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REVIEW

The impact of digitization on the international expansion of firms: a literature review analysis

La incidencia de la digitalización en la expansión internacional de las empresas: un análisis mediante revisión literaria

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ABSTRACT

The digital transformation of companies impacts internationalization is why this article is born with the purpose of providing a systematic review of existing research, analyzing the literature related to key aspects of digital transformation at particular, business and macroeconomic levels. They also demonstrated empirically that information technology systems (ICT) can reduce transaction costs in terms of communication and external coordination between supply chain partners. On the other hand, they proposed that ICT adoption influences foreign border decisions by reducing coordination costs both internally and externally for the firm. This manuscript provides a review of the existing literature to identify the central issues surrounding the positive and negative impacts of digital transformation on the internationalization process of firms. The paper also evaluated the theories and significant variables that explain the growth of e-commerce companies and their internationalization, finding a link in which transaction costs and resource-based perspectives complement each other. The methodology employed was a literature review that identified the most relevant articles in the last five years (2019-2024). The articles were extracted from Scopus. Finally, although most of the existing studies have analyzed a positive impact of digitalization on the internationalization process of companies, only a few studies have mentioned its negative effects on international business.

Keywords: Digitalization, Internationalization, Industry 4.0, ICT.

RESUMEN

La transformación digital de las empresas impacta la internacionalización es por eso que nace este articulo con el propósito de ofrecer una revisión sistemática de la investigación existente, analizando la literatura relacionada con aspectos clave sobre la transformación digital en niveles particular, empresarial y macroeconómico. Además, Balci & Surucu-Balci demostraron empíricamente que los sistemas de tecnología de la información (TIC) pueden reducir los costos de transacción en términos de comunicación y coordinación externa entre los socios de la cadena de suministro. Por otro lado, Han & Kim (2019) propusieron que la adopción de las TIC influye en las decisiones de fronteras extranjeras al reducir los costos de coordinación tanto interna como externamente para la empresa. Este manuscrito proporciona una revisión de la literatura existente para identificar las cuestiones centrales en torno a los impactos positivos y negativos de la transformación digital en el proceso internacionalización de las empresas. Asimismo, el documento evaluó las teorías y variables significativas que explican el crecimiento de las empresas de comercio electrónico y su internacionalización, con lo cual se encontró un vínculo en el que los costos de transacción y las perspectivas

basadas en recursos se complementan entre sí. La metodología empleada fue una revisión literaria que permitió identificar los artículos más relevantes en los últimos cinco años (2019-2024). Los artículos se extrajeron de Scopus. Finalmente, aunque la mayoría de los estudios existentes han analizado un impacto positivo de la digitalización en el proceso de internacionalización de las empresas, solo unos pocos estudios han mencionado sus efectos negativos en los negocios internacionales.

Palabras clave: Digitalización, Internacionalización, Industria 4.0, TIC.

INTRODUCTION

It is essential to understand how digital technologies can transform the processes, methods, and strategies of business internationalisation. In this regard, the United Nations Sustainable Development Goal proposes to develop resilient infrastructure (regional and cross-border) to improve access to opportunities and services, because access to the internet, connectivity, and automation depend on the infrastructure that can be implemented. Thereby enabling less developed countries to access and integrate into the global value chain of small industries and businesses, among other objectives. In addition, digital transformation is an effective means for small and medium-sized enterprises (SMEs) to explore opportunities for success in international markets, including emerging and developed countries.[1]

Previous studies have shown that multinational enterprises (MNEs) are undergoing significant changes in their business strategy and structure to increase global integration.[2] In addition, the emergence of digital technologies, combined with current trends towards globalisation and the opening of international borders, has reduced barriers to entry in many countries, allowing new entrants into an already highly competitive global market.[3] Therefore, stakeholders in the business process must understand the concept of each technology adopted and used, as well as the importance of digital transformation as technology grows and transforms.

