Asian Journal of Research in Computer Science

Volume 17, Issue 12, Page 179-184, 2024; Article no.AJRCOS.125352
ISSN: 2581-8260

Transforming Retail: Elevating Customer Experience and Efficiency with Generative AI Technique

Sandeep Matharoo [a++*]

[a] *Quantum Arc Solutions Inc, Canada.*

Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: https://doi.org/10.9734/ajrcos/2024/v17i12537

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/125352

Original Research Article

Received: 12/10/2024
Accepted: 15/12/2024
Published: 20/12/2024

ABSTRACT

This article examines the impact of generative artificial intelligence (AI) on the transformation of retail in the digital age. The author emphasizes that generative AI, by creating new content and providing personalized experiences, is becoming a key tool for retailers, allowing them not only to understand, but also to anticipate consumer preferences. Special attention is paid to changing the customer experience through innovative solutions such as smart chatbots that are able to adapt to user needs. The article also examines the impact of generative AI on operational efficiency, including inventory management and staff optimization, which helps reduce costs and increase profitability. The financial results of the AI implementation are supported by statistical data showing revenue growth and reduced operating costs. The conclusion emphasizes that generative AI will not only improve existing processes, but also change the very nature of interaction between retailers and consumers, opening up new horizons for business in the future.

**Corresponding author: E-mail: sandeep.matharoo@quantumarc.ca*

Cite as: *Matharoo, Sandeep. 2024. "Transforming Retail: Elevating Customer Experience and Efficiency With Generative AI Technique". Asian Journal of Research in Computer Science 17 (12):179-84. https://doi.org/10.9734/ajrcos/2024/v17i12537.*

Keywords: Generative artificial intelligence; retail; digital transformation; customer experience; personalization; chatbots; operational efficiency; inventory management; innovation; automation.

1. INTRODUCTION

The modern era of digitalization is characterized by an unprecedented level of interconnection between various sectors and technologies, which is particularly evident in the retail sector. The increasing complexity of consumer behavior, combined with continuous competition and an ever-growing internet audience, is rapidly transforming the retail industry. At the core of these transformations lies artificial intelligence (AI), where generative AI serves as a driving force for innovation, contributing to enhanced customer service and achieving unprecedented operational efficiency.

The ongoing struggle to attract and retain customers has reached a fundamentally new level, where technology integration determines the winners and losers in this saturated market. Current research indicates that successful implementation of advanced technological solutions is becoming a key factor in retail competitiveness.

In an environment where companies must rapidly evolve not only to understand but also to anticipate consumer preferences, the implementation of advanced AI-based solutions becomes the primary competitive advantage. Through generative artificial intelligence, retailers gain the ability to develop deeper consumer insights, create personalized experiences at scale, and optimize internal processes to previously unimaginable degrees (Wiredu et al., 2024).

The relevance of this research is driven by the need to systematize approaches to implementing generative AI in retail. Of particular importance is the question of effectively integrating these technologies into existing business processes.

This paper aims to examine generative AI in retail for enhancing customer service quality and operational efficiency (Shanti, 2024).

The methodological foundation of the research comprises works in the field of artificial intelligence, supplemented by contemporary studies in retail and the evaluation of technological innovation efficiency. The information base consists of empirical research in the application of generative AI in business.

2. MATERIALS AND METHODS

The methodological basis of the research is formed on a systematic approach to studying the impact of generative artificial intelligence on retail transformation. The fundamental theoretical foundation comprises concepts and methods of AI application in business, supplemented by modern generative technology tools.

The fundamental difference between generative AI and traditional artificial intelligence solutions lies in its ability not only to analyze and interpret data for decision support but also to create new content (Bizuayehu, 2004). Based on the analysis of existing datasets, generative AI can produce original content in various formats – from text to multimedia materials. In this context, generative AI in retail serves a dual function: acting as a customer interaction tool and as a strategic resource for business operations optimization (Patil, 2018).

