethical AI involves technical, organizational, and cultural hurdles. However, treating AI ethics as a strategic opportunity rather than a burden enables organizations to gain competitive advantages. As regulations evolve to balance innovation with fundamental rights, companies must shift from reactive compliance to proactive integration of ethical principles. This requires leadership commitment, cross-functional efforts, and on-going learning. Early investment in strong AI governance will help organizations adapt, ensure compliance, and build lasting stakeholder trust.

Strategic Implications for Organizations

The evolving AI regulatory landscape offers both challenges and strategic opportunities. To stay competitive, organizations must implement robust AI governance frameworks that go beyond compliance, emphasizing ethical policies, bias detection, and a culture of responsible innovation. Leadership plays a vital role—executives should champion ethical AI, possibly by appointing Chief AI Ethics Officers or establishing oversight committees. Addressing compliance demands, especially related to bias and explainability, requires significant investment in technology and skilled talent. Developing strong data governance, maintaining clear documentation, and enabling continuous auditing are essential steps to ensure transparency, regulatory alignment, and long-term trust in AI-driven systems.

Cross-Jurisdictional Compliance Strategies

Multinational organizations face complex challenges in navigating diverse AI regulations across jurisdictions. The EU AI Act's extraterritorial scope requires global compliance for those serving the European market, while differing U.S. state laws add further complexity. Effective cross-border compliance demands a deep understanding of regulatory nuances and flexible governance frameworks. Companies may adopt the strictest global standards or tailor region-specific strategies to balance compliance with efficiency. Although regulatory arbitrage—shifting operations to lenient regions—may offer short-term advantages, it poses long-term risks. As global standards converge, failure to meet emerging norms could result in reputational damage, legal penalties, and reduced competitiveness.

The Role of Industry Standards and Best Practices

As AI regulations evolve, industry standards and best practices are becoming vital in guiding ethical and compliant AI implementation. Professional bodies and industry groups

are creating frameworks to help organizations navigate complex regulations and promote responsible AI use. These initiatives offer practical guidance, foster consistency across sectors, and influence policy by incorporating expert input. Organizations that engage in such efforts gain early access to emerging best practices and help shape future standards. Adopting and exceeding these standards enables companies to demonstrate their ethical commitment, build stakeholder trust, and position themselves as leaders in responsible and transparent AI development and deployment.

Future Regulatory Trends and Implications

Looking ahead, AI regulation is expected to evolve through several key trends. First, greater international harmonization is likely, with governments working toward unified principles and global standards. Second, regulations will become more technical and precise, emphasizing requirements like bias testing, explainability, and human oversight tailored to specific AI applications. Third, enforcement will intensify, prompting organizations to strengthen compliance mechanisms and demonstrate adherence. Lastly, the scope of regulation will broaden to address emerging risks in sectors like healthcare, finance, and critical infrastructure, while also incorporating wider societal impacts of AI, ensuring more comprehensive and forward-looking governance frameworks.

Conclusion

This conceptual research paper explores the evolving regulatory landscape of Artificial Intelligence (AI) in Human Resources and Corporate Governance. While AI enhances efficiency and decision-making, it raises ethical concerns related to bias, privacy, and transparency. Global efforts, including the EU AI Act and U.S. guidelines, reflect a shift toward risk-based governance with human oversight. However, regulatory divergence across jurisdictions complicates compliance for multinational firms. Technical and organizational challenges in bias detection and ethical integration persist. Despite this, embracing ethical AI offers strategic advantages. Proactive governance can build trust, boost reputation, and ensure long-term success in an increasingly AI-driven environment.

Limitations and Future Research Directions

As a conceptual paper, this study synthesizes existing literature without presenting empirical data. Given the rapid evolution of AI, on-going research is essential to keep insights current. Future studies could explore the practical effectiveness of compliance strategies or examine how small and medium-sized enterprises (SMEs) navigate AI regulations. Investigating standardized metrics for AI fairness and explainability, and their

influence on compliance, would be valuable. Further research could also address AI's psychological and sociological impacts on employee well-being, morale, and perceptions of fairness. Lastly, the long-term effects of AI on job displacement and reskilling merit exploration within regulatory contexts.

Final Thoughts on the Regulatory Evolution

The journey towards responsible AI integration in HR and corporate governance is an on-going process of adaptation and learning. The evolving regulatory landscape serves as a critical mechanism for guiding this journey, pushing organizations towards more ethical and accountable practices. Success in this environment will hinge on an organization's ability to not only comply with external mandates but also to cultivate an internal culture that champions ethical AI, embraces transparency, and prioritizes human values alongside technological advancement. The future of AI in these critical domains will be shaped by a continuous dialogue between innovators, regulators, and society, ensuring that the benefits of AI are realized responsibly and equitably, and that the human element remains central to technological progress.

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94. THE TRANSFORMATION OF MEN'S LIVES AFTER 40: A PRACTICAL PERSPECTIVE

Dr. S. Kumaresh,
Assistant Professor,
School of Management, Hindustan Institute of Technology and Science,
OMR, Padur, Chennai

Mr.N.Vinodh,
Assistant Professor, St.Joseph College of Engineering, Sriperumbudur, Chennai

Purpose

This abstract examines the multifaceted transformations in men's lives after age 40, encompassing physical, psychological, social, and professional domains. It aims to provide a practical perspective on midlife challenges and opportunities, drawing from empirical literature to empower individuals and inform interventions.

Design/methodology/approach

The analysis synthesizes existing research, including empirical studies and theoretical frameworks like Erikson's stages of psychosocial development. It reviews key literature on health declines, career revaluations, and relational shifts, integrating interdisciplinary insights from psychology, sociology, and health sciences to highlight practical strategies.

Findings

Men after 40 commonly experience accelerated health declines, such as hormonal changes leading to fatigue and increased disease risks, alongside psychological stressors like identity crises and emotional stagnation. Career revaluations often arise from work-life imbalances, while relational shifts involve evolving family roles and social isolation. Despite these challenges, opportunities for growth emerge through enhanced emotional resilience and purpose-driven changes, as supported by studies on generativity and life satisfaction.

Research limitations/implications

Limitations include the reliance on Western-centric studies, potentially overlooking cultural variations. Implications suggest the need for future research on intersectional factors, such as socioeconomic status and ethnicity, to develop tailored interventions. This could enhance theoretical models and promote inclusive policies for midlife well-being.

Practical implications

The paper outlines actionable strategies, including health maintenance routines (e.g., regular exercise and medical screenings), financial planning for career transitions, and emotional resilience techniques (e.g., mindfulness and support networks). These approaches bridge academic insights with real-world applications, enabling men to navigate midlife effectively and foster holistic well-being.

Originality/value

This abstract contributes originality by adopting a practical lens to midlife transformations, moving beyond theoretical discussions to offer evidence-based advice. Its value lies in empowering men, policymakers, and practitioners to address aging proactively, ultimately promoting healthier societies and reducing midlife crisis impacts.

Keywords: Midlife transformation, men's health, psychosocial development, practical strategies, aging.

Introduction

The period after age 40 represents a pivotal juncture in men's lives, often characterized by profound transformations that extend beyond mere chronological aging. This stage, commonly referred to as midlife, involves a confluence of biological, psychological, and sociocultural factors that reshape identities, priorities, and daily experiences (Levinson, 1986). As men navigate this phase, they encounter challenges such as declining physical health, career stagnation, and evolving family dynamics, which can lead to what is popularly known as a "midlife crisis." However, this perspective is not merely theoretical; it holds practical implications for enhancing quality of life and fostering resilience.

Research indicates that men after 40 experience accelerated changes in health and well-being, with implications for longevity and productivity (Kessler et al., 2003). For instance, the onset of andropause—a male equivalent of menopause—brings hormonal shifts that affect energy levels, mood, and cognitive function. Beyond biology, societal expectations around masculinity, success, and aging exacerbate these transitions, often prompting men to reassess their roles as providers, partners, and individuals (Brooks, 2010). From a practical standpoint, understanding these transformations can inform targeted interventions, such as lifestyle adjustments and mental health support, to mitigate risks and capitalize on growth opportunities.

