Advances in Consumer Research
https://acr-journal.com/
Volume-2 | Issue-5 | November 2025
Original Researcher Article

How Artificial Intelligence technology is shaping business transformation and facilitating sustained business operational efficiency for Retailers

Joginder Chhabra[1*], Dr.Vanita Bhoola[2], Dr. Suchismita Das[3]

[1*]Research Scholar SP Jain School of Global Management,Mumbai.
[2]Associate Professor & Assistant Dean (EMBA & Executive Education). EMBA SP Jain School of Global Management,Mumbai.
[3]Assistant Professor UG Program (BDS & BDVA) SP Jain School of Global Management, **Mumbai.**

ABSTRACT
Over the last decade, the retail industry worldwide has been constantly evolving. This is mainly because traditional retail business models are facing major disruptions in the new age of retail. The multi-channel physical retail business model is being rapidly replaced by a hybrid model that also includes online delivery. This is enabling retailers to connect with customers directly. Artificial intelligence (AI) is also significantly shaping the retail industry's transformation; its adoption is influencing the value chain components of the retail business and positively impacting the industry.
The swift business transformation of the retail industry over the past decade can be attributed to a new, innovative technology landscape and rapidly changing consumer behaviour. The traditional business model is facing constant challenges from new retail strategies that deliver greater customer value and an improved top line. The importance and motivation behind this research stem from the fact that the retail industry worldwide, including in India, is undergoing a significant transformation, with retailers increasingly focusing on e-commerce and hybrid business models. The adoption of AI by retailers is playing a critical role in shaping this business transformation, as the adoption of this technology across the various components of the retail value chain not only directly impacts the retailer's revenue and profitability but also enables them to interact with their customers and influence their decision-making. In this paper, a qualitative analysis based on a literature review of relevant research has identified key factors that impact retailers' adoption of artificial intelligence technology to enhance business transformation. This study's conceptual framework for AI adoption in India's retail industry is developed through a detailed analysis. This study's findings indicate that perceived competitive advantage, operational efficiency, retailer intention to purchase AI technology, and task automation are the variables that influence retailers' adoption of artificial intelligence technology. The recommendations, based on the research framework, will help retailers create sustained operational efficiency. The research also elaborates on the outcomes of adopting artificial technology, which will enable the retailer to achieve business transformation, with increased revenue, market share, and operational efficiency.
Keywords: Retail industry, artificial intelligence, business transformation, retailer intention to purchase technology, perceived competitive advantage, task automation, operational efficiency, market share, increased revenue

© 2025 by the authors; licensee Advances in Consumer Research. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BYNC.ND) license(http://creativecommons.org/licenses/by/4.0/).

1.0 Introduction

Traditional retailers worldwide are facing major disruptions as new retail business models provide greater value to customers. The multi-channel physical retail business model is being rapidly replaced by a hybrid model that enables retailers to connect with customers directly (Reinartz et al., 2019). To remain competitive in this scenario, traditional retailers need to reduce their operational and functional inefficiencies and adapt themselves to today's fast-changing consumer behaviour. It is necessary to restructure and innovate the complete retail value chain by adopting new technologies.
Artificial intelligence is a technology that enables computers and machines to simulate human learning, comprehension, problem-solving, decision-making, creativity, and autonomy (Stryker & Kavlakoglu, 2024). Artificial intelligence (AI) is significantly influencing the retail industry; its adoption is shaping this transformation and positively impacting the retailer's value chain components (Oosthuizen et al., 2020). However, AI adoption is still at a nascent stage from an

industry perspective, and there is a need to understand better retailers' hesitancy (or apprehension) to adopt these technologies (Aytekin et al., 2021).

This research's key objective is to identify the crucial factors that significantly influence retailers' adoption of AI technology for achieving sustained business transformation (Shankar et al., 2021). This study offers two main contributions to the existing literature on AI's implementation in the retail industry: (1) the development of a conceptual framework that serves as a blueprint for AI technology adoption, focusing on how applying AI at each stage of the value chain can impact a retailer's revenue and profitability; and (2) an analysis of industry-wide adoption rates, highlighting common barriers, such as concerns about full-scale AI adoption, the need to assess technology partners, and associated costs (Weber & Schütte, 2020).

The study will be beneficial for Indian retailers as AI adoption within India's retail sector is low. The ecosystem faces multiple challenges. Only a few large retailers are leveraging advanced AI technologies. The unorganised segment, which still accounts for 87% of total offline retail, has also been slow to adopt AI technologies (Mookerjee et al., 2022). The study will be beneficial to managers/practitioners in the retail industry who are considering adopting AI technology to build a competitive advantage and achieve high customer satisfaction.

The study recommends that retailers consider adopting both customer-and non-customer-facing AI technologies. Some retailers see only immediate benefits in operational efficiency enhancement. This narrow perspective will not be beneficial in the long run.

2.0 Research Problems and Questions

The structured literature review on artificial intelligence adoption by retailers is based on the following research problems and questions.

RQ1: What are the factors that influence the artificial intelligence adoption leading to profitable growth and customer acceptance in the Indian retail industry?

RQ2: How significantly does the retailer's intention to purchase technology influence AI adoption among retailers in the Indian retail industry?

RQ3: How significantly does the perceived competitive advantage influence the adoption of AI by retailers in the Indian retail industry?

RQ4: Does task automation in the organisation have any influence on the adoption of AI by retailers in the Indian retail industry?

RQ5: How significantly does operational efficiency influence the adoption of AI by retailers in the Indian retail industry?

3.0 Research Objectives

To answer the above questions, the following are the research objectives for this study:

Objective 1: To ascertain the factors that influence the profitable growth and customer acceptance of the Indian retail industry.

