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DIGITAL TRANSFORMATION IN SMALL AND MEDIUM-SIZED ENTERPRISES (SMES): AN INTEGRATIVE SYSTEMATIC REVIEW[1]

TRANSFORMAÇÃO DIGITAL NAS PEQUENAS E MÉDIAS EMPRESAS (PMES): UMA REVISÃO SISTEMÁTICA DO TIPO INTEGRATIVA

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ABSTRACT

With the adoption of digital transformation in SMEs, it was possible to identify several contributions of digital business strategies, which are proving increasingly necessary in a constantly evolving corporate environment. This research aims to identify, through the studies, the main contributions of digital transformations in small and medium-sized enterprises over the last 10 years. The methodology used was an integrative systematic literature review, conducted through the multidisciplinary Web of Science database. To analyze the 33 articles, the synthesis matrix developed by Botelho, Cunha and Macedo (2011) was used. The results made it possible to identify some points relevant to the topic, such as the term Digitalization, used to refer to Digital Transformation. Regarding the challenges and opportunities faced by SMEs, a common point is the resistance many of them show to adopting new contemporary updates.

Keywords: digital transformation, digitalization, SMEs, integrative systematic review.

RESUMO

Com a adoção da transformação digital nas PMEs, foi possível detectar diversas contribuições das estratégias de negócios digitais, que se mostram cada vez mais necessárias em um ambiente corporativo em constante evolução. Esta pesquisa tem por objetivo identificar, através dos estudos, as principais contribuições das transformações digitais nas pequenas e médias empresas nos últimos 10 anos. A metodologia utilizada foi uma revisão sistemática de literatura

[1] Received on 12/01/2026. Accepted on 03/02/206. DOI: doi.org/10.5281/zenodo.24002071
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do tipo integrativa, por meio da base de dados multidisciplinar da Web of Science. Para realizar a análise dos 33 artigos, foi utilizada a matriz de síntese desenvolvida por Botelho, Cunha e Macedo (2011). Os resultados permitiram identificar alguns pontos pertinentes ao tema, como a nomenclatura Digitalização, para fazer referência ao termo Transformação Digital. Em relação aos desafios e oportunidades enfrentados pelas PMEs, um ponto comum é a resistência que muitas delas apresentam para aderir a novas atualizações contemporâneas.

Palavras-chave: transformação digital, digitalização, PMEs, revisão sistemática integrativa.

INTRODUCTION

Digital Transformation has shaped the ways companies are managed, enabling new business strategies and opening up new opportunities in the business environment (Skare; Obesso and Ribeiro-Navarrete, 2023). With the advent of new technologies, companies have undergone significant transformations, driving the development of services and products offered by digital enterprises (Organisation for Economic Co-operation and Development - OECD, 2018). Furthermore, the study also discusses how the expansion of networks has enabled the opening of new markets, fostering the emergence of digital enterprises and creating new business opportunities.

New business models have enabled new possibilities for entrepreneurship. According to Agostini, Grandinetti and Nosela (2022), the Internet of Things (IoT) has helped companies undergo the digital transformation process through data analysis. In this regard, this phenomenon can help companies operationalize digital transformation processes within organizations. Another important point is Industry 4.0, which began with the idea of transforming companies into more competitive environments capable of developing (Cotrin and Sebastían, 2021).

Within the scope of Industry 4.0, Cotrin and Sebastían (2021) also discuss how this revolution has been undergoing modifications and aims at new



changes in the technological context. In this context, in some countries, such as Japan, there is discussion about Society 5.0, in which some sectors of the economy have been transforming more rapidly, seeking to stay ahead of the other economies in the world (Fukuda, 2020).

The digital transformation process, which contributes to economic development, is also driven by SMEs. Thus, small and medium-sized enterprises have their financial development as an important aspect, being identified as the types of companies that provide employment and drive the economy in many countries (Haring, Pimentel and Teixeira, 2023). According to Dutta et al. (2021), SMEs can be recognized as enablers of possibilities through their market presence, the creation of new jobs and their entrepreneurial perspective.

