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CONTENTS

AI-DRIVEN E-BUSINESS: THE FUTURE OF CUSTOMER PERSONALIZATION

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Abstract: Contemporary consumers have high expectations regarding the speed, convenience, and personalized solutions of online shopping, which requires the implementation of advanced technologies for analysing consumer behavior, preferences, and accumulated data. In this context, artificial intelligence provides opportunities for dynamic customer profiling, predicting future needs, and offering personalized products and services. The implementation of intelligent systems in e-commerce provides significant benefits, including higher conversion rates, increased sales volumes, and marketing strategies optimization. Personalization not only enhances customer loyalty and strengthens trust in brands but also reduces customer churn and encourages repeat purchases. From retailers' point of view, artificial intelligence integration contributes to more efficient product portfolio and inventory management, while simultaneously helping to reduce operating costs. Global e-commerce leaders, such as Amazon, Alibaba, eBay, Rakuten, and Shopee, already employ a wide range of artificial intelligence–based solutions to enhance customer experience and strengthen their competitive positions on the market.

Key words: artificial intelligence, retail trade, e-commerce, customer personalization, customer behavior.

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Introduction

Contemporary consumers' expectations are focused on achieving the fastest, most spontaneous, and frictionless shopping experience possible. To achieve such an outcome and create an effective customer experience design, retailers must be equipped with appropriate tools that enable personalized interactions and optimization of customer experience in both offline and online environments. Investing in customer experience personalization inevitably leads to higher retail sale volumes and the formation of a pool of loyal customers.

In academic literature, the concept of personalization is understood as the *process of purposefully tailoring products, services, and communications to meet the specific preferences, behaviors, and needs of individual consumers* (Madhuri, Reddy, Kumar, & Manchem, 2024, p. 909). Brands are increasingly confronted with the need for sophisticated approaches for accurate consumer profiling and customer behavior forecasting. These tools are essential for the development and delivery of relevant and personalized content that meets the specific needs and preferences of target audiences. The integration of digital innovations into commercial processes entails the application of advanced consumer profiling methods based on the processing of large volumes of data, analysis of consumer behavior, identification of individual preferences, and continuous synchronization of established interaction patterns. In addition to the challenges arising from a dynamic market environment, there is a growing need for a precise interpretation of signals generated by consumers themselves. This requires effective accumulation and synthesis of multilayered information, which is subsequently used by managers in the strategic decision-making processes.

In the contemporary business environment, harnessing the potential of digital technologies requires a new, intelligent, and purpose-driven approach to understanding consumers based on in-depth analysis of their activity and individual behavior in an online environment. Retailers seeking to expand their business scale are implementing artificial intelligence (AI, digital intelligence) to complement traditional marketing frameworks and to achieve a higher level of personalization. Artificial intelligence has the unique capacity to identify subtle behavioral variations and adapt consumer profiles in response to emerging changes, thereby significantly enhancing the accuracy of personalized commercial offers. Retailers, who are motivated for transformation and pursue operational efficiency, view intelligent systems as an opportunity to improve their managerial adaptability to market shifts and of consumer preference dynamics.

The object of this study is e-commerce in the context of digital transformation and the application of artificial intelligence.

Its subject is the personalization of the customer experience through integration of artificial intelligence in e-commerce and its impact on efficiency, customer satisfaction, and customer loyalty.

The research thesis is formulated as follows: *The integration of artificial intelligence into e-commerce transforms the customer experience by enabling a high degree of personalization, optimizing assortment management and marketing processes, increasing customer satisfaction and loyalty, and contributing to the sustainable competitiveness of the retail sector.*

The aim of the study is to identify the business benefits of implementing artificial intelligence in terms of customer personalization and within the context of e-commerce.

1. Literature Review

The idea of machines exhibiting human-like capabilities is not new. The mathematician John McCarthy was the first to introduce the term "artificial intelligence" in the mid-twentieth century, using it to describe his concept of intelligence inherent in certain machines (The New Yorker, 1981). Nowadays, in addition to the machines designed to perform specific tasks, artificial intelligence is also associated with complex technologies that exist in both tangible and intangible forms. One of the most widely recognized contemporary definitions of AI is offered by Hassani et al., who describe it as "a computer system that reproduces human cognition using data which is accessed from a variety of different sources/systems to take decisions and learn from the resulting patterns." (Hassani, Silva, Unger, TajMazinani, & Mac Feely, 2020) Another common definition of AI was provided by Haenlein and Kaplan, who define it as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation." (Haenlein & Kaplan, 2019).

Customer journey acceleration results from the intensive development of the omnichannel business model and the advancement of modern technologies, including the continuous improvement of artificial intelligence. (Петрова, 2021) Within the retail sector, AI has established itself as a strategic technological tool capable of creating highly accurate customer profiles that reflect consumers' actual tastes and preferences regarding products and services. Online retailers implement AI mainly to personalize customer experience, with the process involving adaptation to individual customer interests. This requires an in-depth analysis of how consumers interact with e-commerce platforms,

what their behavioral patterns are, and how much time they spend in the online ecosystem.