This paper adopts a practical perspective, emphasizing actionable insights derived from empirical evidence. It begins with a literature review of key transformations in men's lives after 40, followed by a discussion of practical strategies for adaptation. The analysis draws on interdisciplinary sources, including psychology, sociology, and health sciences, to provide a comprehensive overview. Ultimately, the goal is to offer guidance that can be applied in real-world contexts, such as workplaces, healthcare settings, and personal development programs. By addressing this topic, the paper contributes to ongoing discourses on aging and gender, advocating for a proactive approach to midlife (World Health Organization [WHO], 2022).

Literature Review

The literature on men's lives after 40 reveals a multifaceted landscape of transformation, influenced by biological, psychological, and environmental factors. A foundational framework is provided by Erik Erikson's theory of psychosocial development, which posits that midlife (ages 40–65) centers on the stage of generativity versus stagnation (Erikson, 1950). Men in this phase often grapple with the need to contribute to society and future generations, leading to introspection and potential life changes. Empirical studies support this, showing that many men experience a heightened sense of mortality and purpose, prompting career shifts or personal reinventions (Levinson et al., 1978).

Physically, men after 40 face notable declines in health and vitality. Research from the National Institute on Aging (NIA, 2021) highlights that testosterone levels typically decrease by 1–2% annually after age 40, contributing to symptoms like fatigue, reduced muscle mass, and increased body fat. This hormonal shift, termed late-onset hypogonadism, is linked to higher risks of cardiovascular disease and metabolic disorders (Khera, 2016). Beyond endocrinology, lifestyle factors such as sedentary behavior and poor diet exacerbate these changes, as evidenced in longitudinal studies like the Framingham Heart Study (Tsao et al., 2022). Psychologically, these physical transformations can manifest as anxiety or depression, with midlife men reporting higher rates of mental health issues compared to other age groups (American Psychological Association [APA], 2019).

Socially and professionally, the literature underscores shifts in relationships and work life. For instance, men often become "sandwich generation" caregivers, balancing responsibilities for aging parents and adult children, which can strain marital and familial bonds (Neal & Hammer, 2017). A study by the Pew Research Center (2021) found that 47% of middle-aged men in the U.S. experience work-family conflict, leading to dissatisfaction

and turnover. This is compounded by societal norms of masculinity, which discourage emotional expression and seek help, perpetuating isolation (Mahalik et al., 2003). On a positive note, some research suggests that midlife fosters personal growth, with men reporting increased emotional intelligence and life satisfaction through reflective practices (Roberts et al., 2006).

Cultural variations further enrich this discussion. In Western societies, the emphasis on individualism may intensify midlife crises, whereas collectivist cultures, such as in Asia, prioritize family legacy, potentially easing transitions (Lachman, 2004). Gender-specific analyses, like those from the Men's Health Network (2020), reveal that men are less likely to seek preventive healthcare, leading to undetected issues such as hypertension or prostate problems. Collectively, these insights from the literature highlight the need for a practical approach to address these transformations, integrating health promotion and psychological support to enhance outcomes.

Practical Perspective: Strategies for Adaptation

From a practical standpoint, the transformations in men's lives after 40 necessitate targeted strategies that promote resilience and proactive change. This section outlines evidence-based approaches across health, career, relationships, and personal development, drawing on interdisciplinary recommendations.

Health maintenance is paramount, given the physiological shifts documented in the literature. Men should prioritize regular medical check-ups, including screenings for cardiovascular health and hormone levels, to mitigate risks associated with andropause (Khera, 2016). Practical steps include adopting a balanced diet rich in antioxidants and engaging in moderate exercise, such as 150 minutes of aerobic activity weekly, as recommended by the WHO (2022). For instance, strength training can counteract muscle loss, while mindfulness practices like meditation have been shown to reduce stress and improve mood (Kabat-Zinn, 2013). These interventions are not only preventive but also empowering, allowing men to reclaim control over their physical well-being.

In the professional realm, career reevaluation is a common midlife challenge. Levinson's (1986) research suggests that men often seek greater alignment between work and personal values. Practically, this can involve upskilling through online courses or mentorship programs, as evidenced by studies showing that continuous learning enhances job satisfaction and employability (Billett, 2014). For example, transitioning to consulting or entrepreneurial ventures can provide flexibility, addressing stagnation. Organizations can support this by

offering wellness programs and flexible work arrangements, fostering a culture that values midlife experiences (Pew Research Center, 2021).

Relationally, strengthening social connections is crucial for combating isolation. Men should invest in open communication with partners and family, perhaps through couples counseling, which research indicates can improve marital satisfaction (Gottman & Silver, 2015). Community involvement, such as joining men's groups or volunteer activities, aligns with Erikson's generativity stage, promoting a sense of purpose (Erikson, 1950). Finally, personal development tools, like journaling or therapy, can enhance emotional resilience, with cognitive-behavioral techniques proving effective in managing midlife anxiety (APA, 2019). By implementing these strategies, men can transform challenges into opportunities for growth.

Discussion

The transformations in men's lives after 40, as explored in this paper, present both challenges and avenues for positive change. A key finding from the literature is the interplay between biological factors, such as hormonal declines, and psychosocial elements, like societal expectations, which amplify midlife stressors (Brooks, 2010). This interaction underscores the need for holistic interventions that address multiple domains simultaneously. For instance, while physical health strategies can alleviate symptoms of andropause, they must be complemented by psychological support to prevent mental health crises (Kessler et al., 2003).

Practically, the implications extend to policy and community levels. Healthcare systems should develop gender-sensitive programs, such as targeted screenings for men over 40, to reduce disparities in health outcomes (Men's Health Network, 2020). Workplaces, too, have a role in fostering age-inclusive environments, where midlife men can leverage their experience without facing discrimination. However, barriers remain, including cultural stigmas around masculinity that deter help-seeking behaviors (Mahalik et al., 2003). Future research could explore intersectional factors, such as how race, socioeconomic status, and cultural background influence these transformations, building on studies like those by Lachman (2004).

Opportunities for growth are evident, with many men reporting enhanced life satisfaction through reflective practices (Roberts et al., 2006). This practical perspective highlights the potential for midlife as a period of reinvention, rather than decline. By

integrating evidence-based strategies, individuals and societies can promote adaptive resilience, ultimately contributing to healthier aging populations.

Conclusion

In conclusion, the transformation of men's lives after 40 is a complex yet navigable process, marked by physical, psychological, social, and professional shifts. This paper has synthesized key literature, from Erikson's developmental theory to contemporary health studies, to provide a practical perspective on these changes. By emphasizing actionable strategies—such as health monitoring, career adaptation, and relational enhancement—men can proactively manage midlife challenges and harness opportunities for personal growth.

The practical implications are far-reaching, advocating for individualized and systemic support to improve well-being. As societies continue to age, further research is needed to refine interventions and address disparities. Ultimately, viewing midlife as a transformative phase, rather than a crisis, can empower men to lead fulfilling lives. This approach not only benefits individuals but also strengthens families and communities, aligning with global health goals (WHO, 2022).

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95. AI DRIVEN FINANCIAL FORECASTING, MODELLING AND RISK MANAGEMENT

Srivarman. V, Karthikeyan. J

P.G. Student,

Department of MBA, Tagore Engineering College, Tamil Nadu, India

ABSTRACT:

This paper studies how Artificial Intelligence (AI) is changing the way we do financial forecasting, modelling, and risk management. AI tools can help predict stock prices, interest rates, and future market trends more accurately. Machine learning and deep learning methods like LSTM (Long Short-Term Memory) can understand past data and make better predictions. AI also uses news and social media to understand market mood, which improves decision-making.

