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The impact of emerging technologies and digitalization challenges on the expansion of international trade of small and medium-sized enterprises, considering the moderating role of industry type

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Abstract

The aim of the study is to investigate the impact of technological tools, technological limitations and digitalization of trade on the development of international trade of small and medium-sized enterprises, moderating the type of industry (type of company activity). This study is applicable in terms of its purpose, and descriptive-analytical in terms of its method, using a survey method with a causal approach. The statistical population of this study is the administrative staff of small and medium-sized enterprises in Zanjan, the statistical sample is 110 people selected by the Cochran formula. The primary data collection tool is a questionnaire, and its face validity and reliability were confirmed by reporting the total Cronbach's alpha coefficient. SPSS version 21 software was used in data analysis, and structural equations and LISREL 8.8 software were used in the inferential analysis and testing of research hypotheses. The results of the study show that technological tools, technological limitations and trade digitalization have a significant impact on the development of international trade with the moderating role of the type of industry of small and medium-sized enterprises.

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Extended Abstract

Introduction

The rapid advancement of technology has led to the creation of the digital age. Digital activities are becoming the most important part of the marketing process (Denicolai, 2021). A penetrating look at the world around us reveals the fact that today's world is much different than yesterday and that in order to survive in such a hyper-competitive market, businesses must compete with other businesses in line with this era. Accordingly, they should take a smarter look at digital marketing and benefit from it (Del Giudice et al., 2019). On the other hand, trade digitalization is a type of marketing that is carried out through digital channels, both online and offline. In this method, all possible capacities and channels available in the digital world are used to deliver information to the customer or consumer (Rashidi et al., 2023). Also, today, new technologies and digitalization are considered the most vital components of commercial and industrial organizations, such that economic theorists have called technology the engine of the economy and believe that it plays an important role in the development of a country (Salamzadeh et al., 2019) because digitalization is a vital tool for organizations to achieve competitive advantage and organizational innovation (Karimi, K. Mahmoodi Ranani, 2025). Given the complexities of human life, technological tools, due to their transformability and the great influence they have on educational, cultural, economic, etc. growth, are considered one of the most dynamic and controversial fields of science and technology (Dana, et al., 2022). This technology is a medium that allows for the expression of a wide range of information, ideas, concepts, and messages. To examine this issue more deeply, the age and size of the company may be important, as some believe that older and larger companies (in terms of size) are usually more capable of competing on international stages (Ben Slimane, Moeuf, 2022). The type of company's activity refers to the field of work and the product or service that the company offers. For example, an automobile manufacturing company, an information technology company, and a financial services company each have a different type of industry (Khin, Ho, 2019). Today, accessing new technologies and digitization as an effective and vital tool and obtaining central and strategic information is a significant advantage for organizations, because more, faster, more appropriate, and more efficient service delivery in industrial companies in Zanjan will all be achieved as a result of using up-to-date and efficient technologies. These systems have provided the basis for managers to use appropriate information anywhere and anytime in their various decision-making. On the other hand, the competitive environment of industrial companies in Zanjan, because it is changing rapidly and the type of changes has become very diverse, requires capabilities that can create a sustainable competitive advantage for the organization. These developments increasingly highlight the need to utilize operational and dynamic capabilities; processes whose role is to change the organization's basic resources. Hence, the main question is as follows: Do technological tools, technological limitations, and digitalization of trade affect the development of international trade of companies located in Zanjan industrial towns by moderating company activity?

Theoretical framework

Digitalization of trade: Digitalization of trade means the acceptance or increase in the use of digital technologies by an organization, industry, or country and is a process that changes the structure of many areas of people's social life in the field of digital communications and media infrastructure in the field of trade (Garcia et al., 2023).

Technological tools: The process of fundamental change, enabled by the innovative use of digital technologies, combined with the strategic leverage of key resources and capabilities,

with the aim of fundamentally improving an entity and redefining its value proposition to stakeholders (Reis et al., 2018).