The effectiveness of AI-driven customer profiling is directly related to the volume and quality of available data used to analyze behavioral patterns and define consumer preferences. At the same time, the implementation of digital intelligence technologies is accompanied by a number of complex challenges. Retailers, alongside end consumers, face fundamental difficulties mostly related to the integration of AI into existing marketing frameworks, as well as to unresolved issues concerning ethics and data privacy. Despite these challenges, AI has significant potential for overcoming such barriers due to its ability to perform in-depth analyses of large and diverse datasets, model and predict consumer behavior, and facilitate the development of personalized and automated marketing strategies (Bano, Azim, Mahmood, Sanaullah, & Ali, 2025).

Personalization and effectiveness of AI-driven retail trade

One of the primary benefits of integrating artificial intelligence and personalized approaches into retail trade is the significant ***increase in sales likelihood***. This naturally leads to a noticeable improvement in conversion metrics, resulting from optimizing customer experience and tailoring offers to the individual needs and preferences of consumers (Yang, Lyu, Zhang, Wang, & Zhao, 2025). In this regard, personalization supported by intelligent systems contributes to a reduction in customer churn and encourages repeat visits to e-commerce platforms (Sharma & Gaur, 2024). Conversion growth has become a key strategic objective for online retailers and plays a crucial role in increasing sales as well as raising average order size (Chad, 2025). This effect is achieved through enhanced customer engagement generated by precisely targeted product recommendations that align with consumers' needs and preferences. At the same time, improvements in conversion rates can lead to substantial gains in the overall efficiency of retail platforms by optimizing interaction and transaction processes, thereby ensuring higher customer satisfaction and supporting sustainable business growth.

Another positive aspect of e-commerce resulting from the integration of new AI-powered personalization capabilities is the significant ***enhancement of marketing strategies*** and the optimization of efforts to address customers' specific needs (Madanchian, 2024). AI technologies enable a dynamic adaptation of product recommendations, content, and communication channels, all of which contribute to maximizing customer engagement and achieving more accurate customer segmentation. This leads to the development of deeper and

more sustainable relationships with consumers while ensuring a higher level of customer satisfaction (Beyari, 2025). Modernization of marketing strategies for segmentation and the optimization of the demand-and-supply relationship further increase the likelihood of conversion while simultaneously promoting the sustainable growth of e-commerce in highly competitive and dynamic market environments. Such adaptations of marketing approaches not only enable more effective customer targeting but also facilitate more efficient resource management, ultimately leading to increased market share and better competitive positioning (Arora, 2024).

The corporate use of customer data and machine learning for customer experience personalization fosters customer engagement and ***brand loyalty***. Enhancing personalization contributes significantly to increasing customer satisfaction (Beldad, De Jong, & Steehouder, 2010). According to the analyses of R.C and Dulloo, there is a strong positive correlation between AI-driven personalization and customer satisfaction (R.C & Dulloo, 2024). As a valuable tool for digital transformation, artificial intelligence facilitates the adaptation of retail operations to the individual desires and needs of consumers. In the long run, the process of tailoring retail trade to consumer preferences through AI serves as a foundation for building brand trust, which manifests itself in a higher frequency of purchases and transforms the behavior of online shoppers into sustained customer loyalty (Hassan, Abdelraouf, & El-Shihy, 2025). One of the key factors in achieving long-term customer engagement and enhancing satisfaction with online retail platforms is the optimization of intelligent system parameters (chatbots) (Vebrianti, Aras, Putri, & Swandewi, 2025).

Customer loyalty in the context of modern commerce should be viewed as a function of two primary determinants: customer service quality and the degree of technological integration of AI-based systems (e.g., voice interfaces, algorithmic recommendation systems, and similar technologies). Within the online marketplace, AI serves as a crucial tool for implementing personalized strategies that simultaneously ***increase the efficiency of sales processes and reduce operating costs***. Modern algorithmic solutions enable the dynamic segmentation of consumer preferences, allowing the development of individualized communication and marketing models. Among the most relevant practices are distribution of targeted informational content containing promotional offers; automated reminders encouraging customers to complete transactions on online platforms; and synchronized integration of product recommendations across multiple digital channels and social media environments. These mechanisms not only contribute to increasing sales volumes but also strengthen long-term customer engagement, which has a direct impact on the sustainability of e-commerce business models. (Rahman, Carlson, Gudergan, Wetzels, & Grewal, 2025; Lee, Gopal, & Park, 2020).

Another significant business area substantially influenced by the development of AI-powered personalized solutions is ***retail assortment management***. The implementation of such technologies contributes to minimizing excess inventory and reducing the associated operating costs, while simultaneously ensuring a more precise alignment between consumer demand and the products offered. As a result, supply chain efficiency is enhanced, a sustainable competitive advantage is created, and retailers strengthen their ability to foreast product assortment more accurately and respond more effectively to market dynamics (Liu, Kalaitzi, Wang, & Papanagnou, 2025).

Retail inventory management becomes increasingly efficient through the integration of advanced intelligent systems that significantly surpass the capabilities of traditional automated solutions. By applying sophisticated machine learning algorithms and conducting in-depth analyses of consumer behavior and market dynamics, artificial intelligence creates the conditions for the continuous optimization of demand forecasting and management processes (Ma, Wang, Ni, & Ping, 2024). Consequently, online retail platforms achieve a high level of operational efficiency and competitiveness in an intensely dynamic market environment.