The methodology for evaluating the effectiveness of generative AI implementation is based on a comprehensive analysis of customer experience and operational indicators. Particular attention is paid to the following systematization (Table 1).

Research shows (Bidochko, 2024). that modern AI chatbots have evolved far beyond simple question-and-answer systems. They can conduct contextual conversations, learn from each interaction, and adapt to specific user preferences. This qualitative leap in technology requires appropriate methodological support to evaluate implementation effectiveness.

The research methodology includes analyzing consumer behavioral patterns when interacting with generative AI systems. Notably, according to studies (Retail reinvented, 2024). consumers increasingly consider using conversational AI for recommendations and consultations. This creates a foundation for developing new methodological approaches to evaluating customer interaction quality.

Table 1. Applications of generative AI in retail

Functional Area	AI Tools	Expected Results
Customer Interaction	- AI chatbots - Personalized recommendations - Contextual dialogues	Enhanced customer satisfaction and sales growth
Operational Efficiency	- Process automation - Inventory optimization - Predictive analytics	Cost reduction and efficiency improvement
Marketing and Promotion	- Content generation - Personalized campaigns - Adaptive advertising	Increased engagement and conversion
Analytics and Forecasting	- Behavior analysis - Trend prediction - Assortment optimization	Business metrics improvement

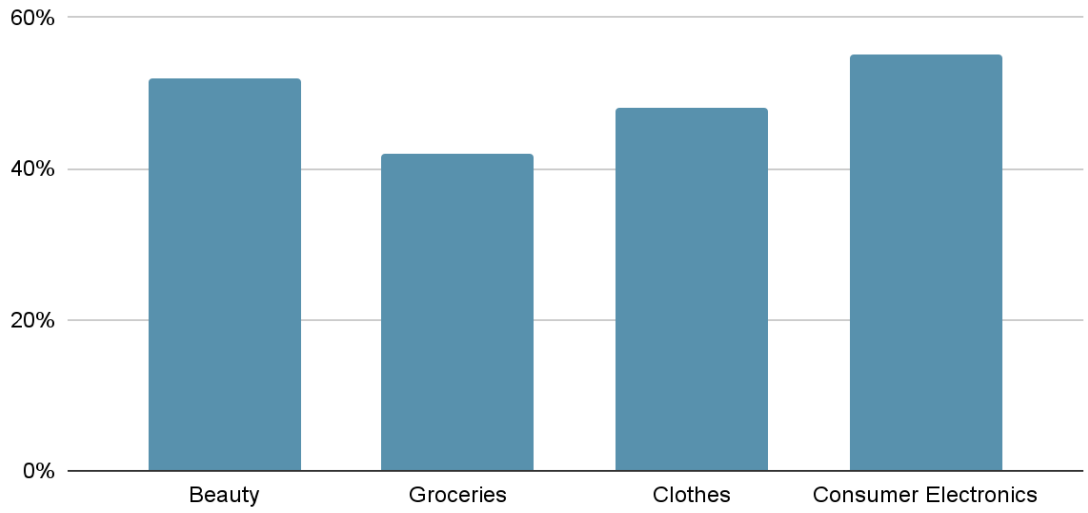

Fig. 1. Consumer likelihood of using conversational AI for advice and recommendations
(Retail reinvented, 2004)