Objective 2: To determine how significantly the retailer's intention to purchase technology influences the adoption of AI by retailers in the Indian retail industry.

Objective 3: To discover how significantly the perceived competitive advantage influences the adoption of AI by retailers in the Indian retail industry.

Objective 4: To understand whether the importance of task automation to the organisation has any influence on the adoption of AI by retailers in the Indian retail industry.

Objective 5: To discover how significantly the influence of increased operational efficiency affects the adoption of AI by retailers in the Indian retail industry

4.0 Scope of the Study

The retail industry, worth US$29 trillion globally, is experiencing a significant transformation as e-commerce companies and retailers adopting hybrid retail business models compete vigorously with those that focus solely on the traditional physical-only model. The principal intention of this research is to help retailers appreciate the importance of AI adoption in the retail industry. The intent is to propose a conceptual framework that facilitates the effective adoption of AI technology by retailers. The primary objective of this research is to identify, validate, and confirm the key factors influencing the adoption of AI in the retail sector.

Significant research and studies on AI adoption by retailers have been conducted.

The current study examines how retailers should strategize their adoption of AI technology, accounting for its risks, benefits, and other challenges, and addresses gaps in the existing literature. This article focuses on how retailers should approach AI adoption, considering the benefits, risks, and other challenges. The research aims to make a relevant contribution to the existing research by analysing the gaps in the literature on this topic. Its proposed framework will facilitate the effective adoption of AI technology across all components of the retail value chain. The objective of the study is to investigate and evaluate the critical determinants that impact retailers' adoption of AI technology and enhance business operations.

5.0 Literature Review

A literature survey is a systematic and comprehensive examination of scholarly works on a particular subject, enhancing understanding of the field. This review was instrumental in recognising the gaps in the research on this topic. Four determinants emerged from the literature review of retailer adoption of AI technology. AI, the IoT, and virtual augmentation are currently buzzwords adopted by many industries worldwide. In the retail industry, the current rate of AI adoption is relatively moderate, according to a survey evaluating AI adoption in the top retail companies worldwide (Weber & Schutte, 2019). Only a few global retailers, such as Walmart and Kroger, have shown absolute willingness to adopt AI technology across all constituents of their retail value chain.

This chapter presents a conceptual framework for the adoption of AI technology in the retail industry, grounded in a literature gap analysis.

- Retailer intention to purchase technology (IP)
- Perceived competitive advantage (CA)
- Task automation (TA)
- Operational efficiency (OE)

5.1 Retailer Intention to Purchase

Purchase intention—also referred to as *purchase intent* or *intention to purchase*—denotes the probability that a consumer will acquire a product or service from a specific brand or retailer. According to Chowdhury et al. (2024), purchase intention reflects a consumer's willingness or predisposition to buy a product or service that integrates artificial intelligence (AI) technologies. As AI continues to permeate diverse industries, consumers are becoming more cognizant of its functional and experiential benefits. The determinants of purchase intention in AI-enabled products include **perceived usefulness**, **ease of use**, and **trustworthiness**—core factors that influence adoption decisions (Chowdhury et al., 2024). Consequently, understanding consumer perceptions and attitudes toward AI is essential for organizations aiming to leverage this technology to strengthen market competitiveness. Furthermore, marketing initiatives, promotional strategies, and enhanced retailer performance play complementary roles in shaping purchase intention.

A key domain of AI application in retail is personalization, in which machine-learning algorithms analyse extensive datasets—such as browsing histories, purchase behaviour, and demographic profiles—to deliver tailored product suggestions and customized shopping experiences (Nguyen, 2024). Within the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use remain critical determinants of consumers' online purchase intentions. Additionally, advancements such as visual search and image recognition technologies have emerged as powerful tools for influencing purchasing behaviour, allowing consumers to search for products by image rather than text, thereby enriching the user experience and potentially increasing conversion rates (Nguyen, 2024). Retailer performance, as highlighted by Hang and Chen (2022), can be evaluated by enhanced operational efficiency, improved employee productivity, and the automation of routine processes. Moreover, performance measurement extends to financial outcomes, such as revenue maximization, profitability enhancement, and returns on investment (Uribe-Tori et al., 2022; Kelley et al., 2022). AI applications further strengthen retailer performance through automated content generation, optimized e-commerce interfaces, and dynamic digital marketing strategies.

These include adding "highlight" features to landing pages, search engine optimization (SEO) enhancements, and integrated management of social media and blog content.

personalized customer loyalty programs, and refining electronic communication channels (Mykytenko & Rzaieva, 2024).

Nguyen (2024) emphasizes that while personalization strategies can enhance click-through rates and strengthen purchase intention, they must be implemented with caution to prevent privacy violations. Ethical considerations such as data privacy, algorithmic bias, and transparency in AI-driven decision-making have become critical to responsible technology deployment. Although AI-enabled dynamic pricing positively influences purchase behaviour, it also raises concerns about fairness and the equitable treatment of consumers (Chowdhury et al., 2024). These challenges underscore the importance of ethical governance in AI-based retail practices.

5.2 Perceived Competitive Advantage

The adoption of artificial intelligence (AI) technologies by retailers substantially enhances their competitive advantage, as it equips them with efficient frameworks to optimize costs, improve product and service quality, strengthen marketing and customer relationship management, and streamline supply-chain operations. According to Shehadeh et al. (2023), core digital enablers such as the **Internet of Things (IoT)**, **big data analytics**, and **cloud computing** constitute foundational AI technologies that facilitate digital transformation and enable organizations to develop customer-centric business models that generate sustained value and competitive differentiation. Digital transformation thus serves as a strategic mechanism for companies to achieve superior market positioning.