Global practices of AI integration into retail trade

Through the application of data analytics and artificial intelligence, retailers can anticipate the specific needs of each customer, manage inventories more accurately, and provide personalized product recommendations. In doing so, they not only optimize stock levels by reducing losses and increasing inventory turnover, but also enrich customer experience, stimulate sales, and foster more enduring customer relationships (Kathiriya, Abhishek, & Sinha, 2022). Furthermore, one of the key advantages of AI in retail trade lies in its capacity to automate routine and operational activities that typically require substantial resources. AI-driven systems have the potential to update inventory records in real time, initiate automated replenishment processes, and generate highly accurate demand forecasts through analyses of historical data and evolving market trends. Such functionality not only improves the efficiency of management processes and frees up significant human resources but also reduces the likelihood of errors resulting from subjective factors in inventory management (Veluru, 2022).

Table 1 presents the experience of leading global retail companies in integrating AI-based systems used to enhance customer personalization and improve competitiveness and sustainability.

Table 1

AI integration by global retailers to enhance customer personalization and improve business efficiency

Company	Number of active customers (year)	Artificial intelligence system
Amazon	310 mln. (2025)	To personalize customer service, Amazon employs the Large Language Model (LLM) model. Retailers partnering with Amazon use an AI-powered generative sales assistant designed to enhance personalization, improve sales forecasting, and optimize inventory management.
Alibaba	~ 900 mln. (2025)	By means of a mobile recommendation system that interacts with shoppers through algorithmic models, the Taobao e-commerce platform enhances users' browsing experience. The platform offers several key advantages: it identifies customer intent and supports purchase decision-making, reveals consumer interest patterns in real time, provides recommendations for unregistered, low-activity, and inactive users, and accommodates a wide range of behavioral scenarios.
eBay	135 mln. (2025)	The core functionality of eBay is achieved through the integration of advanced machine learning methods, computer vision techniques, generative models, analytical tools for studying consumer behavior, and AI cloud infrastructures. Its Magical Listing tool enables retailers to generate product descriptions, detailed specifications, and even pricing suggestions based solely on images or minimal text input.
Rakuten	~ 45 mln. (2025)	Sales forecasting is based on supervised machine learning methodologies. Unsupervised learning is used to discover hidden behavioral patterns within large datasets. Product search is facilitated through semi-supervised algorithms, which retailers employ to categorize vast inventories of merchandise. The analysis of information derived from customer ra-

		tings and reviews is supported by structured machine learning techniques that identify and extract key content data. Reinforcement learning integration is used to improve browsing outcomes and recommendation systems. Deep learning models for Named Entity Recognition (NER) are used to enrich and enhance product catalogs. Moreover, multimodal models are applied to automate the completion of missing product information in listings on the Rakuten Ichiba platform, thereby improving the customer experience and facilitating more informed decision-making during online shopping (De la Comble, Dutt, Montalvo, & Salah, 2021).
Shopee	~ 400 mln. (2025)	The platform integrates technologies such as Augmented Reality (AR), Artificial Intelligence (AI), and personalized shopping mechanisms, all of which contribute significantly to optimizing customer experience. Interactions between sellers and buyers are supported through an intelligent assistant (the "Choki" chatbot), which is based on natural language processing (NLP) algorithms (Zahara, Prabowo, & Wahyuni, 2024). To enhance navigation efficiency within the e-commerce environment and stimulate user engagement, the Shopee platform has implemented a Multimodal Item Embedding Model (MIEM). This innovation improves search accuracy and enhances the alignment between consumer preferences and the products offered, thereby increasing the sales likelihood (Liu, Hou, Zeng, & Yu, 2024).

Artificial intelligence has already become a fundamental component of the strategies adopted by global retailers. The prevailing trend is the integration of generative, multimodal, and predictive models aimed at personalization and optimization. These solutions are designed to simplify consumer decision-making, reduce search time, and increase sales likelihood. As a result, customers can make more informed decisions and achieve higher levels of satisfaction. Artificial intelligence is not used solely within the customer-facing interface; it is also applied to inventory management and forecasting, the automation of product listings and descriptions, and the enhancement of recommendation and navigation systems.

Conclusion

Artificial intelligence has become a strategic tool with significant practical value across various business domains, with its contribution to the development of e-commerce being particularly noteworthy. This sector is characterized by intensive processing of large volumes of heterogeneous data and the need for precise segmentation and targeting of consumer groups. In this context, the integration of machine learning algorithms and predictive analytics methods creates opportunities for optimizing customer experience management processes and automating key operational activities throughout customer journey and buyer communications. A key aspect in the development of the AI solutions market for e-commerce is the pursuit of personalized customer experience. This trend is driven by growing consumer expectations for individualized services and recommendations that enhance the efficiency and quality of online shopping. As a result, there is a complex integration of technology and market practices which creates a highly adaptive and personalized commercial environment that meets contemporary requirements for intelligent digital platforms.

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