Furthermore, R. W. Ahmad et al.[4] explained that Industry 4.0 is leading to the era of digitalisation, which influences commercial activities and allows for increased cooperation between firms; facilitates integration between firm departments; improves processes, operations, product design and services; and implements digital ecosystems with customers and suppliers,[5] which also contributes to the improvement and automation of supply chain procedures.[6]

Many studies have highlighted that digital transformation has strong potential to facilitate internationalisation.[7] However, digital transformation can also negatively affect internationalisation.[8] For example, challenges related to cybersecurity and compliance with international laws associated with this area, adverse effects on communication and performance of various groups or individual employees residing in different countries within the company, variations in the scope of companies' internationalisation, and variations in how consumers interact with various technologies in other countries.[9] However, although most current scholars emphasise the positive effects of digitalisation on the internationalisation process of companies, its adverse effects have not been explored in depth. To address this gap, in this study, we aim to provide a state-of-the-art review of the existing literature to identify the central issues surrounding the positive and negative impacts of digital transformation on the internationalisation process of companies.

A comprehensive review of the literature is conducted to develop the manuscript. The study contributes to the existing literature by showing the positive and negative impacts of digital transformation on the internationalisation of companies and how they can leverage digital channels to develop improved and efficient internationalisation strategies. A multitude of topics and perspectives on digital transformation strategies and their influence on business internationalisation are addressed. It also comprehensively summarizes the theories, concepts, contexts, and methodologies widely used in digital transformation and business internationalisation.

METHOD

A systematic review was carried out to achieve the research objective, focusing on a detailed analysis of the literature. According to Hernández-Sampieri et al.[10] the literature review involves a broad exploration of the systematisation and compilation process, analysing articles in the indexed database. A search was conducted using Scopus, with the inclusion criteria based on the terms 'internationalisation' and 'Industry 4.0' under the subject area 'Business' and only articles within the time range between 2019 and 2024. As a result, 510 articles were found, to which the following exclusion criteria were applied: take the first fifty articles with the most citations, from highest to lowest.

In addition to the above, articles that did not fully cover the study's subject were excluded through exhaustive analysis, even if they were among the top fifty in terms of citations.