A further dimension of competitiveness arises from the adoption of **AI-enabled dynamic pricing strategies**. By leveraging advanced algorithms that analyse market conditions, competitor pricing, and fluctuations in consumer demand, firms can optimize pricing structures to maximize profitability and market share (Dutta et al., 2024). Global retailers such as **Walmart** and **Kroger** exemplify first-mover advantage by integrating AI technologies early within their operations, demonstrating proactive adoption and innovation leadership. In contrast, late adopters tend to implement AI after observing early outcomes, thereby minimizing perceived risks associated with technological change (Shankar et al., 2020).

Depending on context, AI can function as a **system, tool, technique, or algorithm** (Akter et al., 2021; Bawack et al., 2021), creating opportunities for firms to achieve competitive advantage through **big data–driven personalization** that aligns precisely with individual consumer needs. Beyond individual adoption, **strategic collaborations** have also emerged as key enablers of competitive strength (Mostaghel et al., 2022), while a robust **omnichannel strategy** enhances market responsiveness and customer experience (Purcarea et al., 2022). Consequently, organizations that embrace advanced technologies—such as autonomous enterprise applications (AEAs), blockchain, virtual reality (VR), and augmented reality (AR)—to digitally transform their operations are more likely to attain and sustain competitive advantage (Al-Ramah et al., 2024; Shehadeh et al., 2023). Digital transformation additionally supports **value creation** in service-based firms and **process optimization** in

manufacturing enterprises, thereby reinforcing organizational agility and efficiency.

In summary, integrating AI technologies enables firms to innovate rapidly, respond effectively to shifting market demands, and outperform competitors. Embedding AI within strategic management frameworks allows organizations to conduct **real-time market analysis**, deploy **personalized marketing**, and proactively align with emerging trends, thereby driving growth and profitability (Badmus et al., 2024).

Nevertheless, **legacy systems** often constrain organizational agility, hindering the ability to leverage data effectively for competitive advantage.

5.3. Task Automation.

In the context of artificial intelligence (AI) adoption within the retail sector, **task automation** refers to the degree to which AI technologies can perform, streamline, or enhance various functional activities across business operations. The integration of AI automates repetitive, rule-based, and data-intensive processes, thereby improving operational efficiency, organizational agility, and decision-making transparency. Through automation and digital transformation, AI optimizes internal workflows, enhances process control, and boosts overall productivity in retail enterprises. According to Badmus et al. (2024), machine learning algorithms and intelligent systems can handle data cleaning, transformation, and integration tasks that were previously manual and time-consuming, thereby significantly reducing human effort and errors.

Transparency represents a critical determinant of successful AI-enabled automation in retail organizations. The transparency of AI algorithms is essential for cultivating trust among stakeholders, including both consumers and employees. However, many AI systems operate as "black boxes," with their underlying decision-making processes opaque, leading to skepticism and resistance to AI adoption (Badmus et al., 2024). The implementation of AI-based systems enables firms to redesign internal structures to better leverage technological capabilities and identify suitable platforms required for a successful **AI-enabled retail value chain** (Oosthuizen et al., 2020). In addition to improving internal efficiency, AI also enhances customer experience by simplifying shopping processes and providing **digital assistance**. AI-powered tools offer customers comprehensive product information, personalized suggestions, and instant responses to inquiries, thereby reducing cognitive effort and improving satisfaction during shopping interactions (Chaveesuk et al., 2021).

Reinartz et al. (2019) further propose that automation should be implemented in conjunction with four key principles—individualization, ambient embeddedness, interaction, and transparency and control—to maximize organizational value creation. Individualization involves tailoring marketing activities to each consumer's specific needs and preferences. Ambient embeddedness refers to the seamless integration of products, services, and communications into consumers' daily routines, making them a natural part of everyday life. Interaction encompasses both virtual and physical exchanges between consumers and organizations, emphasizing the quality and nature of engagement rather than the specific communication channel. In conclusion, **task automation** is a vital component of AI adoption in retail, enabling comprehensive digitization and streamlining of the retail value chain. However, automation must coexist with **transparency and control** to foster trust among end users.

5.4 Operational efficiency

The adoption of artificial intelligence (AI) technologies substantially enhances retailers' overall operational performance by improving inventory management, streamlining supply chain operations, optimizing demand forecasting, and increasing productivity through automation and data-driven decision-making. It contributes to superior delivery efficiency, reduced operational costs, and improved utilization of skilled manpower, thereby elevating the overall effectiveness of retail operations (Haque et al., 2024). The integration of AI into organizational processes significantly improves firm performance by advancing decision-making accuracy, operational agility, and innovation capacity. Within supply chain management, AI has assumed a transformative role, revolutionizing functions such as demand forecasting, inventory optimization, and logistics coordination, enabling businesses to maintain balanced inventory levels, mitigate stockouts, and prevent overstocking while simultaneously improving efficiency (Haque et al., 2024).

AI-driven automation supports large-scale business transformation by replacing repetitive, manual processes with autonomous systems that learn and adapt (Adanyin, 2024). A primary domain of impact lies in operational efficiency, where traditional workflows characterized by redundancy and limited informational input are replaced with data-driven, automated systems. Data science complements AI adoption by providing predictive and prescriptive insights that allow companies to optimize resources and enhance performance. For instance, predictive analytics in supply chain management enables accurate demand forecasting, leading to more effective inventory control and reduced wastage (Adeniran et al., 2024; Badmus et al., 2024; Oliveira, 2020). By minimizing operational costs and enhancing productivity, AI empowers organizations to allocate resources strategically and maintain a sustainable competitive edge (Badmus et al., 2024). Additionally, data science enables the integration of advanced technologies, such as AI and the Internet of Things (IoT), into organizational frameworks. The convergence of these technologies enables process automation, enhanced decision-making, and increased operational flexibility, ultimately resulting in cost reduction and improved business resilience (Shahin, Chen, Hosseinzadeh, & Zand, 2023). A critical yet intangible benefit of AI-enabled data systems is enhanced productivity, achieved through automation of tasks such as inventory tracking and management. Machine learning algorithms analyse sales patterns, lead

times, and supplier performance metrics to determine optimal reorder quantities and inventory thresholds. This dynamic, data-driven approach allows retailers to adjust stock levels in real time, responding efficiently to fluctuations in consumer demand while minimizing the risks of overstocking or stockouts (Badmus et al., 2024; Aljaž, 2024)