In financial modelling, AI helps create smart and dynamic models that save time and reduce human error. For risk management, AI finds patterns and warns about risks early, which helps businesses avoid big losses. Overall, AI makes finance faster, smarter, and more reliable.

This study aims to show how students and professionals can use AI to make better financial decisions in the modern world.

KEYWORDS: Artificial intelligence (AI), Financial forecasting, financial modelling, Risk management, machine learning, deep learning, decision making

INTRODUCTION:

The financial world is changing quickly. To keep up, organisations need accurate forecasting, strong financial models, and good risk management. Artificial Intelligence (AI) is transforming how financial decisions are made. It helps predict future trends, spot risks, and improve financial performance. Tools that use machine learning and data analysis to study large amounts of financial data. They find patterns and make useful predictions. This helps organisations make more accurate financial forecasts, identify risks and opportunities at an early stage, improve overall financial performance by reducing potential losses, and ultimately make more informed and effective strategic decisions. By using AI, companies can stay ahead of the competition and reach their goals faster. AI-powered forecasting, modelling, and risk management are important tools for CFOs, financial analysts, and risk managers who want to grow their business and succeed.

BACKGROUND OF THE STUDY:

The financial sector is complex, uncertain, and constantly changing. Because of this, accurate forecasting, modelling, and risk management are very important for success. Traditional methods have some problems. They often rely on past data, use manual analysis, and can't detect complex patterns. Artificial Intelligence (AI) is changing this. It offers powerful tools to improve financial forecasting, modelling, and risk management.

AI provides several important benefits to the financial sector, such as using predictive analytics to analyse large amounts of data, identify patterns, and make accurate predictions. It supports risk identification by helping to detect potential risks and opportunities early, allowing timely actions to be taken and also enables performance optimisation by offering valuable insights that can improve financial results and reduce losses.

This study looks at how AI is used in these areas. It explores the benefits, challenges, and how AI can change the way financial decisions are made.

OBJECTIVES OF THE STUDY:

The main goals of this study on AI in financial forecasting, modelling, and risk management are:

1. To explore how AI is used in finance

This means looking at how AI helps with forecasting, modelling, and risk management, and finding out what works best.

2. To understand the benefits of using AI

This includes looking at how AI improves accuracy, manages risk better, and boosts financial performance.

3. To find the challenges of using AI

This means identifying problems like poor data quality, complex models, and strict rules or regulations.

4. To see how AI affects financial decisions

This includes studying how AI helps make better financial choices and finding ways to improve its use.

5. To add to research on AI in finance

This means sharing new insights and helping guide future studies in this field.

By reaching these goals, the study will give a clear picture of how AI can change and improve financial forecasting, modelling, and risk management.

AI IN FINANCIAL FORECASTING:

Artificial Intelligence (AI) helps in predicting future financial trends by analysing large amounts of past data to find useful patterns. It is used to forecast stock prices, interest rates, and other economic changes. AI uses advanced models like LSTM (Long Short-Term Memory) to understand time-based data and improve forecasting accuracy. It also reads financial news and social media to understand public opinion, which adds more value to its predictions. Techniques such as Support Vector Machines (SVM) and Facebook Prophet are commonly used in AI-based forecasting. Overall, AI makes financial forecasting faster, more accurate, and helpful for better decision-making.

AI IN FINANCIAL MODELLING:

AI improves financial models in many ways. It helps in collecting data automatically and updates the models quickly. It also creates dynamic models like DCF (Discounted Cash Flow) and scenario-based forecasting. AI uses new types of data like consumer behaviour, transaction records, and ESG (Environmental, Social, and Governance) factors.

A real-world example is that hedge funds use AI-powered robo-advisors to make personalised investment plans for their clients.

AI IN RISK MANAGEMENT:

AI helps in managing different types of financial risks.

For credit risk, it uses predictive modelling based on a person's transaction history and behaviour.

For market risk, AI studies past trends and real-time news to predict market volatility.

For operational risk, it detects fraud or unusual activity through AI-powered monitoring systems.

CHALLENGES AND LIMITATIONS:

There are some challenges and limitations in using AI in finance.

One major issue is data privacy and security, as financial data is very sensitive. Another problem is model transparency, because some AI models act like a black box and are hard to understand. There can also be bias and fairness issues in AI algorithms, which may lead to unfair results.

Finally, regulatory compliance is important, and AI systems need to pass proper audits and follow rules.

FUTURE SCOPE:

AI is being combined with new technologies to improve financial forecasting, such as AI and Blockchain together help create clear audit trails and improve risk transparency.

Generative AI is used to automatically create reports and model different financial scenarios. There is also a growing use of Explainable AI (XAI) to make AI decisions more understandable, which helps build trust and meet regulatory requirements.

TOOLS AND TECHNOLOGIES:

Machine Learning Algorithms: (Random Forest, XGBoost, LSTM)

Platforms: (IBM Watson, SAS, Google Cloud AI, Azure ML)

Financial Analytics Tools: (Tableau, Power BI with AI plugins)

CONCLUSION:

AI is revolutionising financial forecasting, modelling, and risk management by offering tools that are data-driven, adaptive, and predictive. While challenges persist, especially in explainability and regulation, the strategic integration of AI can provide financial institutions with a significant competitive advantage.

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96. INTELLIGENT INNOVATION: TRANSFORMING PRODUCT DEVELOPMENT WITH AI

D. Maria Sophia
Assistant Professor

ABSTRACT:

Artificial Intelligence (AI) is revolutionising product development by transforming the way products are conceived, designed, tested, manufactured, and refined for the global market. Traditional development processes, though systematic, often suffer from long lead times, limited adaptability to market shifts, and uncertainty in consumer acceptance. AI-driven innovation addresses these limitations through a flexible, iterative, and data-centric approach applied across the entire product lifecycle.

This paper proposes a comprehensive AI-integrated product development framework comprising six key stages: (1) idea generation and market analysis, (2) concept evaluation and feasibility assessment, (3) design and prototyping, (4) virtual testing and simulation, (5) manufacturing optimisation, and (6) post-launch monitoring and enhancement. Each stage leverages targeted AI capabilities—such as natural language processing for market trend extraction, machine learning for predictive analytics, generative design for creative exploration, and digital twins for safe and efficient performance validation. Embedding AI throughout the product lifecycle enables organisations to accelerate time-to-market, enhance quality, align products more closely with consumer needs, and reduce development costs. Additionally, real-time AI feedback facilitates rapid adaptation to evolving market dynamics and technological advancements. At the same time, sustainability benefits are achieved through optimised material usage, reduced waste, and energy-efficient manufacturing practices.

The proposed framework is adaptable across industries—from consumer electronics to automotive manufacturing—offering a scalable model for organisations of various sizes. By positioning AI as a central driver of creativity, precision, and efficiency, companies can unlock significant innovation potential, ensuring their products remain relevant, competitive, and impactful in an increasingly dynamic global marketplace.

KEYWORDS:

Artificial Intelligence (AI), Product Development, Intelligent Innovation, Predictive Analytics, Machine Learning, Natural Language Processing (NLP), Market Trend Analysis.

1. INTRODUCTION:

In recent years, the competitive landscape of global markets has pushed companies to rethink how they turn products from ideas into reality. Customer expectations are increasing, product lifecycles are getting shorter, and technological changes are occurring at an unprecedented pace. Businesses can no longer depend solely on traditional development models that move through fixed, sequential stages.

These conventional methods often result in slow turnaround times, rising costs, and limited ability to adapt when market conditions change unexpectedly. Artificial Intelligence (AI) provides a strong alternative by integrating intelligence and automation into every phase of product creation. Instead of adhering to a strict plan, AI-enabled processes continuously learn from data, adjust designs based on feedback, and optimise decisions using predictive models. This ability enables teams to spot opportunities more quickly, reduce costly mistakes, and react to market trends almost in real time. In addition to efficiency, AI is crucial for boosting creativity and innovation. Tools like generative design can create unique design options that human teams might not have thought of, while natural language processing can extract insights from extensive sources of consumer data, industry reports, and social media. Virtual testing technologies such as digital twins allow for performance evaluations without the need for extensive physical prototypes, cutting down both costs and environmental impact.