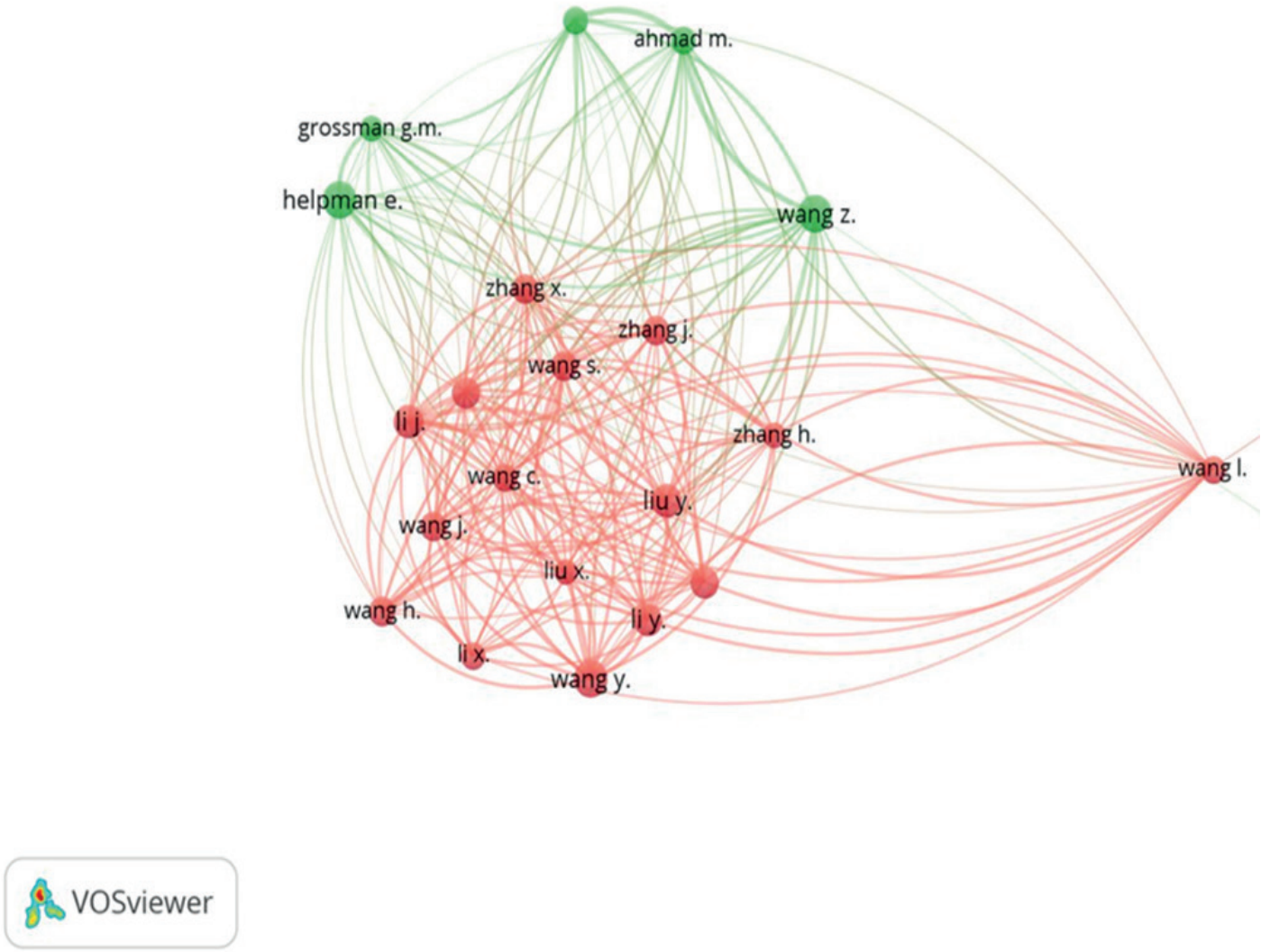

Figure 1. Co-citation network

The figure above shows a dense collaboration network in an area of study on digital transformation in international business, with key authors acting as connection points. This co-authorship visualisation helped identify the field's most influential researchers and opinion leaders and shows how collaboration networks can vary in size and intensity, reflecting different approaches within the general field of study. The image shows several coloured clusters, representing groups of authors collaborating frequently. The connections between authors indicate the frequency of their collaborations. We can see the main clusters: the red cluster is made up of authors such as Wang L., Wang Y, Li J, Liu Y. and Zhang X. This group shows a dense collaboration network, suggesting that these authors work together regularly on common projects or research areas. The green cluster includes authors such as Ahmad M, Grossman G.M., and Helpman E. Although they are fewer in number, they have clear connections. This group could be related to a more specific academic network. In terms of the most influential authors, Wang L stands out as the author with the most connections in the network, acting as a key node between different subgroups. Wang Y and Li J also have multiple connections, establishing themselves as central figures in their respective clusters.

The network figure shows the interactions between keywords and illustrates the properties of word networks. Therefore, during the descriptive analysis, we ran the keyword function using VosViewer (the most relevant keywords that co-occur in our sample). The software performs statistical calculations and generates graphs, among other properties. After coding, the programme reveals that the most frequent keyword clusters were impact, innovation, performance, business, company, knowledge, technology, model and strategies, and the main individual keywords were e-commerce, internationalisation, big data, digitalisation, digital, innovation, big data analysis, Industry 4.0, artificial intelligence and additive manufacturing.Results Citation analysis Bibliometric analysis (shows the 10 most cited articles up to 2024) with their respective number of citations.