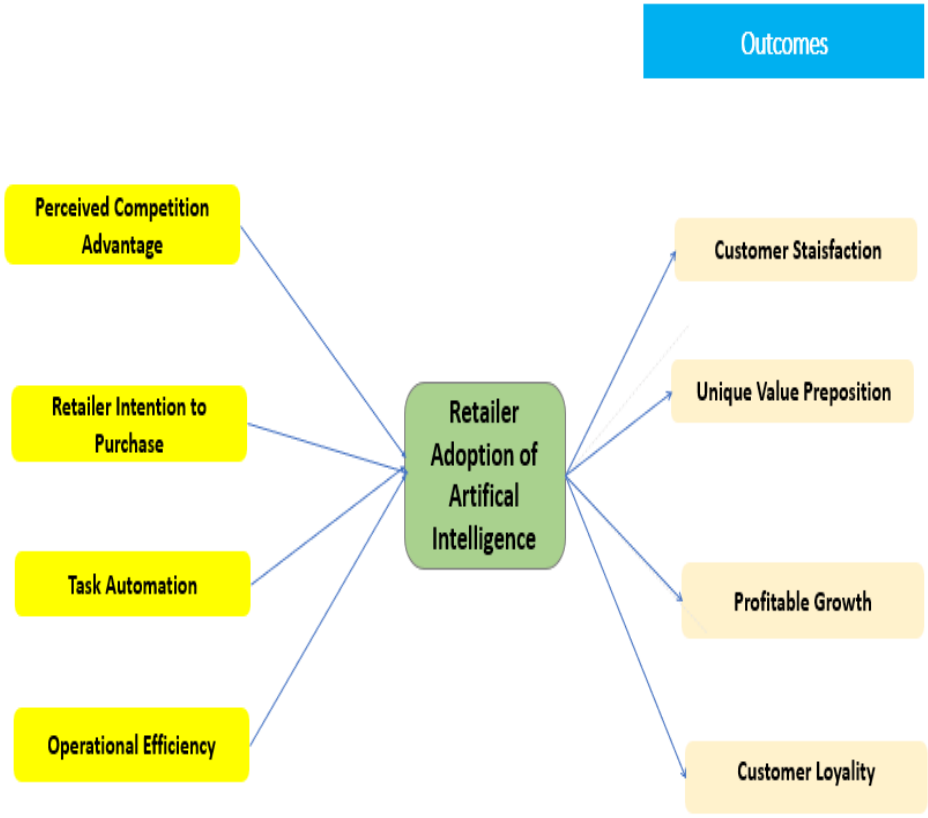
6.0 Proposed Methodology

The study's methodology is qualitative and based on GAP variable analysis derived from the literature review.

1. We start by identifying and finalising the criteria to be used for searching the relevant research material. The year of publication is from 2019 to 2024; the chosen language is English; and "Artificial Intelligence" and "Retailing" were used as keywords for the search.
2. The key databases that were being researched for the literature review are DOAJ, ProQuest, EBSCO, Clarivate Analytics, and Google Scholar.
3. Four independent variables were identified that impact the adoption of artificial intelligence technology by retailers. This is based on a detailed GAP-variable analysis of the literature. The barriers and the perceived risks of AI technology adoption by retailers are also identified
4. Finally, a conceptual framework is developed, and further research gaps and limitations in the existing research are then analysed to arrive at likely areas of future research.

7.0 Research framework

We have created a basic research framework and a Research framework with outcomes



8.0 Discussion, Analysis, and Outcome

8.1Retailer Intention to Purchase

8.1.1 Improved Performance: AI technology enhances the organization's overall performance by improving efficiency, work performance, and employee productivity, and by enabling more effective consumer responses.

8.1.2Marketing and Promotion: Retailers use a variety of AI technologies enabled in–store promotions (Digital displays, Kiosks, robots) along with marketing messaging with the aid of AI technology, aided geo-targeting, and influence purchasing when the customer is in proximity to a retail store

Outcome: Artificial Technology enables customers to explore, shop, and evaluate their experiences with less time and effort, resulting in increased satisfaction in making buying decisions and completing transactions. (Customer satisfaction).

Proposition 1: Retailer Intention to purchase technology driven by marketing and promotion, and by improved performance, positively influences the adoption of artificial intelligence by retailers.

8.2 Perceived Competitive Advantage

8.2.1 AI Systems create new and unique resources that drive company performance and aid in incremental revenue.

8.2.2 Optimized pricing: Customers are receptive to optimized and best price offers as delivered by AI agents.

8.2.3 Strategic Alliances: To ensure the successful implementation of AI technology, a Retail company must develop Strategic alliances on the value-delivery side (Service partners, logistics companies, etc.).

8.2.4 Digital transformation: AI-enabled digital transformation enables businesses to leverage knowledge and integrate into all their functions/domains for new value creation and develop a competitive advantage.

Outcome: Adoption of AI technology improves overall Sales performance and profitability by Enhancing Customer Purchase Intentions to actual sales with higher productivity and better overall efficiency. (Profitable growth)

Proposition 2: perceived competitive advantage emanating from unique resources, optimized pricing, strategic alliances, and digital transformation positively influences retailers' adoption of artificial intelligence.