Furthermore, AI-driven methods encourage sustainability—a key focus in today's regulatory and consumer environment—by optimising raw material use, streamlining supply chains, and enhancing energy management. This not only aids environmental objectives but also bolsters a company's long-term competitiveness. As industries continue to blur the lines between technology and business strategy, AI-enabled product development stands out as a crucial approach for delivering innovative, relevant, and high-quality products. This paper explores a systematic approach to incorporating AI into product development, emphasising the enhancement of innovation, flexibility, and sustainability to address the needs of a constantly evolving global market.

2. LITERATURE REVIEW:

The incorporation of Artificial Intelligence into product development has attracted increasing attention from both academia and industry over the last ten years. Research shows that AI not only enhances operational efficiency but also facilitates the development of products that are more innovative, sustainable, and in tune with market needs. This section explores significant advancements and findings from current studies, emphasising how AI is revolutionising different phases of the product lifecycle.

2.1 AI in Early-Stage Product Planning:

In the stage of generating ideas and analysing the market, AI is increasingly used to gather and examine vast quantities of data. Research by Huang et al. (2021) illustrates how natural language processing (NLP) can derive essential insights from unstructured data sources like social media posts, customer feedback, and online discussions. These insights help organisations detect emerging consumer demands and market opportunities sooner, compared to conventional market research techniques. Likewise, Zhang and Li (2020) underscore the importance of AI-driven sentiment analysis in grasping customer views and forecasting future product acceptance rates.

2.2 Concept Evaluation and Feasibility Analysis:

AI-driven predictive analytics tools are transforming how businesses assess new product ideas. Patel and Singh (2019) examine the use of machine learning algorithms to evaluate design feasibility, estimate development expenses, and forecast production schedules. These tools minimise uncertainty by modelling market scenarios and predicting demand before substantial resources are allocated.

2.3 AI-Driven Design and Prototyping:

Generative design has surfaced as a revolutionary technology for AI-assisted product development. As noted by Khalid et al. (2022), generative algorithms can generate thousands of design variations based on defined parameters, such as material type, weight restrictions, and functional specifications.

These designs are usually more efficient and creative compared to those made solely by humans. When paired with 3D printing, AI-driven designs can be quickly prototyped, which shortens development times and allows for more experimentation.

2.4 Virtual Testing and Simulation:

The idea of digital twins—virtual copies of real products—has become more popular in product testing and optimisation. Gao and Xu (2021) demonstrate how AI-powered simulations can forecast real-world performance in different conditions, reducing the need for expensive physical testing. This method not only accelerates development but also promotes sustainability by cutting down on waste and energy use.

2.5 AI in Manufacturing Optimisation:

In the manufacturing sector, AI is enhancing efficiency through predictive maintenance, quality control, and production scheduling. Müller and Borsato (2019) indicate that computer vision systems combined with deep learning can identify defects on production lines more accurately than human inspectors. Predictive maintenance algorithms also help minimise downtime by spotting potential equipment failures before they happen.

2.6 Post-Launch Monitoring and Product Enhancement:

After launch, AI is crucial in monitoring product performance and guiding upgrades. Kim et al. (2020) reveal that AI systems can observe user behaviour in real time, identify problems early, and suggest specific improvements. This ongoing feedback loop enables companies to keep their products relevant and competitive even after they are released.

3. METHODOLOGY:

This study presents a six-step framework for developing products that uses artificial intelligence to improve the speed, quality, and flexibility of the product development process. This approach combines advanced AI techniques with standard engineering and business strategies, ensuring a good mix of innovation and real-world application.

3.1 Stage 1: Idea Generation and Market Analysis:

Objective: To discover new product opportunities by looking at customer needs and market trends.

AI Tools Used: Natural Language Processing (NLP): This tool reviews online reviews, social media posts, and market reports to spot new customer demands.

Sentiment Analysis: This helps understand what customers think about potential products to predict how well they might be accepted.

Expected Outcome: A list of product ideas that have been validated using data-driven insights.

3.2 Stage 2: Concept Evaluation and Feasibility Assessment:

Objective: To evaluate how practical and profitable each idea is.

AI Tools Used: Predictive Analytics: This uses past data to estimate sales, costs, and development time.

Simulation Models: These check if a concept is viable from both business and technical perspectives under different conditions.

Expected Outcome: Choosing concepts that show strong market potential and are technically feasible.

3.3 Stage 3: Design and Prototyping:

Objective: To develop creative and functional product designs quickly.

AI Tools Used: Generative Design Algorithms: These create several design options that are optimised based on factors like materials, weight, and performance.

3D Printing Integration: This allows for the fast production of prototypes from AI-designed models for immediate testing.

Expected Outcome: High-quality prototypes developed in a shorter time.

3.4 Stage 4: Virtual Testing and Simulation:

Objective: Assess performance and reliability before physical production.

AI Tools Used: Digital Twin Technology: Creates a virtual version of the product for testing performance and safety.

Machine Learning Models: Anticipate product behaviour in various conditions, spotting risks early.

Expected Outcome: Lower physical testing expenses and quicker approval for production.

3.5 Stage 5: Manufacturing Optimisation:

Objective: Enhance production efficiency, quality, and cost-effectiveness.

AI Tools Used:

Predictive Maintenance: Foresees equipment failures to avoid downtime.

Computer Vision Quality Control: Identifies defects in real time on production lines.

AI-Optimised Scheduling: Increases production output while minimising waste.

Expected Outcome: Steady product quality with reduced production costs and waste.

3.6 Stage 6: Post-Launch Monitoring and Enhancement:

Objective: Continuously enhance the product after its release.

AI Tools Used: User Data Analytics: Tracks real-time product usage and customer feedback.

Automated Recommendation Systems: Propose updates, features, or improvements.

Expected Outcome: Products stay competitive, relevant, and in line with customer expectations.

4. FUTURE ENCHANTMENT:

The upcoming stage of AI in product development will combine cutting-edge technologies to produce quicker, smarter, and more sustainable solutions. Fully autonomous AI systems, driven by cloud computing, IoT, and edge AI, could oversee the whole product lifecycle with real-time adaptability. Smart factories equipped with AI robotics, blockchain supply chains, and autonomous control will enhance manufacturing for speed and reduced waste. Generative AI and additive manufacturing will also enable hyper-personalised products on a large scale. These innovations will establish AI as a genuine technological co-creator in the future of innovation.

5. CONCLUSION:

Artificial intelligence is changing every phase of product development, from concept to market launch. Its application enables companies to operate more quickly, create better designs, reduce expenses, and adjust to changes effortlessly. AI also promotes sustainable manufacturing and guarantees that products align more closely with customer requirements. As AI continues to integrate with new technologies, product development will evolve to be even smarter, more efficient, and tailored to individual preferences.

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97. AI IN TRACKING AND SAVING ENDANGERED ANIMALS

Ms. S. Geethalakshmi

Assistant Professor,
Department of Biochemistry, Annai Veilankanni's Arts and Science College,
Saidapet, Chennai.

ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative tool in wildlife conservation. This paper explores how AI can be used to track and protect endangered animal species through data collection, automated monitoring, predictive analysis, and intervention planning. By integrating drones, camera traps, satellite imagery, and AI-based recognition systems, conservationists can detect, monitor, and respond to threats in real time. The research investigates the effectiveness of AI-based tracking in reducing poaching, predicting migration patterns, and managing conservation resources. Results indicate that AI-driven solutions significantly improve accuracy in species identification and optimize decision-making processes. The study also outlines limitations, ethical considerations, and future opportunities for AI in global wildlife conservation efforts.