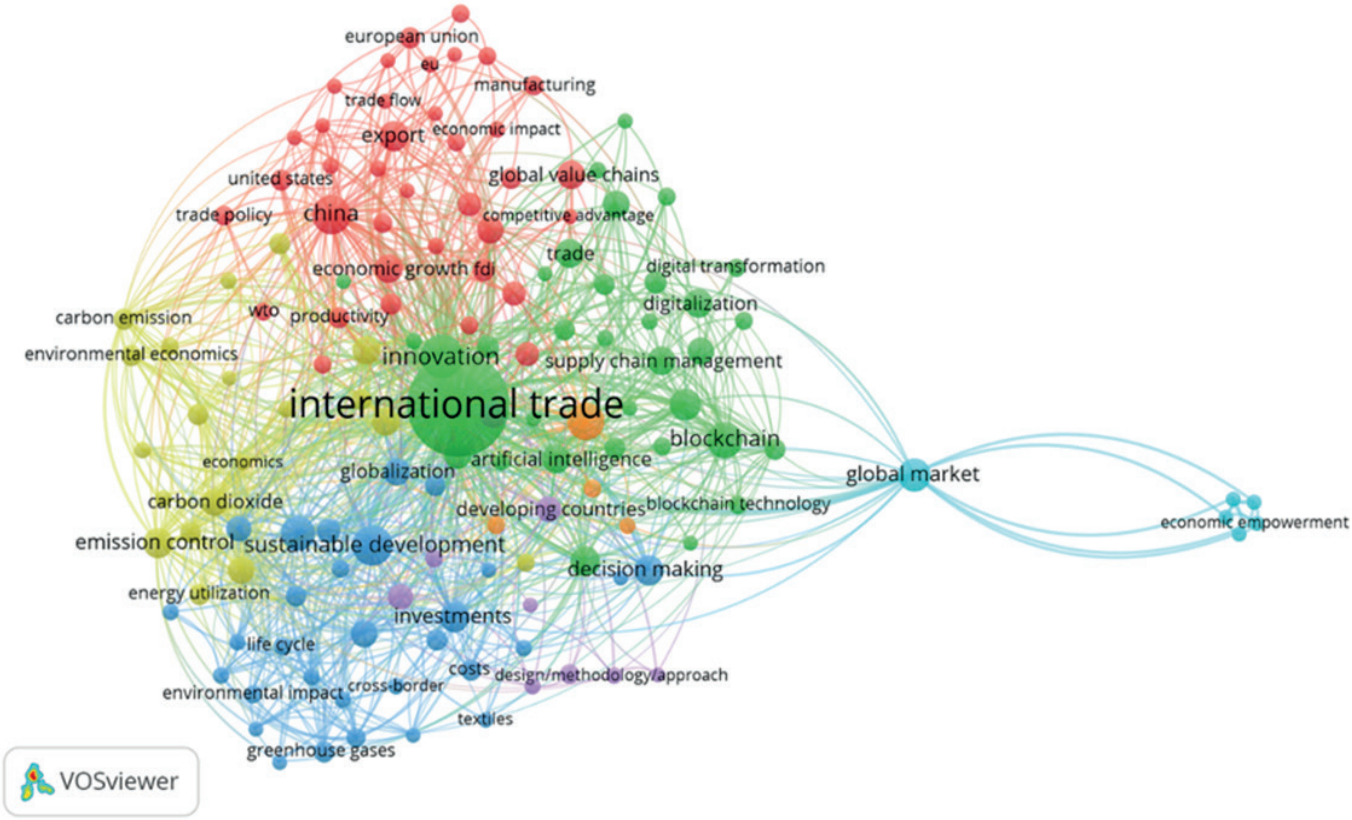

Figure 2. Keywords

RESULTS

Table 1. Main research

Author	Title	Year	Total appointments (TC)
Cheng et al.	How do technological innovation and fiscal decentralisation affect the environment? A history of the fourth industrial revolution and sustainable growth	2021	162
Lopes de Sousa Jabbour et al.		2019	235
Shahzad et al.	Circular economy business models and operations management	2022	174
Sun & Huang	Investigating spillovers and the connection between financial globalisation, high-tech industries and environmental footprints: New evidence in the context of China	2022	338
Kimani et al.	Predictions of carbon intensity based on factor analysis and an improved extreme machine learning model from the perspective of carbon efficiency	2020	145
Del Giudice et al.	Blockchain, business and the fourth industrial revolution: Where from, where to, why and how?	2019	145
Matthess & Kunkel	Changing wealth II in the Chinese economy. The effect of horizontal technological spillovers from SMEs on international growth	2020	63
Jafari-Sadeghi et al.	Structural change and digitalisation in developing countries: Conceptual linking of both transformations	2022	174
Cariou et al.	Towards agility in international high-tech SMEs: exploring key drivers and main results of dynamic capabilities	2019	208
Zhou et al.	Towards low-carbon global supply chains: A multi-trade analysis of CO2 emission reductions in container shipping	2021	67

Digital transformation

Digital transformation and platforms have transformed businesses, offering enormous opportunities for entrepreneurs.[1] Sinha & Roy[11] define digital transformation as a key term that describes organisational

changes driven by digital technologies in the context of the fourth industrial revolution, Industry 4.0. The digitisation of business processes and digital strategies in Industry 4.0 links advanced techniques and disruptive technologies in producing goods and services, facilitating business management and governance, and enabling communication and cooperation between industries worldwide. Digital technologies and strategies enable the emergence of new products and services[12] that would quickly cross international borders and significantly impact the economic activities and institutional framework of the countries of origin and the host countries. In addition, they could affect the internationalisation process in terms of timing, pace, location, method of entry, learning and recombination of foreign markets[7] and accessibility to local market resources and capabilities.[13]

