

Original Article (Quantified)

Factors affecting the adoption of artificial intelligence in e-commerce by small and medium-sized enterprises

Keyhaneh Karimi¹ , Elaheh Mahmoodi Ranani² 

1- Department of Accounting, Kh.C., Islamic Azad University, Khomeinishahr, Iran

2- Department of Mathematics, Kho.C., Islamic Azad University, Khomeinishahr, Iran

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Abstract

The aim of this study is to evaluate the factors affecting the adoption of artificial intelligence in e-commerce by small and medium enterprises. This study is applicable in terms of its purpose, and is a quantitative research type. The present study proposes an integrated model based on the framework of dynamic capabilities, entrepreneurial orientation, and customer-centric systems. The empirical data of this study were collected through a digital survey using a purposive sampling method from small and medium enterprises in Iran. The analysis of the collected data was performed using structural equation modeling, and the results point to the role of dynamic capabilities and entrepreneurial orientation in facilitating the adoption of artificial intelligence in e-commerce. The data of this study were collected by distributing an online questionnaire to a sample of 183 decision-makers and managers in small and medium enterprises in Iran working in e-commerce. This study confirms the positive impact of AI adoption on the business performance of SMEs. The findings show that AI adoption in e-commerce is significantly associated with improved business performance of SMEs. Also, this study emphasizes the pivotal role of dynamic capabilities and entrepreneurial orientation in driving AI adoption in the e-commerce sector, which in turn can help improve business performance. These results emphasize the importance of developing technological capabilities and innovative approaches in SMEs to effectively utilize AI and achieve growth and success.

Keywords:

Artificial
Intelligence,
E-commerce,
SMEs,
Dynamic
Capabilities

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Corresponding Author: Keyhaneh Karimi

Email: k.karimi@iau.ac.ir

Extended Abstract

Introduction

Many companies are looking to leverage e-commerce to increase sales, improve services, and achieve greater customer satisfaction. If successful e-commerce strategies and tools are effectively implemented, this technology can significantly increase the revenue and profits of SMEs (Abbas et al., 2023; Ojha et al., 2023). However, the success of using these platforms depends on the level of commitment and trust of companies in smart technologies, which are effective in improving technical services and enhancing customer experience (Mishra et al., 2023). The adoption of artificial intelligence in e-commerce is considered one of the key factors for the success of businesses, as this technology uses existing data to identify opportunities and improve products and services (Liu et al., 2024).

While several studies have addressed the role of artificial intelligence in e-commerce, including customer service, sales facilitation, and information gathering, research related to the adoption and enhancement of artificial intelligence tools in maintaining e-commerce performance and supporting entrepreneurship in small and medium-sized enterprises is still scarce. Therefore, this article seeks to examine the factors affecting the adoption of artificial intelligence in e-commerce in small and medium-sized enterprises to promote entrepreneurship and strengthen the role of these companies in the country's economic progress and development. Insufficient understanding of how SMEs effectively use AI tools in e-commerce can negatively impact their ability to gain competitive advantage. Hence, there is a need for more in-depth research to identify challenges, exploit opportunities, and improve the effectiveness of using these technologies (Salah & Ayash, 2024).

This paper identifies the benefits and opportunities for SMEs to adopt AI systems in e-commerce and suggests various ways to implement effective strategies for entrepreneurship development and selecting appropriate AI tools. The following key research question is formulated to guide the research and provide a structured approach to understanding the various factors involved: What factors influence SMEs' adoption of AI in e-commerce?

Theoretical literature

Artificial Intelligence

Artificial Intelligence is a branch of computer science that aims to design systems that can automatically and intelligently process information and perform various tasks. By imitating human intelligence and abilities such as learning, reasoning, problem solving, natural language understanding, and pattern recognition; this technology helps humans solve the most complex scientific, industrial, and social challenges. Artificial intelligence has been recognized as one of the most revolutionary technologies of the modern era since its early years and has now penetrated all aspects of human life (Simone, 2018).