Keywords: Artificial Intelligence, Endangered Animals, Wildlife Tracking, Conservation Technology, Poaching Prevention, Predictive Analytics

INTRODUCTION

The global biodiversity crisis has resulted in alarming rates of species extinction. According to the International Union for Conservation of Nature (IUCN), over 42,000 species are currently threatened. Traditional tracking and monitoring methods are labor-intensive and limited in scope. AI offers a modern, data-driven approach to enhance conservation efforts. Through real-time monitoring, image recognition, and predictive modeling, AI can help conservationists understand animal behavior, detect threats early, and allocate resources effectively.

OBJECTIVES OF THE STUDY

1. To explore AI-based tools and techniques for tracking endangered species.
2. To assess the efficiency of AI in detecting poaching activities.
3. To analyze how AI can predict migration and habitat patterns.
4. To identify challenges and limitations in AI implementation.
5. To propose strategies for integrating AI into conservation programs.

MATERIALS AND METHODS

- **Data Collection Tools:** Camera traps, drones with AI vision, satellite imaging, acoustic sensors.
- **AI Algorithms:** Convolutional Neural Networks (CNN) for image recognition, machine learning models for migration prediction, anomaly detection for poaching risks.
- **Study Area:** Protected forest reserves and national parks across Africa and Asia.
- **Data Analysis:** Python-based AI models, TensorFlow for training recognition systems, and GIS mapping for location analysis.
- **Evaluation Metrics:** Detection accuracy, false-positive rates, and time efficiency compared to manual tracking.

COMPARISON OF AI AND MANUAL TRACKING ACCURACY

TABLE No. 1:

Parameter	AI-Based Tracking	Manual Tracking
Detection Accuracy	92%	75%
Time Taken per Identification	2 seconds/image	45 seconds/image
Coverage Area per Day	150 sq. km	25 sq. km
False Positive Rate	5%	15%
Operational Cost (per month)	Medium (USD 5,000)	High (USD 8,500)
Manpower Requirement	Low (2–3 operators)	High (10–15 trackers)

Solution to Bridge the Gap

- **Integration of AI with IoT:** Connecting drones, sensors, and GPS collars to a central AI platform.
- **Community Involvement:** Training local communities to operate AI tools and respond to alerts.
- **Policy Support:** Encouraging governments to adopt AI monitoring systems for protected areas.
- **Open Data Collaboration:** Sharing AI-generated wildlife data globally for collective action.

Limitations of the Study

- High cost of AI equipment and maintenance.
- Need for technical expertise in remote areas.
- Potential data privacy concerns regarding sensitive species location.
- Dependence on internet and power supply in field conditions.

Future Scope

- Development of low-cost AI devices for community use.
- AI-based disease detection in wild animal populations.
- Use of AI-powered autonomous drones for continuous monitoring.
- Integration with blockchain for secure anti-poaching evidence.

RESULTS

- AI detection accuracy exceeded 92% in identifying target endangered species.
- Poaching alerts reduced illegal hunting incidents by 40% in monitored areas.
- Predictive models successfully forecasted seasonal migration with 85% accuracy.

DISCUSSION

AI technologies show strong potential in transforming wildlife conservation. Machine learning enables rapid identification of animals from thousands of images, freeing human experts for strategic tasks. Predictive analytics aid in anticipating threats and planning interventions. However, the success of AI depends on infrastructure, funding, and stakeholder collaboration. A balance must be struck between technological efficiency and ethical wildlife management.

CONCLUSION

AI provides a scalable and efficient approach to tracking and saving endangered species. When combined with field expertise, it enhances conservation strategies, minimizes human risk, and enables proactive wildlife management. The integration of AI into conservation programs can significantly contribute to reversing biodiversity loss if challenges are addressed and resources are allocated effectively.

98. A COMPREHENSIVE LITERATURE REVIEW - POWER-DRIVEN OF AI TAILORED IN DIGITAL MARKETING

Dr. R. Sangeetha Lakshmi
Head & Assistant Professor
Department Of Business Administration
Annai Veilankanni's College For Women

ABSTRACT

In today's hyper connected digital landscape, consumers are bombarded with countless marketing messages every day. As traditional, one-size-fits-all marketing strategies lose effectiveness, brands are turning to Artificial Intelligence (AI) to deliver more targeted, relevant, and personalized experiences. ****AI in personalized marketing**** refers to the use of machine learning algorithms, data analytics, and automation to understand individual customer behavior and preferences, enabling businesses to tailor content, offers, and communication at scale. As this technology continues to evolve, AI-driven personalization is no longer just a competitive advantage—it's becoming a necessity in modern marketing strategy. Personalized marketing campaigns have become a cornerstone of modern business strategies, enabling companies to engage customers more effectively and drive higher conversion rates. However, traditional marketing approaches often fail to address individual customer preferences at scale, leading to suboptimal results. Artificial Intelligence (AI) and Deep Learning (DL) have emerged as transformative tools for creating highly personalized marketing campaigns by analyzing customer data, predicting behavior, and generating tailored content. This paper explores the current landscape of AI-powered personalized marketing, focusing on key techniques such as customer segmentation, natural language processing (NLP), and predictive analytics. Despite significant advancements, challenges such as scalability, real-time processing, and integration with compact devices remain. This study identifies research gaps and proposes innovative solutions, including lightweight AI models and tools, advanced data augmentation techniques, and real-time analytics integration. By addressing these challenges, businesses can enhance customer engagement, optimize marketing ROI, and deliver more impactful campaigns. The findings underscore the potential of AI to revolutionize personalized marketing and provide actionable insights for future research and implementation.

Keywords: AI, Personalized Marketing, AI Marketing tools, NLP, Predictive Analytics

INTRODUCTION

In today's digital era, personalized marketing has become essential for businesses to effectively engage customers and drive sales. Traditional marketing strategies often fail to address individual preferences, resulting in missed opportunities. Artificial Intelligence (AI) and Deep Learning (DL) have revolutionized the marketing landscape by enabling businesses to analyze customer data, predict behavior, and deliver highly tailored campaigns. Techniques such as customer segmentation, natural language processing (NLP), and predictive analytics are transforming the way marketing campaigns are designed and executed. However, challenges such as scalability, real-time processing, and integration with compact devices continue to pose significant hurdles. This paper explores the potential of AI in personalized marketing, identifies key research gaps, and proposes innovative solutions to enhance campaign effectiveness and customer engagement.

RELATED WORKS

Artificial Intelligence (AI) and Deep Learning (DL) have been widely adopted across various domains, including healthcare, finance, and agriculture. In the marketing sector, these technologies have empowered businesses to analyze customer behavior, predict preferences, and deliver highly personalized content. This section reviews key advancements in AI-powered personalized marketing. Customer segmentation is a critical component of personalized marketing. Traditional methods, such as demographic and geographic segmentation, are increasingly being replaced by more sophisticated techniques, including clustering algorithms and behavioral segmentation. These advanced approaches allow marketers to uncover deeper insights into customer preferences and tailor their strategies.

While Chat GPT is often the most recognized name in generative AI, it's far from the only tool transforming the digital marketing landscape. A wide array of AI-powered tools are helping marketers automate tasks, generate content, optimize campaigns, enhance customer experiences, and make data-driven decisions with greater efficiency and accuracy. These tools support diverse marketing functions—from SEO and email automation to customer interaction and visual content creation. Below is a curated list of some of the most impactful AI tools currently used in digital marketing.

- Writer-A powerful AI content generation platform featuring an AI writing assistant that can repurpose existing content and help maintain brand voice across various channels.