Digital transformation is renewing the industry and promoting emerging technologies that transform everyday life, creating new business models and forms of production.[5] This shift towards digital transformation profoundly impacts business models, as it will rethink the interaction between consumers, businesses, and suppliers.

Transaction cost theory

The most frequently used theory in digital transformation and international business is transaction cost theory (TCT). This theory considers the costs incurred by a company in an economic exchange or how transactions will be carried out to minimise costs.[14] In international companies, this typically occurs when they establish agreements with a supplier or integrate functions with partner companies. According to TCN, a company should minimise the cost of implementing contracts or its decisions about operating in a foreign market. Through the lens of TCN, Allen et al.[6] proposed a theoretical framework for understanding the impact of digital transformation on the organisation of export intermediation and argue that, in the virtual environment of the Internet, the role of an export intermediary not only manages monetary, physical, and information flows, but also needs to have customer relationships and intimate market knowledge to serve all marketing channels that virtuality cannot replace adequately. Sadiq et al.[15] examined different technology licensing contracts' determinants and transaction costs. Regarding multinational corporations and their adoption of digital technologies, Nguyen[16] showed how modern multinational companies use information and communication technologies (ICT) to reduce production costs.

Furthermore, Balci & Surucu-Balci[17] empirically demonstrated that information technology (IT) systems can reduce transaction costs regarding communication and external coordination between supply chain partners. On the other hand, Han & Kim[9] proposed that adopting ICT influences foreign border decisions by reducing internal and external coordination costs for the company. Furthermore, Hervé et al.[1] found that global digital platforms in Southeast Asia and sub-Saharan Africa enabled micro-suppliers to enter global offshoring markets. Similarly, Zhou et al.[18] recognised that other unconsidered factors inhibiting trade within e-commerce could contribute to increased transaction costs. Finally, Hervé et al.[1] evaluated the theories and significant variables that explain the growth of e-commerce companies and found a link in which transaction costs and resource-based perspectives complement each other.