E-commerce

E-commerce is defined as the electronic buying and selling of items by consumers and businesses using computerized business exchanges. In this study, e-commerce is defined as the buying and selling of transactions over the Internet (Esare et al., 2012). E-commerce allows businesses to grow more easily in the global market and opens up new ways for companies to communicate information with consumers, suppliers, and other stakeholders (Tai, 2022).

Small and Medium Enterprises

In recent years, the importance and role of small and medium enterprises have been increasing, both in industrialized and developing countries. With the advent of new technologies, there have been transformations in production and the methods of it, distribution, and organizational structure of companies. It is essential for small and medium enterprises to use AI tools to obtain maximum value and competitive advantage, which includes reducing human errors, analyzing customer data, and providing highly efficient services. AI also helps in providing new and intelligent innovations that serve both institutions and customers, such as sales forecasting and attracting more customers (David et al., 2023).

Research Methodology

This study adopts a quantitative approach using a questionnaire to obtain data from officials in small and medium enterprises. It aims to investigate the factors associated with the adoption of AI in the field of e-commerce, while considering the relevant literature to improve the study results. Data for this study were collected by distributing an online questionnaire to a sample of 183 decision-makers and managers in small and medium-sized enterprises in Iran working in e-commerce. The sample focused on store owners and supervisors regarding their main occupations. The e-store owners were contacted through visits to the small and medium-sized enterprises, as well as through phone calls, WhatsApp, and email to encourage participation in the survey.

Research Findings

Structural equation modeling was used to analyze the data collected from the questionnaires and test the hypotheses. Based on the data analysis, the results of structural equation modeling showed that entrepreneurial orientation has a positive and significant effect on the adoption of AI-based e-commerce. The findings indicate that dynamic capabilities have a very positive and significant effect on the adoption of AI-based e-commerce. These findings emphasize that dynamic capabilities, such as the ability to learn quickly, adaptability, and continuous innovation in SMEs, can play a key role in the adoption and effective use of AI-based e-commerce. The results showed that the adoption of AI-based e-commerce has a positive and significant impact on the business performance of SMEs. This indicates a very strong and significant effect of this relationship. These findings emphasize that the adoption of new technologies such as AI can significantly improve the business performance of companies. In particular, companies that exploit AI-based e-commerce will be able to optimize their processes, reduce costs, and generally achieve economic advantages in competition with other companies.

Conclusion

This research shows that SMEs need to develop dynamic capabilities and strengthen entrepreneurial orientation to successfully adopt AI in e-commerce. Dynamic capabilities, as the ability of an organization to reconfigure resources, adapt to changes, and exploit new opportunities, are considered key factors in the adoption of new technologies. The results of the present study emphasize that companies with stronger dynamic capabilities are able to integrate AI into their business processes more effectively, which leads to improved organizational performance.

From a practical perspective, this research shows that in order to optimally utilize AI, small and medium-sized enterprises should focus on developing their dynamic capabilities and

strengthening an entrepreneurial culture. Investing in employee training, developing agile strategies, and creating support structures for innovation can help to more effectively adopt this technology. From a theoretical perspective, this study highlights the role of dynamic capabilities and entrepreneurial orientation in the adoption of digital technologies and establishes a link between the strategic management, entrepreneurship, and digital transformation literature.

The present study aimed to provide a model to investigate the factors affecting the adoption of artificial intelligence in e-commerce by small and medium-sized enterprises in Iran. The results of this study are consistent with the results of Salah et al., (2024), Wei et al., (2022), Palataeka et al., (2023), Yang et al., (2024), Stalings et al., (2024), and Cabrit et al., (2024). The findings show that small and medium-sized enterprises need to develop dynamic capabilities and strengthen entrepreneurial orientation to successfully adopt artificial intelligence in e-commerce. Dynamic capabilities, as the ability of the organization to reconfigure resources, adapt to changes, and take advantage of new opportunities; are considered key factors in the adoption of new technologies.

Finally, this study suggests directions for future research; including examining the impact of other organizational and environmental factors on AI adoption, analyzing the role of government policies and financial support in the development of digital technologies, and studying the long-term impact of AI on the sustainability of small and medium-sized businesses. Also, conducting comparative research across industries can help to better understand the structural and strategic differences in the adoption of this technology.