.

8.3 Task automation

8.3.1 Transparency and Control: AI systems provide customers with superior information, education, and product use to simplify customers' access for greater transparency. AI also enables efficient retrieval of comprehensive product information from various sources, enabling greater control and value generation for better decision-making by the Retailer.

8.3.2 Effort expectancy: AI technologies provide digital assistance and easy access to comprehensive product information to the customer to elicit a timely response from the customer while shopping.

8.3.3 Organization restructuring: Implementation of AI systems enables the retail company to reorganize efficiently to leverage technology and also identify technology and organization platforms necessary for the successful implementation of an AI-enabled retail value chain.

Outcome: AI enables the organisation to innovate, transform, and improve business processes through radical business transformation. It helps the organisation create a unique value proposition by fulfilling longstanding consumer needs in unprecedented ways.

Proposition 3: Efficient Task automation, driven by improved transparency and control, effort expectancy, and organisational restructuring, positively influences the adoption of artificial intelligence by retailers.

.

8.4 Operational efficiency

8.4.1 Inventory management: AI assists retailers in streamlining inventory management by predicting customer demand, fulfilling customer requirements, and planning inventory flow to maximize retailer profit by the use of clustering techniques.

8.4.2 Cost: Retailer's decision to adopt the technology is based on risk assessment and cost-benefit analysis.

8.4.3 Delivery: More and more retailers are using AI to build automated delivery mechanisms for providing better service and connecting with the Shoppers, also facilitating customer choice and simplifying ordering.

8.4.4 Increase productivity: AI implementation improves employee productivity by significantly increasing the relevance of direct customer feedback to each employee.

8.4.5 Skilled manpower planning: The AI-enabled retail value chain is heavily reliant on trained and skilled employees, manpower management, and planning to implement, manage, and work alongside new technology efficiently.

Outcome: Artificial Technology enables customers to explore, shop, and evaluate their experiences with less time and effort, resulting in greater satisfaction when making a buying decision and completing an actual transaction.

Proposition 4: Enhanced operational efficiency emanating from better inventory management, Delivery, increased productivity, and skilled manpower planning positively influences the adoption of artificial intelligence by retailers

9.Contributions to practice

This is qualitative research based on a detailed GAP variable analysis of the available relevant literature. The study, in a scientific manner, seeks to address the research problem and to propose a conceptual framework for the adoption of artificial intelligence technology by retailers.

The study identified five independent variables: perceived competitive advantage, retailer intention to purchase technology, task automation, and operational efficiency.

This study's research questions and objectives were formulated based on the business obstacles encountered by retail business organisations. The Indian retail industry is one of the fastest-growing markets in the world. The current retail market in India, estimated at US$930 bn, is expected to reach US$1,930 bn by 2030 (Gopalaiah & Ramanathan, 2023). Food and grocery retail leads the Indian retail market, with its contribution expected to reach US$1,230 bn by 2030 (Gopalaiah & Ramanathan, 2023). India currently ranks among the world's top five retail markets and is projected to become the third-largest consumer market globally by 2030, following China and the United States. This study's findings offer profound insights into the strategic planning needs that retailer organisations should consider when adopting AI technology. Retailers must plan for full-scale AI adoption if they are to succeed and realise the real benefits of increased market

share, revenue, and customer loyalty in the medium to long term.

The findings indicated significant market potential for the retail sector in India. The multi-channel physical retail business model is being rapidly replaced by a hybrid model that enables retailers to connect with customers directly (Reinartz et al., 2019). To remain competitive in this scenario, traditional retailers need to reduce their operational and functional inefficiencies and adapt themselves to today's fast-changing consumer behaviour. It is necessary to restructure and innovate the complete retail value chain by adopting new technologies.

10.0 How AI helps Business Operations.

Artificial intelligence (AI) has become a pivotal enabler of efficiency and competitiveness within the retail industry, enhancing overall business performance by maximizing operational capabilities, reducing costs, and optimizing backend processes such as inventory management, logistics, and supply chain coordination. It also contributes to sales growth through data-driven insights, automation, and process standardization. Moreover, AI significantly improves the customer experience through personalization, targeted engagement, and intelligent customer support systems. Key AI technologies commonly utilized in retail for operational optimization and inventory management include computer vision, deep learning, edge AI, intelligent applications, machine learning, robotic process automation (RPA), virtual assistants, chatbots, insight engines, and the Internet of Things (IoT) (Oosthuizen et al., 2020).

AI serves as a transformative catalyst in contemporary retail, driving innovation and operational efficiency while enabling more resilient, data-driven business models. Its adoption substantially enhances retailers' overall performance through improved inventory control, highly efficient supply chain operations, precise demand forecasting, and increased productivity. Furthermore, it contributes to cost reduction and process transparency, and better utilization of skilled manpower, thereby elevating organizational efficiency (Haque et al., 2024). AI-powered systems also optimize critical business processes such as demand prediction and production planning, supporting evidence-based decision-making (Weng et al., 2024).

11.0 Limitations and Scope for Future Research

The study is grounded in a review of a limited selection of articles and employs a qualitative secondary research approach. The research used to build the framework has its own constraints, underscoring the need for additional evidence to strengthen the relationship between the independent and dependent variables. To validate all four propositions, quantitative techniques with a representative sample are necessary. Empirical methods, such as A/B testing, can be used to quantify results and ensure the model's reliability and validity. Moreover, further research supported by evidence is needed to identify additional independent variables that may influence retailers' AI adoption. Future studies should also explore customer concerns about safety and privacy, as this is a critical area that requires more evidence-based insights to foster customer trust.