Resource-based theory

Resource-based theory (RBT) was used in ten studies linking digital transformation and international business because this theory offers opportunities to investigate the relationship between international knowledge transfer and innovative performance.[19] RBT suggests that organisations should focus on their internal strengths and on intelligent business management to explain economic organisation and governance to seek a sustainable competitive advantage.[20] The emergence of ICT, the first path to digital transformation, presents a competitive advantage for many companies. For example, Jafari-Sadeghi et al.[7] extended TBR by empirically examining the value of information technologies and their potential to enable suppliers to configure their governance mechanisms to achieve superior outcomes in cross-border relationships. Furthermore, by combining TBR and dynamic capability, Chang et al.[14] empirically demonstrated that ICT investments also improve the joint performance of partners in a relational environment. Similarly, Yoon et al.[21] demonstrated how virtual integration between companies could serve as an alternative governance mechanism for suppliers and provide them with competitive advantages. However [22] proposed and empirically evaluated the concept that ICT alone cannot represent a company's competitive advantage because other companies' barriers to imitation and acquisition are relatively low. About resource-based theory and digital platforms, Siddik et al.[23] asserted that there are two types of intangible assets: reputation and website traffic, which are positively related to the degree of internationalisation and the level of competitiveness of the company.

Similarly, Faride and Malik[24] argued that, in a collaborative economy, competitive advantages arise from widespread adoption, mastery, and trust rather than from the rarity or difficulty of imitating assets. Furthermore, Garcia-Teruel Simón-Moreno[25] stated that digital technologies have a positive impact on the internationalisation of SMEs through the mediation of international market intelligence. Finally, regarding e-commerce companies, M. Ahmad[26] argued that TBR partially explains their growth.

Internalisation theory

Internalisation theory (IT) was used in five studies. Research applying this theory seems to focus on how digital transformation alters IT assumptions about the nature of firm-specific assets and governance structure[27] focused on the theoretical implications of digital change on firm-specific advantages; distinguished that digitalisation involves upgrading technologies and human capital to improve governance and strategic management in cross-border decision-making. Inkinen et al.[26] stated that 'business education is one of the critical factors that can nurture individuals' entrepreneurial intentions, along with other personal and institutional factors'.

Furthermore, Bildirici & Ersin examined the implications of collaborative economy companies and their interactions with different national ecosystem configurations. Furthermore, based on knowledge from the field of economics, L. Wang et al.[29] introduced the notion of network externalities and drew distinctions between network externalities within countries and between countries, about digital platforms and new forms of internationalisation. In this vein, Buranelli de Oliveira et al.[30] argued that the emergence of digital platforms and ecosystems implies a shift in thinking from resource ownership to resource orchestration. Finally, Puthusserry et al.[31] used IT to explain how product characteristics motivate the selection of a mode of entry into international markets, basing their discussion on the internationalisation process of eBay.

New international firms theory

The theory of new international enterprises (NEI) was used as a lens in four studies, and researchers applied it from different but related perspectives. First, Strange & Zucchella[32] investigated how business ecosystems, institutional arrangements, and digital capabilities interact to foster international enterprises. Second, A. Das[33] explains that digitally-based international new ventures are firms that use the contemporary globalised and digitalised world to develop a unique competitive advantage across borders and analyzes how recent technological developments have shaped the internationalisation processes of INVs. Finally, Dumanska et al.[34] developed and tested a theoretical framework to explain the drivers and outcomes of risks associated with using a digital platform for international start-ups.

Impact of digital transformation on the internationalisation of companies

Digital transformation involves the use of digital technologies in many areas of business strategy, namely: digital platforms[35], Internet technologies[23], digital services[28], digital ecosystems, and information and communication technology, use of other advanced technologies, such as automation, artificial intelligence, and big data analysis.[27] Many studies have addressed the issue of digital transformation by analysing how isolated technologies help companies transform leadership and business organisation, modify business models, enable development, increase business capabilities and productivity, or enable them to go abroad and internationalise. For example [36] observed evidence that companies need to develop knowledge management and ICT capabilities to achieve higher performance at the project portfolio level. Sarkisyan[37] presented two cases of e-commerce villages in rural China to address how ICT creates and empowers critical actors in a marginalised community.