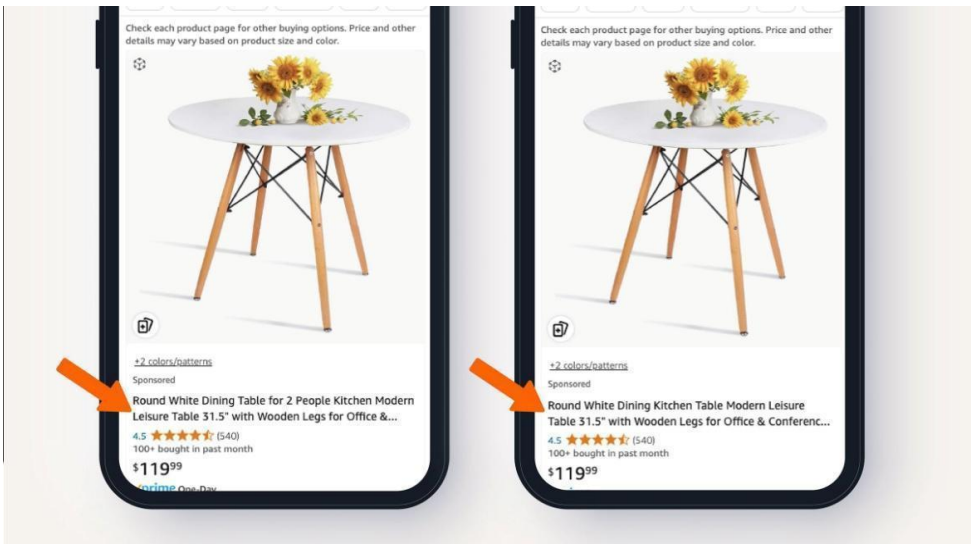

Fig. 2. Changing the product name to a more relevant one using AI
(Weatherbed, 2018)

Within the research framework, special attention is paid to methods of personalizing customer experience. Practice shows (Weatherbed, 2024) that implementing advanced generative AI tools enables personalized recommendations considering not only purchase history but also broader user behavior, including search history and interaction with specific product categories.

The theoretical foundation of the research also includes the concept of proactive customer interaction, where companies anticipate needs before they are explicitly expressed. This approach marks the transition from reactive customer service to proactive engagement, which is one of the distinguishing features of generative AI application in retail (Verma, 2023).

Thus, the proposed methodology provides a comprehensive approach to studying the impact of generative AI on retail transformation. This creates a theoretical foundation for developing practical recommendations for implementing and optimizing AI solutions in the retail sector.

3. RESULTS

Analysis of generative AI's impact on retail has revealed three key transformation areas: customer experience transformation, operational efficiency enhancement, and financial impact on business.

In the realm of customer experience, generative AI demonstrates impressive results in transforming consumer interactions. In an era where customers demand speed, relevance, and personalization, AI technologies ensure compliance with all these requirements (Bidochko, 2024). AI chatbots, which have evolved far beyond simple question-and-answer systems, are now capable of conducting contextual conversations, learning from each interaction, and adapting to specific user preferences.

A notable example is an online fashion store where, instead of using static filters and basic sorting mechanisms, AI chatbots recommend entire collections based on purchase history, body type, and even personal style preferences. Amazon has successfully implemented advanced generative AI tools that provide personalized recommendations considering not only previous purchases but also broader user behavior (Weatherbed,2018) as shown in Fig. 2.

A particularly important achievement has been the transition from reactive customer service to proactive engagement, where companies anticipate needs before they are expressed. Research shows that retailers using these advanced systems have achieved a 40% increase in customer service efficiency.

In terms of operational efficiency, the impact of generative AI has proven even more significant. Behind every seamless customer interaction lies a complex system of logistics, inventory management, supply chain coordination, and workforce allocation. By analyzing vast amounts of data, AI algorithms can predict consumer demand with high accuracy (Bidochko, 2024) as clearly demonstrated in Fig. 3.