First, the study's scope was limited to a specific industry. The findings for this research are limited to the organised retail sector. They cannot be generalised, as different countries have different retail industry scenarios and varying rates of AI technology penetration.

Scaling AI applications will nonetheless require robust technological platforms and adequate IT readiness, including the minimum infrastructure necessary for effective system implementation. Future research should therefore explore technological architectures and infrastructure frameworks essential for large-scale AI integration.

The research study is purely qualitative; however, alternative approaches, such as case study methodology and a phenomenological design, could offer more in-depth insights into technology adoption, making this a promising area for future research. A case study could be conducted on a major retail chain in India, such as Reliance or the Tata Group. Additionally, triangulation studies could be carried out across various developed retail markets worldwide, using diverse data sources, research methods, and tools. This would help to generalise findings and improve the overall credibility of the research.

12.0Conclusion

To summarise, the research indicates that retailers' adoption of AI technology has a positive impact, with customers greatly benefiting from faster transactions and greater convenience through automation. Global retailers in advanced economies who engage in the full-scale adoption of AI technology have a definite competitive advantage by way of reduced operational costs, inventory optimisation, and specialised promotions. They can also increase customer purchase intent through an AI-enabled, intelligent, and connected product portfolio.

Extant research demonstrates that AI adoption generates measurable benefits for the retail sector, particularly by accelerating transactions, improving service convenience, and enhancing process automation. Retailers that have implemented AI at scale consistently report competitive advantages, including reduced operational costs, optimised inventory management, and more precise promotional strategies. AI-enabled product ecosystems also strengthen consumer purchase intentions by offering personalised, connected experiences.

Although concerns persist regarding whether investment should prioritise customer-facing or back-end technologies, as well as issues related to consumer privacy, the evidence suggests that full value realisation requires AI integration across the entire retail value chain. A dual emphasis on both operational and customer-oriented technologies is essential, as a narrow focus on efficiency improvements alone is unlikely to yield sustained strategic benefits.

The research framework proposed in this study provides a structured pathway for achieving long-term competitive advantage. Retailers must proactively address consumer privacy concerns and develop comprehensive AI adoption strategies to achieve profitable growth, create a unique value proposition, and enhance customer satisfaction and loyalty, thereby driving future revenue growth and market share expansion.

References

1. Aly, M. (2020). Factors, barriers and attitudes affecting the adoption of digital technologies by NZ cooperative retailers. *Journal of Asia Entrepreneurship and Sustainability, 16(5)*, 169–209.
2. Al-Ramah, M., Hussein, A., & Alkhateeb, R. (2024). *Digital transformation, blockchain, and immersive technologies as enablers of competitive advantage. Technological Forecasting and Social Change, 197,* 122878. https://doi.org/10.1016/j.techfore.2023.122878.
3. Adanyin, A. (2024). *AI-driven automation and digital transformation: Reshaping business efficiency. International Journal of Innovation and Technology Management, 23*(2), 85–102.
4. Adeniran, I. A., Okafor, C., & Bello, T. (2024). *Leveraging data science for competitive advantage: Insights from the global retail sector. Journal of Business Analytics and Technology Strategy, 16*(2), 88–104.
5. Aljaž, T. (2024). *Machine learning applications in retail inventory management: Improving operational productivity. Journal of Artificial Intelligence and Operations, 8*(1), 66–82.*
6. Akter, S., Wamba, S. F., & Gunasekaran, A. (2021). *Reshaping business models with artificial intelligence: Conceptual foundations and future research directions. International Journal of Information Management, 57,* 102345. https://doi.org/10.1016/j.ijinfomgt.2020.102345
7. Anica-Popa, I., Anica-Popa, L., Rădulescu, C., & Vrîncianu, M. (2021). The integration of artificial intelligence in retail: Benefits, challenges and a dedicated conceptual framework. *Amfiteatru Economic, 23(56)*, 120–136.
8. Anica-Popa, I. (2021). *Artificial intelligence in retail replenishment and supply chain optimization. Procedia Computer Science, 181,* 145–154. https://doi.org/10.1016/j.procs.2021.01.156
9. Aytekin, P., Virlanuta, F. O., Guven, H., Stanciu, S., & Bolakca, I. (2021). Consumers' perception of risk towards artificial intelligence technologies used in trade: a scale development study. *Amfiteatru Economic, 23(56)*, 65–86.
10. Badmus, O., Ali, M., & Rahman, S. (2024). *Artificial intelligence and strategic competitiveness in the retail industry: Real-time analytics and personalized marketing. International Journal of Retail Strategy and Innovation, 19*(1), 59–77
11. Bawack, R. E., Wamba, S. F., & Carillo, K. (2021). *Artificial intelligence in practice: Emerging patterns, challenges, and research directions. Business Process Management Journal, 27*(6), 1653–1675. https://doi.org/10.1108/BPMJ-07-2020-0335
12. Busman, L., & Ananda, R. (2022). *Artificial intelligence applications in consumer behavior: A study on AI-driven purchase intentions. Journal of Consumer Research and Marketing Analytics, 18*(3), 112–128
13. Chaveesuk, S., Khalid, B., & Chaiyasoonthorn, W. (2021). Digital payment system innovations: A marketing perspective on intention and actual use in the retail sector. *Innovative Marketing, 17(3)*, 109.
14. Chaveesuk, S., Sunyavivat, S., & Muangsin, V. (2021). *Artificial intelligence adoption in retail: Enhancing customer experience and decision support systems. Journal of Retail and Consumer Services, 61,* 102559. https://doi.org/10.1016/j.jretconser.2021.102559
15. Chowdhury, S., Rahman, M., & Akhtar, T. (2024). *Consumer purchase intention toward AI-enabled products and services: The role of perceived usefulness, trust, and ease of use. Journal of Retail Technology and Innovation, 15*(1), 33–52.
16. Chen, S. C., & Shang, S. S. (2021). Sustaining user experience in a smart system in the retail Industry. *Sustainability, 13(9)*, 5090.
17. Devanesan, M. D., & Venkatesh, R. (2021). Impact of in-store retail technologies on enhancing retail footfall among physical retail formats in India. *Academy of Marketing Studies Journal, 25(6)*, 1*13.
18. Dhruv, G., Noble, S. M., Roggeveen, A. L., & Jens, N. (2020). The future of in-store technology. *Journal of the Academy of Marketing Science, 48(1)*, 96–113.
19. Dutta, S., Kapoor, N., & Gupta, R. (2024). *Dynamic pricing strategies enabled by artificial intelligence in modern retail. Journal of Pricing and Market Intelligence, 13*(2), 101–119.
20. Mookerjee, J., Chattopadhyay, S., & Rao, O. R. (2022). Adoption of technology and the unorganized retailers. *Mathematical Statistician and Engineering Applications, 71*(4), 12887-12903.
21. Mostaghel, R., Oghazi, P., & Sattari, S. (2022). *Strategic collaboration and technology* Giroux, M., Kim, J., Lee, J. C., & Park, J. (2022). Artificial intelligence and declined guilt: Retailing morality comparison between human and AI. *Journal of Business Ethics*, 1–15.
22. Grewal, D., Gauri, D. K., Roggeveen, A. L., & Sethuraman, R. (2021). Strategizing retailing in the new technology era. *Journal of Retailing, 97(1)*, 6–12.
23. Gopalaiah, S., & Ramanathan, A. (2023). *Future of retail: emerging landscape of omni- channel commerce in India*, Deloitte report