In addition, Cheng et al.[38] found that digital transformational leadership and organisational agility positively influence digital transformation, and that digital transformational leadership influences agility and organisational transformation to thrive in the Industry 4.0 era. However, Shahzad et al.[39] identified and explained how digitalisation capabilities enable manufacturing companies to co-create value with customers. In addition, Kimani et al.[40] proposed a framework of ecosystem-specific advantages applicable to future research on digital platforms. Similarly, Sun & Huang[41] explored how UK-based food and beverage industry SMEs leverage Internet-enabled value co-creation to internationalise. Finally, some scholars focused on the relationship between cultural, administrative, geographical, and economic distances and the success of digital companies in global markets.[42]

Individual level

Previous studies have highlighted the significant impact on organisations at the individual level. All digital transformation begins with managing and using information and communication technologies (ICT) at the individual level. No matter what interaction is needed or what information needs to be transferred, it cannot be done successfully without the key technological tools provided by ICT.

ICT helps managers increase partnership value assess cultural knowledge to understand new business opportunities[30] and make better international boundary decisions.[43] Managers of multinational companies consider ICT to play a crucial role in their competitive advantage. Conversely, internet technologies, digital services, artificial intelligence, and e-commerce improve business-to-business (B2B) and business-to-consumer (B2C) relationships.[44]

On the other hand, previous studies identified problems associated with the negative impact of digital transformation on companies due to factors related to individuals and groups. For example, to use digitalisation tools to work effectively, employees in several countries must have the talent, knowledge, and skills to use

these technologies effectively, according to Hervé et al.[35] In addition, some companies may lack the necessary efforts to adequately train all employees who may come into contact with foreign customers, as stated by Jafari-Sadeghi et al.[45] This situation can be a significant challenge. Previous studies have explained variations in how employees handle various technologies, which may be linked to grammatical variables such as age and gender, location, and experience in using technology. In addition, this may be related to some psychological factors and human characteristics belonging to employees, which may affect their performance and digital transformation.

Company level

When a company decides to internationalise, digital transformation is a mechanism and strategy for seeking international business opportunities and helping to connect exporters and importers quickly. In addition, by using digital platforms, companies could establish impressive e-commerce channels and social networks to attract foreign customers and partnerships. When companies decide to develop digital technologies and explore innovations, they gain opportunities in the areas of knowledge advantages, international entrepreneurship[46], and business sustainability and competitiveness creation[47], among others. Internet technologies provide opportunities for connection and inclusion [48] network relationship development improvement of global strategies and competitiveness, and expansion of international business and entrepreneurship.[49]

However, when a company decides to internationalise, digital transformation is a mechanism and strategy for seeking international business opportunities and helping to connect exporters and importers quickly. In addition, by using digital platforms, companies could establish impressive e-commerce channels and social networks to attract foreign customers and partnerships. When companies develop digital technologies and explore innovations, they gain opportunities in knowledge advantages.[30] Furthermore, digitisation processes are fundamental to ensuring business competitiveness and sustainability, and creating competitiveness, among other things. It is worth mentioning that the results indicate that internet technologies provide opportunities for connection and inclusion and the development of network relationships, improvement of global strategies and competitiveness, and expansion of international business and entrepreneurship.[50]

Macro level

Another body of research provides a new perspective on the influence of digital transformation on the path, pattern, pace, and process of business internationalisation.[50] Furthermore, since Industry 4.0, technology has impacted businesses' functional and geographical configurations.[37] As a result, geographical distance has a significant impact on international business. However, according to [51] digitalisation has enabled companies with so-called platform business models to emerge in many sectors of the economy without worrying about the actual distances between countries.

However, another body of research provides a new perspective on how digital transformation affects the trajectory, pattern, pace, and processes of business internationalisation, as stated by Y. C. Wang et al.[52] and Onjewu et al.[53] Furthermore, since Industry 4.0, technology has impacted companies' functional and geographical configurations. As a result, geographical distance has an essential impact on international business. However, digitalisation has allowed companies with platform business models to emerge in many sectors of the economy without physical distances between countries being a limiting factor.