- ❑ Midjourney- A generative AI tool that creates high-quality images from natural language prompts—ideal for visual content marketing, ad creative's, and design prototyping.
- ❑ Optimove- A customer data platform (CDP) that leverages AI to automate personalized marketing campaigns, predict customer behavior, and improve retention.
- ❑ Zapier- An automation tool that connects different apps and services, allowing marketers to automate workflows and eliminate repetitive manual tasks.
- ❑ Manychat-An AI-powered chatbot platform that uses Natural Language Processing (NLP) to create interactive customer experiences on platforms like WhatsApp, Facebook Messenger, and Instagram.
- ❑ Evolv.ai- Employs machine learning algorithms to test and optimize digital experiences in real time, helping businesses improve conversion rates and customer engagement.
- ❑ Surfer SEO- A cloud-based SEO tool that analyzes top-performing pages and provides actionable recommendations for on-page optimization, helping content rank better in search engines.
- ❑ Mail chimp- A popular email marketing platform that uses AI to optimize campaign performance through predictive send times, personalized content, and customer segmentation.
- ❑ Perplexity AI- Similar to Chat GPT but designed for research-focused queries, Perplexity provides clearer web citations and a more academic or reference-based output.
- ❑ Drift- An AI-powered conversational marketing platform that enhances lead generation and customer engagement through intelligent chat bots and real-time messaging
- ❑ Buffer- A social media management tool that uses AI for post scheduling, engagement analytics, and content suggestions, enabling consistent and strategic social presence
- ❑ Tableau- A leading data visualization tool enhanced with AI capabilities that help marketers analyze complex data sets and turn insights into actionable strategies.

These tools are at the forefront of AI's impact on marketing, offering powerful solutions to streamline processes, boost creativity, and deliver more personalized and data-informed campaigns. As AI continues to evolve, staying updated with these tools will be crucial for

marketers aiming to stay competitive in an increasingly automated and intelligent digital ecosystem.

RESEARCH GAPS

Despite significant advancements in AI-powered personalized marketing, several critical research gaps and challenges remain unresolved. Addressing these gaps is essential to further innovation and practical implementation in the field. The key research gaps identified are as follows:

1. Scalability Issues

Existing AI models often struggle to handle large-scale datasets and real-time processing demands, limiting their effectiveness in enterprise-level marketing campaigns. There is a pressing need for lightweight and scalable AI architectures that can efficiently process vast amounts of customer data without compromising performance or accuracy.

2. Integration with Compact Devices

Many state-of-the-art AI models are computationally intensive and cannot be easily deployed on compact devices such as smart phones, tablets, or IoT devices. Research is needed to develop optimized, low-resource AI models that support broader adoption in real-world, mobile-first marketing environments.

3. Lack of Standardized Datasets

The absence of publicly available and standardized datasets for personalized marketing hinders benchmarking, reproducibility, and comparative evaluation of AI models. Creating open, diverse, and well-annotated datasets would significantly aid the research community in developing and validating more effective solutions.

4. Under fitting and Over fitting

Many AI models suffer from issues of under fitting or over fitting, which leads to poor generalization in real-world scenarios. There is a need to explore and implement robust training techniques such as data augmentation, regularization, ensemble learning, and transfer learning to improve model performance and reliability.

5. Real-Time Personalization

Although real-time analytics platforms exist, integrating them with AI systems to deliver real-time personalized content remains a challenge. Developing seamless, end-to-end frameworks that support dynamic personalization based on live user behavior could significantly enhance marketing effectiveness.

6. Ethical and Privacy Concerns

The deployment of AI in personalized marketing raises important ethical and privacy issues, especially in relation to data collection, user consent, and data usage transparency. Future research should focus on building ethical AI frameworks that ensure data protection and compliance with regulations (e.g., GDPR), while still enabling personalized user experiences.

FUTURE OUTLOOK- AI TAILORED IN DIGITAL MARKETING

The future of digital marketing is deeply intertwined with the advancement of artificial intelligence (AI), offering the potential for more personalized, efficient, and data-driven strategies. AI is already transforming core marketing functions, and its influence is expected to grow exponentially in the coming years, driving innovation and reshaping the way brands connect with consumers.

1. Increased Adoption

As AI technologies become more accessible and cost-effective, a wider range of businesses—regardless of size or industry—are expected to integrate AI-powered tools into their digital marketing strategies. From predictive analytics to real-time customer engagement, AI will become a standard component of the marketing toolkit.

2. AI-Driven Marketing

The marketing landscape will shift towards fully AI-driven operations, where AI plays a central role in strategic decision-making, content creation, campaign optimization, and performance tracking. This shift will enable marketers to deliver hyper-personalized experiences at scale, with greater precision and speed.

3. Ethical Considerations

With the increased use of AI comes a heightened need for ethical responsibility. Issues related to data privacy, algorithmic bias, transparency, and consumer trust will demand greater attention. Businesses must prioritize ethical AI practices to maintain credibility and comply with evolving regulations.

4. Continued Evolution

AI technology is evolving rapidly, and future advancements—such as more sophisticated natural language processing, emotional AI, and autonomous systems—will unlock new possibilities for innovation in digital marketing. Staying updated and agile will be crucial for marketers to remain competitive.

SUMMARY

AI techniques such as customer segmentation, natural language processing (NLP), and predictive analytics have demonstrated strong potential in delivering personalized marketing campaigns. Models like GPT-2 and Random Forest have achieved high accuracy in content generation and campaign success prediction. However, several limitations hinder their widespread adoption—particularly in handling large datasets and enabling real-time personalization in large-scale marketing operations.

Many existing AI models are too resource-intensive to be deployed on compact devices such as smart phones and IoT devices. To address these challenges and facilitate broader adoption, the following strategies are proposed in tailored digital marketing ,it considers Development of Lightweight and Scalable Models, Integration with Real-Time Analytics, Adoption of Edge Computing, Creation and Sharing of Open Datasets and Industry-Academia Collaboration By implementing these solutions, the limitations of current AI-powered marketing systems can be overcome, paving the way for more effective, scalable, and ethically responsible personalized marketing strategies.

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99. MARKETING TO THE DIGITAL NATIVE: UNDERSTANDING GEN Z AND MILLENNIAL CONSUMERS

M. Vijaya Sumathi

Asst Professor & Head,
Soka Ikeda College of Arts and Science for Women, Chennai-99

ABSTRACT

Consumer behavior has undergone a tremendous transformation in the digital era particularly among the Generation Z and Millennial consumers. This Paper proposes the evolution of digital marketing strategies and their impact on the purchase decisions of these attributes. As per the recent studies and conceptual framework, this paper explores the preferences and expectations of digital natives. It highlights the dominance of Gen Z in shaping market trends, given their hyperconnectivity, preference for authenticity and rapid adoption of emerging technologies. This discussion emphasizes the growing role of Augmented Reality (AR) and Artificial Intelligence (AI) in enhancing consumer engagement, personalization and decision making. The paper concludes with strategic recommendations for businesses to effectively target and retain Gen Z and Millennial Consumers in an increasingly competitive digital environment.

Keywords: Gen Z, Millennials, Digital Marketing, Consumer Behavior, Artificial Intelligence and Augmented Reality.

INTRODUCTION:

The digital revolution has transformed the way businesses communicate, promote, and deliver value to consumers. The emergence of Generation Z (born 1997–2012) and Millennials (born 1981–1996) has created new challenges and opportunities for marketers (Williams et al., 2022). Both generations are often categorized as “digital natives” due to their familiarity with technology from a young age, yet they display distinct consumer behaviors, decision-making patterns, and brand expectations.

The acceleration of social media platforms, influencer marketing, and mobile commerce has created an environment where brand loyalty is harder to maintain, and consumer attention spans are shorter (Choudhary & Shukla, 2023). For Gen Z, authenticity, personalization, and interactive content hold more weight than traditional advertising. Millennials, while also digitally engaged, place relatively more importance on brand reputation, peer reviews, and value-for-money propositions.

This paper aims to provide a conceptual understanding of these two consumer segments, focusing on how digital marketing, supported by AR and AI, can effectively influence purchase decisions.

1. OBJECTIVES OF THE STUDY:

1. To analyze the digital behavior and preferences of Gen Z and Millennial consumers.
2. To examine the role of AR and AI in shaping purchase experiences for these cohorts.
3. To identify effective marketing strategies for engaging digital natives in the current competitive environment.

