

13. Role of Artificial Intelligence in E-Commerce

Ms. Sakshi Makhija

Assistant Professor, Department of Commerce,
PIET NCR College, Panipat, India.

Abstract:

The rapid advancement of AI technology has transformed the way of thinking and prospecting the shopping habits as it was to be in early times. The development has transfigured the drivers affecting the consumer behavior while making purchase decision. The study identifies the major key drivers influencing the purchase decision of the consumer. The AI has made drastic change in reshaping the consumer buying decision.

The study reveals that personal recommendations, chatbots, self-generated feedback forms etc. have positive impact on purchasing behavior and enhance the sale as well. However, due to the automated technology, drawbacks should also be considered while relying on information provided. Consumer trust and AI autonomy, reliability issues due to the unusualness of the concept, financial information and security, and malfunctioning of systems are the factors that adversely impact the purchase intention of online customers. This paper contributes to the existing literature by providing theoretical foundation for understanding the tools of AI in shaping the consumer purchase decision in online shopping. These findings provide valuable insights for implications and application for various tools and also provide the foundation.

Keywords:

Artificial Intelligence, E-Commerce, Purchase Decision, Consumer Behavior.

13.1 Introduction:

Technology has given us so much. Each and every research and improvements has meant to be advantageous and making our life more and more convenient to a maximum extent. Whether it is shifting from traditional manual form to the digital or to the automated form, technology has proven itself. Gone are the days where physical market is the only place where shopping can be done. The internet and information technology has made drastic change in way of doing the business (Sagaguchi & Aoki, 2022). Now E-commerce is the new digital platform to meet out all the requirements and also the preferable option for consumers. The integration of Artificial Intelligence is icing on cake.

The integration of AI in e-commerce has revolutionized the way businesses interact with customers and manage their online operations. Whether it is related to product recommendation by machine learning or by answering all the queries by giving 24/7 services, AI has achieved a milestone in modern shopping (Rane et al., 2024a; Song et al., 2019).

AI has developed its potential in optimizing the inventory management through predictive analysis and enhances its fraud detection capabilities (Pallathadka et al., 2023). Now it is more convenient to search the product by uploading the image says visual search technology (Nathalie et al., 2024). The analysis of customer feedback and social media sentiment helps the businesses to improve their suggestions and customer experiences (Fedorko et al., 2022).

13.2 Literature Review:

13.2.1 Integration of E-Commerce and Artificial Intelligence:

E-commerce refers to the Electronic Commerce is the digital platform dealing with goods and services (Jain et al., 2021). E-commerce has transformed the global marketplace by enabling businesses and consumers to buy and sell goods and services through digital platforms (Kalakota & Whinston, 1997). The technique like artificial intelligence creates the environment, where one can identify and resolve the problem to attain the pre-determined goals (Fedorko et al. 2022). The artificial intelligence is the extension of human intelligence resulting in progress of global economy (Song et al., 2019). In the recent times the artificial intelligence has gained so much popularity not only in marketing but also in the economic growth.

The tools of artificial intelligence like chatbots, personal recommendation mechanism have highly recommended tool as marketing strategies. Artificial intelligence is integrated to achieve the major aim to get reliable quality control methods, design standard and to search the new ways of searching and serving customers, maintaining low cost (Pallathadka et al., 2023).

13.2.2 Impact of AI Generated Tools in E-Commerce:

- 1. Recommendation Engine:** The recommendation system is the advanced AI tool to give suggestions and recommendation closely to their interest and searching history. (Khrais, 2020; Maurya et al., 2024). People are notified by their search and purchase history and facilitate with best possible buying suggestions (Alamdari et al. 2020). According to the Juan-Pedro, the personal recommendation system has positive influence on the behavioral intention of consumer while getting the suggestions (Driskill & Riedl, 1998). AI enables the product recommendation by interpreting the consumer behavior, their purchasing and browsing history as well as their taste and preferences. AI with data base management system and machine learning algorithm analyze the purchase patterns and suggest the best recommendation for the consumer (Song et al., 2019; Pallathadka et al., 2023).
- 2. Wonderful Search Capabilities:** AI improves the search functions of the consumer by understanding their context behind customer queries. The visual search engine creates more convenient to the customer as they can find the product by uploading the image (Zhang et al., 2021; Sun et al., 2004).
- 3. Efficient Pricing and Inventory Management:** AI algorithms interpret the market trends, competitor pricing, demand fluctuations, and supply chain variations to enhance pricing strategies. The analytical predication capacities of AI help the businesses to maintain the optimum inventory levels (Khrais, 2020; Maurya et al., 2024).