DISCUSSION

Digital transformation has proven to be a key resource for companies seeking to internationalise, facilitating expansion and access to new markets. However, its implementation is challenging, especially when examined comprehensively at the individual, business, and macroeconomic levels.[54] At the individual level, studies show that the lack of digital skills and the impact of demographic, psychological, and human factors limit the effective use of digital tools, which can hinder the efficiency of digitalisation in international trade contexts. Qiu et al.[55] highlight that this lack of training and technological adaptation among employees highlights the importance of investing in developing digital skills at the organisational level.

Refuting Y. C. Wang et al.[52] digitisation opens doors to developing innovative business models and establishing transnational trade networks. However, it also requires a consistent digital technology and platform investment strategy. Lack of investment in digitisation can result in a decline in companies' competitiveness, especially in sectors where digital transformation is critical for sustainability and market positioning.

Similarly, Cho et al.[56] consider that digitalisation is transforming the dynamics of international trade, blurring geographical boundaries and enabling companies to overcome physical constraints. However, the impact of this transformation on the global economic structure is complex and uneven, affecting companies differently depending on their location, sector, and ability to adapt to technology.[57,58,59,60] This reality poses a challenge for governments and international institutions, which must create regulatory frameworks that balance the opportunities and mitigate the risks of digitalisation.[61,62,63,64]

Digital transformation is a vital resource for the internationalisation of companies, expansion, and access to new markets. Implementing this transformation has never been without challenges, mainly when analyzed at the individual, business, and macroeconomic levels.[54] Studies at the organisational and individual levels have shown that the lack of digital skills and the influence of demographic, psychological, and human factors impede the successful use of tools, creating complications in the effectiveness of digitalisation in international trade. Qiu et al.[55] show that this lack of preparation and technological adaptation among employees highlights the need to invest in developing digital skills at the organisational level.[65,66,67]

According to Y. C. Wang et al.[52] the digital revolution is an opportunity to develop innovative business models and establish transnational business networks, which means that it should consequently involve a strategy of constant investment in digital technologies and platforms. Low levels of investment in digitalisation can potentially lower companies' competitiveness, especially in areas where digital transformation is essential for sustainability and competitive positioning in the market.[68,69,70]

Similarly, Cho et al.[56] indicate that digitalisation is transforming the dynamics of international trade, removing geographical boundaries and allowing companies to overcome physical limitations. However, this transformation has complex and uneven effects on the global economic architecture and affects companies differently, depending on their location, sector, and ability to adapt to technology. This challenges governments and international institutions to develop regulatory frameworks that balance opportunities while mitigating the risks of digitalisation.[71,72,73,74]

CONCLUSIONS

Although digital transformation presents new opportunities for access to global markets, it also poses personal, business, and macroeconomic challenges. Another change factor is businesses' digital readiness and investment, both at the individual and institutional levels, and the need for a technologically adaptable, digitally skilled workforce and investment in digital infrastructure. This means they must be strategically oriented in this direction, from an inclusive policy environment to allowing emerging companies and economies to truly undertake transformation for their good, adding multiplicity to the impacts they face due to digitalisation.

Digital transformation, while competitive, can also be a double-edged sword and act as a barrier in contexts where access to resources and technology is not easy.

Most of the literature reviewed supports this, advocating for a positive impact of digitalisation on the internationalisation process of commercial companies. Only a few have cited negative impacts on international business. In this way, we summarise the various issues existing in the literature, taking into account individual, company, and macro perspectives.

Finally, it is important to mention that the analyzed studies reveal an interconnection between the different thematic categories of disruptive technologies. Our sample identified the five most studied research streams: information and communication technologies (ICT), digital platforms and e-commerce, Internet technologies, digital services, and ecosystems.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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