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Presenting a model for applying artificial intelligence in exporting electronics products

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Abstract

The aim of the present study is to present a model for the application of artificial intelligence in the export of electronics industry products. The research method is applicable in terms of its purpose, and quantitative in terms of its implementation method. The statistical population of the study included sales experts and marketing specialists in electronics export companies, whose sample size was estimated using the stratified random sampling method and the Cochran formula. Given that the number of these people is about 1600, the sample size was considered to be 306 people. The data collection tool is a researcher-made questionnaire. SPSS and PLS software were used to analyze the data. The results showed that the composite reliability indices were all more than 0.7 and the convergent validity for most categories was more than 0.5. The results of the hypothesis tests also indicate the complete confirmation of the relationships between the model categories with a significance level of $p < 0.001$. Also, the GoF criterion was used to examine the overall fit of the model and the measurement for the structural model. The GOF value is 0.815, indicating a strong fit of the model.

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Extended Abstract

Introduction

In today's advanced world, where the speed of change is doubling every day, domestic performance in relation to business activities is not enough to remain competitive. Rather, it is better to expand the scope of business operations beyond the country's borders. Companies or organizations that are interested and inclined to enter foreign markets must gain a proper understanding of the global trade system (Wang et al., 2023).

Several factors may expand the scope of a company's activities to the international arena. The attack of foreign competitors on a company's domestic and local market by offering better products or prices is one of these factors (Xu & Tian, 2023). The company's foreign market may be shrinking or the company may consider it advisable to enter new markets to produce more and take advantage of economies of scale. The company's goal in entering foreign markets may be to break away from market dependence and to escape the risks of such dependence (Yan, 2023). The process of smartization is one of the characteristics that reduces the challenges facing organizations in enabling them to be present in international markets (Alyan, 2022). Collecting, analyzing, storing, and using data to design better experiences for people is a very difficult task, but with the help of new technological advances such as artificial intelligence and robotics applications, the marketing department of the company can use complex applications for production, distribution, and export, as well as create appropriate customer experiences (Prakash, 2023). By analyzing large amounts of data, artificial intelligence can bridge the gap between data science and implementation, which was previously an impossible task. The advancement of technology use in exports is the result of the integration of big data with the academic study of intelligent systems (Gabelaia, 2022). The Internet of Things, data science, cloud computing, big data, artificial intelligence, and blockchain are all technological innovations that are changing the way we live, work, and even interact with international markets. Further development of these technologies may lead to super automation and large-scale networks that will usher in the Fourth Industrial Revolution (or Industry 4.0) (Saheb et al., 2022). However, few studies have examined the role of artificial intelligence on exports in the electronics industry, and given the existing research gap, the present study answers the question: what is the application model of artificial intelligence in the export of electronics products?

Theoretical Framework

Artificial Intelligence

Artificial intelligence is a branch of computer science with a long history. While in the past, artificial intelligence was limited to a largely theoretical field, recent advances in data generation and computing have allowed artificial intelligence to move from theory to application (Haenlein & Kaplan, 2019).

Application of Artificial Intelligence in Exporting Electronics Products

AI-based quality control systems, by monitoring the production and distribution process in real time, ensure the quality level of products before they are shipped to international markets and prevent product returns or brand losses (Barykin, 2023). In the electronics industry, where competitive advantage is based on innovation, speed of response, and supply chain optimization, AI acts as a strategic driver for improving export performance indicators. Companies that apply AI technologies in their marketing, demand planning, and export logistics processes have more sustainable growth and higher market share compared to competitors (Zhai, 2022).

Zolghadr et al. (2026) investigated the modeling and validation of the role of artificial intelligence in enhancing the export capabilities of electronics companies: a mixed approach. The results of the qualitative section showed that five main categories including causal conditions (ICT infrastructure, data quality, technical capacity), contextual conditions (supportive policies, international cooperation, innovative organizational culture), intervening conditions (sanctions, rapid technological changes, legal barriers and customs regulations), strategies (demand forecasting, price optimization, logistics intelligence, human resource empowerment) and consequences (competitive advantage, global market penetration, increased customer satisfaction, cost reduction) constitute the model structure. In the quantitative section, the composite reliability indices were all more than 0.7 and the convergent validity for most categories was more than 0.5. The results of the hypothesis test also indicated the complete confirmation of the relationships between the model categories with a significance level of $p < 0.001$.

Fekret et al. (2024) studied the role of artificial intelligence marketing on increasing sales and exports of Iranian sports goods using a phenomenological approach. The phenomenological approach was carried out using the Claise method (1976), which after coding the interviews using the phenomenological method led to the identification of 9 main themes and 53 sub-themes. The 9 main themes included (accurate identification of dimensions and indicators of smart marketing, SEO development, greater use of digital marketing and content marketing strategies, increasing the quality of Iranian sports goods, proper management of advertising and sales of Iranian sports goods, use of artificial intelligence tools, coverage of neuromarketing, employment of specialized human resources, exchange of information between the marketing and sales units).

Research Methodology

The research method is applicable in terms of its purpose, and quantitative in terms of its implementation method. The statistical population of the study included sales experts and marketing specialists in electronic product export companies, which were estimated using the stratified random sampling method and the Cochran formula. Considering that the number of these people is about 1600, the sample size was considered to be 306 people. The data collection tool is a researcher-made questionnaire.

Research findings

SPSS and PLS software were used to analyze the data. The results showed that the composite reliability indices were all more than 0.7 and the convergent validity for most categories was more than 0.5. The results of the hypothesis test also indicate the complete confirmation of the relationships between the model categories with a significance level of $p < 0.001$. Also, the GoF criterion was used to examine the overall fit of the model and measure for the structural model. The GOF value is 0.815, which indicates a strong fit of the model.

Conclusion

The present study was conducted with the aim of presenting a model for the application of artificial intelligence in the export of electronics industry products. The results of this study are in line with the results of Zolghadr et al. (2026), Fekret et al. (2024), Haghghi (2024), Rahimi Klor et al. (2024), Bandegi et al. (2024), Mao & Lu (2024), Hasan & Ojala (2024), Menzies et al. (2024), and Karamipour (2023). Menzies et al. (2024) showed that AI can be used in innovation approaches in international trade, international market selection, entry modes, foreign exchange, international human resource management, international supply

chains, culture management and other topics. AI has necessitated changes in workplace settings and the need for organizational and employee adjustments in response to this technology.

Based on the research results, the following suggestion was made:

Improving logistics and smart supply chains: AI systems can identify cheaper and faster transportation routes and predict customs problems or busy ports. Companies should use this capability to reduce delivery times and transportation costs.