4. **Check on Counterfeit Activities:** Machine learning models like Neural networks Support Vector Machine (SVM) continuously monitor the transactions which help the business as well as consumer from the financial risk (Gayam, 2020a).
5. **Voice and Conversational Commerce:** The integration of AI integrated voice search engines and conversational software provides the seamless experience for the consumer. The natural language understanding mechanism has simplified the consumer search and purchasing process (Nathalie, 2024).
6. **Virtual Assistant:** The technology has shifted the paradigm to the customer support to reduce the limitations of traditional customer support models. The tools like chatbots, Amazon alexa unlike human beings are not restricted by constraint like operational availability timings. It gives the best possible answer meeting the dynamic demand of the consumers. (Gayam, 2020b) Chatbots is the artificial intelligence assistant which is designed to give quick response to the voice commands and consumer's queries (Song et al., 2019).
7. **Logistic and Warehousing:** The quality of logistics and warehousing services are improved as compared to traditional logistic services system. (Song et al., 2019) From prediction of demand to AI based Robot for Goods movement, AI enables the warehousing operations fast, accurate, seamless and cost- effectively (Sodiya et al., 2024).
8. **Interactive Marketing and Targeting Prospects:** Searching the targeted customers is always a challenging task for the businesses. The implementation of AI makes it possible by analyzing the customers views and search history through machine leaning algorithm. Remarketing is done on the basis of prospective customers and demand can be analyzed as well (wang et al., 2023; Rane et al., 2024b)

13.2.3 Challenges in Application of AI in E-Commerce:

1. **Data Privacy:** AI is heavily depending on the data due to this data privacy and security is the major concern for the users (Rane et al., 2024a). The massive calculation of data through shopping and search history and browsing may lead to the breach of data privacy ethics. In often cases the users have no knowledge about how their data has been used (Youssef et al., 2023)
2. **Lack of Technical Literacy:** The lack of AI awareness and understanding is another concern for the businesses as well as the consumer. AI is still in learning stage. Due to insufficient knowledge and understanding of AI, the capabilities and potentials are not fully utilized (Rane et al., 2024b).
3. **Expensive:** High cost is implemented with implementing and maintaining the AI system. It has been rightly said that the technology comes with the cost. The cost of implementation of AI tools is very high which is not suitable of small productions and businesses. The increased cost ends with the burden on consumer of product paying high cost.
4. **Resistant and Inefficient Organizational Structure:** The successful implementation of AI depends on the team work. Traditional hierarchical structures often create silos between departments, impeding the cross-functional collaboration necessary for successful AI integration. Data scientists, IT teams and marketing departments need to be aligned and ensure the smooth functioning of AI solutions. The organization should provide extensive training to work effectively with AI tools.

5. **Technical Infrastructure and Integration:** The technical challenges of implementing AI in e-commerce are substantial. The Lack of necessary supporting infrastructure to assist the AI application is the major barrier. The integration of AI with E-commerce requires the seamless functioning without any technical glitch is the key consideration to be sorted (Zhang et al., 2021; Familoni & Onyebuchi, 2024).
6. **Skills Gap and Workforce Adaptation:** Another key consideration is the shortage of skilled professionals who can develop, implement, and maintain AI systems. Additionally, existing staff generally require substantial training to work productively with AI tools. The resistance to adapt may significantly slow down AI adoption processes (Rane et al., 2024).
7. **Compliance with privacy and data protection laws:** The evolving regulatory landscape adds another layer of complexity. Varying international regulations regarding AI usage, data protection, and consumer rights create compliance challenges for e-commerce businesses operating across borders (Song et al., 2019; Rane et al., 2024). The General Data Protection Regulation (GDPR) of Europe and the California Consumer Privacy Act (CCPA) of US are two examples of data privacy laws (Ikhtiyorov, 2023). Organizations must constantly adapt their AI implementations to meet changing regulatory requirements while maintaining operational efficiency.

13.2.4 AI Implementing Strategies:

There is a strict requirement to plan critically before implementation of AI tools. There is a need to identify the specific objectives of businesses to implement the machine learning algorithm. Further, the implementation strategy should include the legal compliance also. The technical barrier must be removed as it highly depends on the understanding and awareness of technical team (Ikhtiyorov, 2023). For the protection of consumer data, businesses should adopt the cyber security measures to handle the AI operations. Additionally, it is also equally important for the consumer to utilize the benefits of AI very wisely as it is still a machine learning algorithm (Ikhtiyorov, 2023; Rane et. al., 2024b).

13.3 Research Methodology:

The research methodology begins with the literature review to understand the impact of AI in E-commerce. The study includes the literature review of major database including Web of Science, Scopus and Google scholar for relevant years. The review ensures that paper strictly adhere to achieve the aim of this study has been included. Appropriate keywords were selected to show the effectiveness of the literature review. The selected words are "Artificial Intelligence", "Implementation of AI in E-commerce," "Purchase decision,". By analyzing through thses keywords, significant research papers have been selected. Further the analysis has been done and provides the valuable insights in categorizations and major points.

13.4 Discussion:

Future research should explore emerging AI technologies and their potential integration into e-commerce systems. This includes investigating advanced machine learning algorithms, natural language processing capabilities, and autonomous decision-making systems.

Additionally, researchers should examine how edge computing and 5G technology will enhance AI applications in e-commerce, potentially revolutionizing real-time data processing and customer interactions. Future studies should adopt more interdisciplinary approaches, combining insights from computer science, business management, psychology, and ethics. This could lead to more holistic understanding of Human-AI interaction in e-commerce environments, psychological impacts of AI-driven personalization etc.

13.5 Conclusion:

No doubt Artificial Intelligence is the revolutionary step in E-Commerce. The implementation of AI in E-commerce has definitely changed the buying behavior and purchasing decision of consumer. The consumers feel more convenient by several means like receiving the instant answers of their queries, regular recommendations and suggestions, voice assistants. But as it is rightly being said that technology comes with the cost. The cost in term of money as well in some challenges also. The awareness and understanding of AI is very necessary for both technology user and consumers of E-commerce. Businesses must consider the key factors like security concern, privacy of data pro-actively while implementation of tools.

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