Technological constraints: These are various factors hinder the development, adoption and effective use of technologies. These barriers can be technical, economic, social, cultural, or even political in nature (Vial, 2019). In general, technological constraints can be divided into the following categories (Li et al., 2018):

-Technical barriers: Highly complex technologies may have high development and maintenance costs and require a specialized workforce

-Economic barriers: High costs: Developing and implementing new technologies often involves very high costs. Return on investment is uncertain.

-Social barriers: Resistance to change: People may resist adopting new technologies because they are accustomed to old ways of doing things.

-Cultural barriers: Cultural beliefs: Some cultural beliefs may conflict with the development and use of new technologies.

-Political barriers: Cumbersome regulations and laws: Complex and cumbersome laws and regulations can hinder the development and commercialization of new technologies

Internationalization: Internationalization means that a company operates in one or more foreign markets and therefore expands its activities in an international context. Internationalization also helps companies gain a competitive advantage in doing business abroad (Ly, Mason, 2020).

Industry type: Industry type refers to the classification of companies based on their main field of activity, which indicates the field of specialization and the nature of the company's business (Rachinger et al., (2019).

Research methodology

This research is applicable in terms of purpose, and descriptive-analytical method, using a survey method with a causal approach. The statistical population in this study includes employees in the administrative department of small and medium-sized companies in Zanjan, and the statistical sample is 110 people, selected by the Cochran formula and a simple random method. The primary data collection tool is a standard questionnaire, and the validity was confirmed in the form of a face-to-face and factor analysis method with the KMO index, as well as their reliability by reporting the total Cronbach's alpha coefficient.

Research findings

Descriptive and inferential statistical methods were used in data analysis; descriptive analyses by the SPSS software version 21, and inferential analysis and testing of research hypotheses by structural equations and LISREL 8.8 software. The results of the study using the path analysis technique show that technological tools, technological constraints and trade digitalization have a significant impact on the development of international trade with the moderating role of the type of industry of small and medium-sized enterprises.

Conclusion

By conducting this study, we found that in today's world, technology is recognized as the main driver of economic growth and development. Small and medium-sized enterprises are no exception to this rule. With the increasing progress of information and communication technology, new tools and methods have been made available to these companies for conducting international trade. Also, familiarity with the methods of entering global markets is one of the important components of the success of companies in achieving a greater market

share. These results are in accordance with the findings of Priya et al. (2023), who emphasized the role of digital transformation in the process of internationalization. Therefore, it is recommended to managers and experts of industrial companies in Zanzan province that sufficient and specialized human resources be used in the evaluation and supervision of information and communication technology projects, and that the information and communication technology development strategy be formulated and implemented in full detail. In general, it is recommended to managers and experts of small and medium-sized industrial companies in Zanzan province that laws and regulations, as well as holding various types of tenders and evaluating proposals correctly, be considered important for the use of information and communication technology, and that supervision of the use of information and communication technology be carried out by specialized and trained individuals, because supervision and management of the design of information and communication technology projects by a specialized team indicates the type of expertise of individuals in the use of information and communication technology. Since the use of information and communication technology requires investment and allocation of the necessary budget by organizations, it is recommended to managers and experts of small and medium-sized industrial companies in Zanzan province to pay attention to this issue and make extensive investments in creating and updating software and hardware systems. Of course, this investment must be commensurate with environmental changes and current activities. It is also recommended to managers and experts of small and medium-sized industrial companies in Zanzan province to hold numerous seminars and workshops by top-level managers to justify information technology. For human resources, all relevant units in the organization should be present, and cooperation should be carried out to upgrade information technology systems in a regular and planned manner. It is recommended that employee empowerment operations, especially in the field of information technology, be ongoing, so that this can be considered an important factor in the acceptance and support of information and communication technology. Employee empowerment in information and communication technology should be such that relevant data is made available to employees during the implementation of the application program so that they can communicate between old and new systems and become aware of the opportunities that have arisen.