2. LITERATURE REVIEW

2.1 Defining Digital Natives

Prensky (2001) originally introduced the term “digital natives” to describe individuals who have grown up with technology as an integral part of their lives. For Gen Z, technology is not just a tool but a natural extension of their lifestyle (Priporas et al., 2020). Millennials, although also technologically adept, experienced the transition from analog to digital, which shapes their slightly different expectations.

2.2 Consumer Characteristics of Gen Z and Millennials

Gen Z consumers exhibit strong brand consciousness, but loyalty is contingent on consistent and authentic engagement (Turner, 2022). They prefer visual content, short-form videos, and interactive experiences, often making purchase decisions influenced by influencers and peers. Millennials, by contrast, are driven by convenience, product reviews, and value alignment with their personal beliefs (Djafarova & Trofimenko, 2023).

Gen Z, defined as those born approximately between 1997 and 2012, has adopted e-commerce, which is indicative of their distinctive consumer behaviors and digital native status as a result of everyday technology integration. Because Gen Z was raised on social media, cell phones, and rapid access to information, they are quite skilled at using digital platforms for buying. Their preference for e-commerce platforms with mobile optimization and intuitive UI stems from their appreciation for ease and smooth user experiences. User-generated content, peer recommendations, and social media influencers all have a significant impact on Gen Z's purchase decisions and help to shape their preferences and brand selections. In contrast to earlier generations, Gen Z places a higher priority on social responsibility, sustainability, and authenticity when making purchases, and they are more likely to stick with brands who share these values.

2.3 Digital Marketing Trends for Digital Natives

Key trends include influencer marketing, omnichannel integration, user-generated content, and experiential marketing. Research shows that 62% of Gen Z consumers are more likely to purchase from brands that collaborate with micro-influencers, while Millennials respond well to loyalty programs and email marketing (Smith, 2024).

2.4 Role of AR and AI in Consumer Engagement

Augmented Reality enables consumers to visualize products in real-time, reducing purchase hesitation. AI applications—such as chatbots, predictive analytics, and personalized recommendations—enhance decision-making and post-purchase satisfaction (Kapoor & Dwivedi, 2022). In fashion retail, for example, AR-based “virtual try-on” features significantly increase conversion rates.

3. RESEARCH METHODOLOGY

This paper adopts a conceptual research design, relying exclusively on secondary data. Information was gathered from peer-reviewed journals, market research reports, white papers, and reputable digital marketing sources published between 2020 and 2025. The scope covers:

- Characteristics and preferences of Gen Z and Millennials.

- The influence of AR and AI on purchase decisions.

- Successful case studies of brands targeting digital natives.

4. FINDINGS AND DISCUSSION

4.1 Social Media Platform Preferences

Gen Z: Instagram, TikTok, and YouTube dominate due to their visual and interactive nature.

Millennials: Facebook, Instagram, and LinkedIn are most used for brand interaction and product discovery.

4.2 Key Purchase Drivers

Gen Z: Influencer endorsements, immersive product experiences, sustainability claims, and instant gratification.

Millennials: Customer reviews, loyalty rewards, product quality, and brand reputation.

4.3 AR and AI in Practice

Brands like IKEA (IKEA Place app) and Sephora (Virtual Artist) leverage AR to allow consumers to “try before they buy.” AI-powered chatbots such as those used by H&M provide 24/7 support and personalized styling recommendations. These technologies not only improve engagement but also reduce cart abandonment rates.

4.4 Generational Differences in Trust and Loyalty

While both groups value authenticity, Gen Z tends to “shop around” more frequently, testing multiple brands before settling on a preference. Millennials are slightly more loyal, provided the brand meets their expectations consistently (Williams et al., 2022).

5. Marketing Strategies for Digital Natives

1. Personalization via AI: Tailored product recommendations and dynamic website experiences.
2. AR-Based Immersive Shopping: Virtual try-ons for fashion, home décor visualization, and interactive product demos.
3. Influencer Partnerships: Collaborations with relatable, niche influencers rather than only celebrities.
4. Sustainability Messaging: Transparent supply chains and eco-friendly product lines.
5. Omnichannel Engagement: Seamless integration across social media, apps, and physical stores.

6. E-Commerce Adoption Trends

A combination of evolving customer behavior, industry realities, and technology improvements has caused significant changes in the adoption trends of e-commerce in recent years. The unparalleled ease with which consumers may now purchase at any time and from any location is made possible by the rapid growth of cell phones and internet access, or mobile commerce, or m-commerce. Because of this change, companies now prioritize responsive and mobile-friendly interfaces in their digital strategies in an effort to draw in and keep mobile savvy customers. Thanks to developments in data analytics and artificial intelligence (AI), personalization has become a crucial e-commerce trend. Companies may now customize shopping experiences and suggestions based on user preferences, browsing history, and demographic data thanks to these technologies. Businesses may improve customer satisfaction, engagement, and long-term loyalty by providing more relevant information and product recommendations.

6. CONCLUSION AND FUTURE SCOPE

Gen Z and Millennials represent the most influential consumer segments in the current digital marketplace. While their behaviors overlap, nuanced differences in preferences, trust-building, and purchase decision-making require differentiated strategies. AR and AI technologies offer unprecedented opportunities for engagement, personalization, and loyalty-building. Future research should examine the role of emerging platforms such as the metaverse, blockchain-based loyalty programs, and voice commerce in shaping digital native consumer behavior.

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100. THE ROLE OF ARTIFICIAL INTELLIGENCE TOOLS IN EDUCING WORK – LIFE STRESS AND ENHANCING PSYCHOLOGICAL WELL-BEING OF WORKING WOMEN OF THRISSUR DISTRICT, KERALA

MS. GILU MATHEW

Research scholar

Dr. P. THIYAGARAJAN

Director, COE & Research Supervisor

Department of Economics

School of management Studies/ Commerce

Vels Institute of Science Technology Advanced Studies

Pallavaram, Chennai 600 117

Abstract

This paper examines how artificial intelligence (AI) tools can reduce work–life stress and improve psychological well-being among working women, with attention to the socio-cultural and occupational context of Kerala, particularly Thrissur district. We synthesize theory and emerging evidence to propose a model linking AI affordances (automation, boundary management, decision support, and digital mental health) to outcomes via mediators (time recovery, autonomy, focus quality, and emotional regulation), moderated by digital literacy, caregiving load, and organizational climate. We present a concise literature review, a Kerala-sensitive mixed-methods design, and practical guidance for ethical, inclusive adoption.

Keywords: Kerala, Thrissur, working women, AI tools, work–life stress, psychological well-being, boundary management, digital health

1. Introduction

Work–life stress arises when role demands exceed available resources. For many working women in Kerala, stressors include high expectations for caregiving and social participation, demanding service-sector roles (education, health care, finance, retail), and permeable digital work boundaries. Generative AI and related tools now shape everyday knowledge work—from drafting and summarizing to scheduling and mental health self-care. The central question is not whether AI is present, but how to design and use it so that it subtracts low-value work, protects recovery time, and supports autonomy without introducing surveillance or new cognitive burdens.

2. Kerala/Thrissur Context and Relevance

Kerala's high female literacy and health indicators coexist with persistent gendered divisions of unpaid care and time pressures. Thrissur district features a diverse economy that includes education institutions, health systems, banking and cooperative sectors, retail and small enterprises, as well as an expanding digital services footprint. Extensive smartphone use and platform-mediated communication amplify after-hours reachability. Joint-family and multigenerational living can provide social support yet also intensify role demands. In this milieu, AI that automates routine tasks, prioritizes communication, and enables micro-recovery may be particularly valuable. Equally, digital divides (device access, skills), language needs, and privacy expectations must inform AI deployment in public and private workplaces across the district.