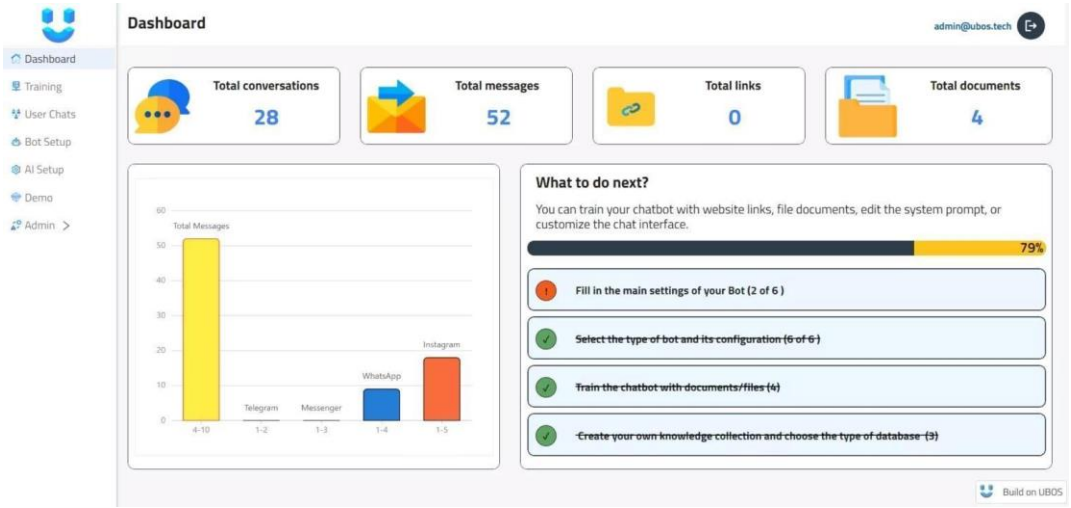

Fig. 3. Chatbot with AI for demand forecasting
(Bidochko, 2024)

The financial results of implementation are impressive: some retailers report a 30% reduction in customer service costs after implementing AI-based solutions. Companies using AI for sales and demand forecasting observe a 67% increase in sales conversion compared to competitors who haven't yet adopted these technologies.

In workforce optimization, AI analyzes customer flow data and predicts peak shopping hours, ensuring adequate store staffing levels (Harshini, 2018) AI-based inventory and personnel management systems provide real-time analytical data, allowing trends to be anticipated before they emerge.

The financial impact of generative AI implementation is confirmed by specific indicators. A Nvidia study (2024) showed that 69% of surveyed retailers reported an increase in annual revenue after implementing AI technologies, while 72% recorded significant reductions in operational costs (Bizuayehu, 2024) Fortune Business Insights forecasts that the global AI market in retail will reach $85.07 billion by 2032.

Thus, the research results demonstrate that generative AI is becoming not just a technological innovation but a necessary tool for maintaining competitiveness in modern retail. The key success factor is an organization's ability to effectively integrate AI solutions into existing business processes and maximize their potential for creating unique customer experiences and improving operational efficiency (Surampudi, 2024).

4. DISCUSSION

The research results reveal several key discussion points regarding the role of generative AI in retail transformation.

First, there is a notable difference in the effectiveness of AI solution implementation among different retailers. While some companies demonstrate impressive sales conversion growth of 67%, others are still in the initial stages of technology adoption. This may be attributed to differences in approaches to integrating AI into existing business processes and organizational readiness for technological change (Patil, 2024).

Special attention should be paid to the balance between automation and the human factor in customer service. Despite the 40% increase in efficiency when using AI chatbots, the question of maintaining a personalized approach and emotional component in customer communication remains open.

The economic feasibility of implementing generative AI for small and medium-sized businesses also warrants discussion. While large retailers like Amazon show impressive results, it remains unclear how accessible and effective these technologies are for smaller market players (Recio-Román, 2024).

5. CONCLUSION

The conducted research demonstrates the fundamental role of generative AI in retail transformation. The implementation of AI technologies leads to qualitative changes in both customer experience and operational efficiency.

The scientific value of the research lies in systematizing approaches to implementing generative AI in retail and identifying key success factors in this process. The developed methodological approach to evaluating the effectiveness of AI solutions is of particular significance.

The practical significance of the work is determined by the possibility of using the obtained results to form strategies for implementing generative AI in retail companies. The proposed metrics and evaluation criteria create a foundation for making informed management decisions.