https://www.scribd.com/document/656816869/in-ad-future-of-retail-noexp

24. Guha, A., Grewal, D., Kopalle, P. K., Haenlein, M., Schneider, M. J., Jung, H., ... & Hawkins, G. (2021). How artificial intelligence will affect the future of retailing. *Journal of Retailing, 97(1)*, 28–41.
25. Hang, Y., & Chen, P. (2022). *Assessing retail performance through automation and efficiency: The influence of digital technologies. International Journal of Productivity and Performance Management, 71*(2), 290–308.
26. Haque, A., Rahman, N., & Ahmed, S. (2024). *Artificial intelligence in retail: Enhancing performance through automation and analytics. Journal of Retail and Consumer Management, 22*(3), 112–129.
27. Joshi, M. A. (2024). *Bridging the AI skills gap: Workforce upskilling and competency development in digital retail. Human Resource Development Review, 23*(1), 73–95.
28. Kamkankaew, P., Boonlua, S., & Piansoongnern, O. (2024). *Artificial intelligence in marketing automation: Implications for strategic creativity and efficiency. Asia-Pacific Journal of Marketing and Logistics, 36*(2), 310–327.
29. Kaur, V., Khullar, V., & Verma, N. (2020). Review of artificial intelligence with retailing sector. *Journal of Computer Science Research, 2(1)*.
30. Kelley, D., Watson, R., & Ford, M. (2022). *Measuring organizational performance: A financial and operational perspective. Strategic Management Review, 10*(4), 187–202
31. Kishen, R., Upadhyay, S., Jaimon, F., Suresh, S., Kozlova, N., Bozhuk, S., .& Matchinov, V. A. (2021). Prospects for artificial intelligence implementation to design personalized customer engagement strategies. *Journal of Legal, Ethical and Regulatory Issues, 24*, 1–18.
32. Low, F. S., & Lee, W. C. (2021). *Developing a humanless convenience store with AI system. Journal of Physics Conference Series (Vol. 1839, No. 1, p. 012002).* IOP Publishing.
33. Mahmoud, A. B., Tehseen, S., & Fuxman, L. (2020). *The dark side of artificial intelligence in retail innovation*. Emerald Publishing Limited.
34. Madanchian, M. (2024). *Ethical governance and transparency in artificial intelligence adoption: Implications for retail management. Journal of Business Ethics and Digital Transformation, 18*(1), 77–94.
35. Martin, K. D., Kim, J. J., Palmatier, R. W., Steinhoff, L., Stewart, D. W., Walker, B. A., Yonggui Wang & Weaven, S. K. (2020). Data privacy in retail. *Journal of Retailing, 96(4)*, 474–489.Mykytenko, N., & Rzaieva, S. (2024). *AI-driven marketing and retail optimization: Strategies for increasing productivity and profitability. European Journal of Digital Business Transformation, 9*(1), 75–92.
36. Mykytenko, N., & Rzaieva, S. (2024). *AI-driven marketing strategies in retail: Enhancing e-commerce through automation and personalization. European Journal of Digital Business Transformation, 9*(1), 75–92.
37. Nichifor, E., Trifan, A., & Nechifor, E. M. (2021). Artificial intelligence in electronic commerce: Basic chatbots and the consumer journey. *Amfiteatru Economic, 23(56)*, 87–101.
38. Nguyen, C. D. (2024). *Artificial intelligence in e-commerce: Personalization, dynamic pricing, and ethical considerations. Asia-Pacific Journal of Business and Technology Innovation, 12*(2), 56–73.
39. Oliveira, J. T. D. (2020). *State-of-art of artificial intelligence in the Portuguese food retail sector* [Doctoral dissertation].
40. Oliveira, R. (2020). *Predictive analytics for supply chain performance optimization. International Journal of Logistics Research and Applications, 23*(7), 588–604.
41. Oosthuizen, K., Botha, E., Robertson, J., & Montecchi, M. (2020). Artificial intelligence in retail: The AI-enabled value chain. *Australasian Marketing Journal*, j-ausmj.
42. Oosthuizen, D., Bruwer, J., & van der Merwe, P. (2020). *Artificial intelligence integration and organizational restructuring in retail supply chains. Technological Forecasting and Social Change, 161,* 120300. https://doi.org/10.1016/j.techfore.2020.120300.
43. Prentice, C., & Nguyen, M. (2020). Engaging and retaining customers with AI and employee service. *Journal of Retailing and Consumer Services, 56*, 102186.
44. Purcărea, T., Ioan-Franc, V., Ionescu, Ş. A., & Purcărea, I. M. (2021). The profound nature of the connection between the impact of using artificial intelligence in retail on buying and the consumers' perceptions of artificial intelligence on the path to the next normal.. *Amfiteatru Economic, 23(56)*, 9–32.
45. Purcărea, T., Ioan-Franc, V., Ionescu, Ş. A., Purcărea, I. M., Purcărea, V. L., Purcărea, I., ... & Orzan, A. O. (2022). Major shifts in sustainable consumer behavior in Romania and retailers' priorities in agilely adapting to it. *Sustainability, 14(3)*, 1627.
46. Purohit, S., & Jain, A. K. (2021). Leveraging IOT and AI for delivering tailor-made customer experiences in Indian petro retailing. *Indian Journal of Science and Technology, 14(7)*, 604–609.
47. Purcarea, T., Vasiliu, C., & Dinu, V. (2022). *Omnichannel retail strategies: Creating value through integration and innovation. Journal of Retail and Consumer Services, 68*, 103057. https://doi.org/10.1016/j.jretconser.2022.103057.
48. Reinartz, W., Wiegand, N., & Imschloss, M. (2019). *The impact of digital transformation on the retail industry: Individualization, embeddedness, and interaction. Journal of Retailing and Consumer Services, 50,* 76–85. https://doi.org/10.1016/j.jretconser.2019.04.018