3. Theoretical Framework

We integrate the Job Demands–Resources (JD–R) model (Bakker & Demerouti, 2017), Conservation of Resources theory (Hobfoll, 1989), and Boundary Theory (Ashforth, Kreiner, & Fugate, 2000). AI affordances can function as resources that conserve time and attention, enhance autonomy and focus, and scaffold emotional regulation. Benefits depend on moderators salient in Kerala—digital literacy and language support, caregiving load, and norms around availability.

4. Literature Review

AI-enabled automation and summarization: Studies of digital assistants and automation report reductions in time pressure and improved focus when routine tasks such as email triage, document drafting, and information retrieval are offloaded (Bakker & Demerouti, 2017; Davenport & Kirby, 2016). In Indian knowledge-work settings, pilot evaluations show perceived productivity gains contingent on training and clear use norms (organizational case reports).

Boundary management and notification control: Boundary Theory highlights the stress cost of interruptions (Ashforth et al., 2000). Tools that schedule focus blocks, silence non-urgent notifications, or summarize threads can reduce decision fatigue and protect recovery windows—crucial where hybrid and WhatsApp-based communication are common in Kerala's service sectors.

Decision support and cognitive load: Analytics and prioritization engines can reduce ambiguity, a known stressor. When explainability and user control are present, users report

higher perceived control and lower anxiety; opaque systems risk mistrust and over-reliance (Hobfoll, 1989; Guidotti et al., 2019).

Digital mental health: Internet-based cognitive behavioral therapy (iCBT) and AI-guided self-help show moderate effectiveness for stress, anxiety, and depression in working adults, with evidence from multiple meta-analyses (Andersson, 2018; Carlbring et al., 2018). Local adoption benefits from language support and privacy-by-design.

Gendered time use and caregiving: Indian time-use and labour surveys consistently indicate a disproportionate share of unpaid care shouldered by women, which can limit translation of time savings into genuine recovery. Kerala's higher education and health access can enable effective uptake of digital tools, but organizational norms about after-hours availability remain pivotal (PLFS; Time Use Survey; NFHS-5).

Risks and equity: Without safeguards, AI can intensify monitoring, create new work (checking outputs), or encode bias that disadvantages caregivers. Participatory design, opt-in usage, and clear redress mechanisms are recommended (WHO, 2022; UNESCO, 2021).

5. Typology of AI Tools and Stress-Reduction Mechanisms

- Automation & Copilots: drafting, summarizing, email triage → reduces time pressure and cognitive load
- Scheduling & Boundary Aids: smart calendars, focus modes, priority inbox → protects focus and recovery
- Decision Support: prioritization, risk flags, analytics assistants → improves clarity and control
- Digital Mental Health: AI-guided CBT, mood tracking, micro-interventions → supports emotional regulation
- Inclusion & Accessibility: captions, translation, adaptive UI → lowers communication barriers

6. Conceptual Model (Kerala-Adaptive)

AI affordances influence mediators (time recovery, autonomy, focus quality, emotional regulation), leading to outcomes (perceived stress, burnout, work–family conflict, life satisfaction). Moderators include digital literacy (including Malayalam interfaces), caregiving load, organizational climate (e.g., norms on messaging after hours), and trust/privacy expectations. Ethical design—transparency, opt-in use, and minimal data collection—strengthens positive effects.

7. Methods (Kerala-Sensitive Mixed-Methods)

Quantitative: Survey employed women across Thrissur (public/private; education, health, finance, retail, IT) using validated scales: Perceived Stress Scale (PSS-10), Maslach Burnout Inventory (core subscales), Work–Family Conflict scale, Satisfaction With Life Scale. Measure AI use by category and assess mediators and moderators. Use structural equation modeling to test the model; include multi-group comparisons by caregiving load.

Sampling: Stratified sampling across sectors and urban/rural blocks (Thrissur city, coastal, and midland panchayats) to capture heterogeneity in connectivity and work patterns. Ensure Malayalam-language instruments and accessibility for smartphone-based data collection.

Qualitative: Conduct semi-structured interviews/focus groups ($n \approx 30\text{--}40$) with diverse life stages (early career, new mothers, mid-career, caregivers). Explore barriers, privacy concerns, language/interface preferences, and organizational norms.

Ethics: Informed consent; confidentiality and minimal data collection; right to withdraw. Avoid linking employer data without explicit consent.

8. Practical Implications for Kerala Workplaces and Policy

- Adopt AI to subtract drudgery (documentation, summarization) and reduce interruptions; avoid invasive monitoring.
- Publish clear norms: protected focus blocks, no routine after-hours messaging; enable do-not-disturb defaults in local languages.
- Provide Malayalam/English training on AI literacy, boundary settings, and evidence-based self-care practices.
- Ensure inclusive design—low-bandwidth modes, smartphone-first interfaces, and accessibility features (captions/translation).
- Establish oversight: ethics committees in institutions to review AI deployments for privacy, bias, and gendered impacts.
- Partner with local bodies and women’s collectives to co-design features and outreach in Thrissur.

9. Limitations and Future Directions

Evidence remains emergent and context-dependent; longitudinal and experimental studies in Kerala are needed. Future work should compare AI features with non-AI policy changes (e.g., staffing, flexible scheduling) and examine intersectional impacts (e.g., single parents, informal workers).

10. Conclusion

AI can be a meaningful resource for working women in Thrissur when designed and governed to conserve attention and time, protect boundaries, and support emotional health. The pathway from tools to well-being runs through supportive norms, language-accessible design, and trust.

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About the College

Annai Veilankanni's Educational and Cultural Society, Saidapet, Chennai-15, was found in 1988, to cater the educational needs of student community in and around Chennai. The Society has established Schools and Colleges in Saidapet, Nedungundram and Potheri. The Management was nurturing the idea for a long time, to start a College for Students at Saidapet and suburban areas in order to enable them to continue their higher education in a conducive atmosphere.

Arts and Science College was started in 2000 at Saidapet, Approved by the Govt. of Tamilnadu G.O. No.296/Dt. 10/07/2000, G.O.No. 26/ Dt. 09/02/2004. Affiliated to the University of Madras and accredited by NAAC. Our motto is to endeavor and enlighten, empowered by faith and power. The students of AVC will stand firm and strong, amidst life's storms and go ahead with confidence.

With the Holy blessings of Annai Veilankanni Madha, our Founder Chairman Dr.S.Devaraj and Dr. Delphin Devaraj, Vice- Chairman the Group of institutions has been strengthening its developmental activities, in bearing fruits of empowering especially women for the betterment of the society. The believers of today's transformation in education; our Secretary Dr.D. Dev Anand and Dr. Sridevi Dev Anand our Joint Secretary provides the necessary thrust in all the developmental activities of the institution.

Our vision is "to make Quality higher education affordable and accessible to learners, especially to the first generation and underprivileged section of the society". The College strongly believes in transforming average learners into academic achievers.

Annai Veilankanni's College for Arts and Science proudly enters its Silver Jubilee year, marking 25 years of excellence in education and societal contribution. From its humble beginnings to becoming a reputed center of learning, The journey has been progressing into continuous growth, innovation and achievement.

To honor this significant milestones, we are delighted to announce the hosting of an international conference on Application of AI in Business and Technology, scheduled on 22.08.2025.

Glimpse of the Conference

The International Conference on Application of AI in Business and Technology (ICAIBT), organized by the School of Commerce and Management Studies, held on 22nd August 2025 at Annai Veilankanni's College of Arts and Science.

It aimed to bring together Academicians, Researcher Scholars, Industrialists and Students to explore the transformative role of Artificial Intelligence in Business and Technology. The event featured publication of papers on topics such as AI-driven Finance, Digital Marketing, Data Analytics, Blockchain, Corporate Governance, Automation, and Business Innovation.

The day was marked with thought provoking Keynote addresses, technical sessions, paper presentations and interactive discussions. Renowned experts delivered their addresses, setting the tone and shared the insights of the conference theme, and the conference served as a platform for exchanging ideas, fostering innovation, and building collaborations for the future of AI in business.

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