Further research may focus on developing industry standards for generative AI implementation, studying the specifics of applying these technologies in various retail segments, and analyzing the long-term impact of AI on retail business model transformation.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

Bidochko, A. (n.d.). Revolutionize retail with generative AI: AI chatbots for business growth. *Ubos*. Retrieved from https://ubos.tech/generative-ai-for-retail/

Harshini, C. (n.d.). Revolutionizing retail with generative AI: Applications and benefits. *Analytics Insight*. Retrieved from https://www.analyticsinsight.net/generative-ai/revolutionizing-retail-with-generative-ai-applications-and-benefits

Standish, J., Kitchen, B., Leary, B., & Berger, S. (n.d.). Retail reinvented: Unleashing the power of generative AI. *Accenture*; Retrieved from https://www.accenture.com/fi-en/insights/retail/unleashing-power-generative-ai

Patil, D. (2024). Artificial intelligence in retail and e-commerce: Enhancing customer experience through personalization, predictive analytics, and real-time engagement. *ResearchGate*. Retrieved from https://www.researchgate.net/profile/Dimple-Patil/publication/385890528_Artificial_intelligence_in_retail_and_e-commerce_Enhancing_customer_experience_through_personalization_predictive_analytics_and_real-time_engagement/links/67398df269c07a4114490b5e/Artificial-intelligence-in-retail-and-e-commerce

Patil, D., Rane, N. L., & Rane, J. (2024). Future directions for ChatGPT and generative artificial intelligence in various business sectors. *ResearchGate*. Retrieved from https://www.researchgate.net/profile/Nitin-Rane-2/publication/385358213_Future_directions_for_ChatGPT_and_generative_artificial_intelligence_in_various_business_sectors/links/6721f1acdb208342dedd5d4d/Future-directions-for-ChatGPT-and-generative-artificial-intelligence-in-various-business-sectors.pdf

Recio-Román, A., Recio-Menéndez, M., & Román-González, M. V. (2024). The future of retail: Harnessing generative AI for disruptive innovation and sector transformation. *Reshaping Marketing Science in Wholesaling and Retailing*. Retrieved from https://www.igi-global.com/chapter/the-future-of-retail/ 354680

Shanti, J. (2024). Impact of generative AI on customer experience and personalization in the retail sector. *Minds Unveiled*. Retrieved from https://www.taylorfrancis.com/chapters/edit/10.4324/9781032711089-14/impact-generative-ai-customer-experience-personalization-retail-sector-shanti

Surampudi, Y., Ratnala, A. K., & Krothapalli, B. (2024). Generative AI for retail CRM systems: Revolutionizing customer engagement and satisfaction through data-driven personalization. *Journal of Science & Technology*. Retrieved from https://thesciencebrigade.com/jst/article/view/504

Verma, R. M., & Kumari, N. (2023). Generative AI as a tool for enhancing customer relationship management automation and personalization techniques. *International Journal of Responsible Artificial Intelligence*. Retrieved from https://neuralslate.com/index.php/Journal-of-Responsible-AI/article/view/66

Wiredu, J. K., Abuba, N. S., & Zakaria, H. (2024). Impact of generative AI in academic integrity and learning outcomes: A case study in the Upper East Region. *Asian Journal of Research in Computer Science, 17*(8), 70–88. https://doi.org/10.9734/ajrcos/2024/v17i7491

Bizuayehu, S. (2024, August 12). Revolutionizing retail: How generative AI is shaping the future of shopping. *Forbes*. Retrieved from https://www.forbes.com/sites/columbiabusinessschool/2024/08/12/revolutionizing-retail-how-generative-ai-is-shaping-the-future-of-shopping/

Weatherbed, J. (2024, September 19). Amazon is stuffing generative AI into its shopping experience. *The Verge*. Retrieved from https://www.theverge.com/2024/9/19/24249046/amazon-generative-ai-tools-personalized-shopping-recommendations

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/125352