49. Rodgers, W., Yeung, F., Odindo, C., & Degbey, W. Y. (2021). Artificial intelligence-driven music biometrics influencing customers' retail buying behavior. *Journal of Business Research, 126*, 401–414.
50. Roggeveen, A. L., & Sethuraman, R. (2020). Customer-interfacing retail technologies in 2020 & beyond: An integrative framework and research directions. *Journal of Retailing, 96(3)*, 299–309.
51. Shankar, V., Kalyanam, K., Setia, P., Golmohammadi, A., Tirunillai, S., Douglass, T., ... & Waddoups, R. (2021). How technology is changing retail. *Journal of Retailing, 97(1)*, 13–27.
52. Shankar, V., Kannan, P. K., & Li, H. (2020). *How technology is reshaping retail: AI adoption, risk perception, and competitive advantage. Journal of Retailing, 96*(4), 468–489. https://doi.org/10.1016/j.jretai.2020.08.004
53. Shahin, A., Chen, M., Hosseinzadeh, A., & Zand, F. (2023). *Integrating artificial intelligence and Internet of Things (IoT) technologies for operational excellence. Technological Forecasting and Social Change, 188,* 122350. https://doi.org/10.1016/j.techfore.2023.122350
54. Shehadeh, M., Alzoubi, H. M., & Alshurideh, M. (2023). *Artificial intelligence and digital transformation for competitive advantage: The mediating role of big data and cloud computing. Journal of Theoretical and Applied Electronic Commerce Research, 18*(4), 159–176. https://doi.org/10.3390/jtaer18040159.
55. Singh, H., & Chakrabarti, S. (2020). Defining the relationship between consumers and retailers through user-generated content: insights from the research literature. *International Journal of Retail & Distribution Management*.
56. Song, X., & Bonanni, C. (2024). *Digital technologies and business model innovation in global retail organizations. Journal of Business Research, 167,* 114203. https://doi.org/10.1016/j.jbusres.2023.114203
57. Stanciu, V., & Rîndașu, S. M. (2021). Artificial intelligence in retail: Benefits and risks associated with mobile shopping applications. *Amfiteatru Economic, 23(56)*, 46–64.
58. Stryker, J., & Kavlakoglu, E. (2024). *What is artificial intelligence (AI)?* IBM. https://www.ibm.com/topics/artificial-intelligence
59. Uribe-Tori, M., Sanchez, L., & Becker, J. (2022). *Financial performance indicators and investment returns in retail business models. International Journal of Retail Economics, 14*(3), 202–219.
60. Viswanathan, J. (2024). *Artificial intelligence–driven demand forecasting in global retail: A paradigm shift in efficiency and accuracy. Journal of Retail Technology and Innovation, 18*(2), 201–219.
61. Weber, F., & Schütte, R. (2020). A domain-oriented analysis of the impact of machine learning—the case of retailing. *Big Data and Cognitive Computing, 3(1)*, 11.
62. Weng, Y., Lin, C., & Li, S. (2024). *AI-powered demand forecasting models and inventory optimization in retail industries. Computers & Industrial Engineering, 186,* 109985. https://doi.org/10.1016/j.cie.2023.109985.
63. Wei, Y., Tran, S., Xu, S., Kang, B., & Springer, M. (2020). Deep learning for retail product recognition: Challenges and techniques. *Computational intelligence and neuroscience, 2020*.
64. Wilson, G., Perez, H., & Zhang, Y. (2024). *Workforce adaptation and skill transformation in AI-integrated organizations. Journal of Organizational Change Management, 37*(4), 442–459.
65. Xu, J., Hu, Z., Zou, Z., Zou, J., Hu, X., Liu, L., & Zheng, L. (2020). Design of smart unstaffed retail shop based on IoT and artificial intelligence. *IEEE Access, 8*, 147728–147737.