SMEs face difficulties along the way but aim to improve operational efficiency and their production capacity, whether to improve how they perceive their needs or as a means of creating new forms of quality (Kumar et al., 2023). In this context, small and medium-sized enterprises are increasingly adopting digital tools to strengthen their competitiveness and innovate their processes. This transformation enables greater operational efficiency and opens up new opportunities for growth, positioning these companies more competitively in the current market (Skare, Obesso and Ribeiro-Navarrete, 2023).

The factors associated with digital transformation in SMEs have raised various ways of viewing these new perspectives, thus prompting the need for new studies on the involvement of technologies in small and medium-sized businesses (Scuotto et al., 2023). In this regard, the guiding question of this study is to identify in the literature what the main contributions of digital transformations to small and medium-sized enterprises have been over the last 10 years? To answer this question, the following objective was established: to identify, through the studies, the main contributions of digital transformations to small and medium-sized enterprises over the last 10 years.



It is therefore apparent that new studies are necessary and should pay attention to the foundation that current studies already allow us to perceive. Therefore, this research is justified by highlighting the importance of investigating what has already been produced in the literature, thus enabling the presentation of new paths that may contribute to the development of this field of study (Gonzalez-Varona et al., 2024).

This study is divided into five parts: the first is this introduction, followed by the second part, which presents the theoretical framework on digital transformation in SMEs. The third section presents the study methodology, the fourth section reveals the results of the systematic data analysis and discussion of the results, and finally, the fifth section addresses the final considerations of the study, indicating its contributions and limitations, as well as recommendations for future research.

DIGITAL TRANSFORMATION

Packmohr, Brink and Paul (2023) illustrate that Digital Transformation (DT) occurs when an organization digitalizes its internal way of working and, in connection with this, begins to offer services or products in a digital format, together with increased satisfaction among its end consumers. In this regard, Birkel and Wehrle (2024) present the concept of DT as comprehensive, as it may be linked to Industry 4.0, digital servitization, or even certain specific technologies. Begnini et al. (2023) view DT as a strategy that aims at holistic change within the organization, enabling changes in the way products and services are managed, making them integrated and directly affecting the relationship with the end customer.

Accordingly, Rama and Holl (2023) present the terminology Digitalization to refer to the term Digital Transformation. They contextualize the inherent capacity to implement technology-based changes. Shah et al. (2024) reinforce



that the term Digital Transformation is considered recent and also presents itself as a strategy that enables success for organizations wishing to remain competitive in the broad digital landscape.

Digital transformations can be presented in an easily understandable manner when companies prioritize resources that may be effective in the process of technological expansion (Yu, Fletcher and Buck, 2022). In this sense, Jeza et al. (2022) argue that some organizations view new technologies as a new path and need to devise strategies to adapt to the needs that digital transformation may bring to the organizational environment.

The development of new skills to meet market demands in the digital era provides practical examples of success in the digitalization process (Scuotto et al., 2021). Also in the view of Scuotto et al. (2021), the growth and evolution of organizations depend on the individual, who, with their skills, creativity and adaptability, plays a crucial role in this process.

For Lucian and Liana (2023), within some sectors, digital changes can be recognized as revolutionary, capable of affecting management models, ways of leading and people's behavior; these revolutions can be a crucial point for companies to devise effective strategies. In this regard, digital transformation has a transformative power that increases the agility of all market participants; it is a cyclical process, as agility is both a consequence of digitalization and a prerequisite for more advanced digital development (Selaković et al., 2023).

Digitalization has attracted new forms of digital processes, which are: (social, mobile, big data, cloud, AI). These new processes require efficient sociotechnical knowledge capable of promoting the effectiveness of their application (Legner et al., 2017). Digital tools can bring about moments of maturity within companies, and artificial intelligence can also provide forms of analysis and diagnosis, whether for the implementation or improvement of the structure (Motjolopane and Ignitia, 2023).



To enable the reader to understand the context in which the article is situated. The next section of this study sought to compile information on the definitions of small and medium-sized enterprises.

Small and medium-sized enterprises

The Brazilian Micro and Small Business Support Service - SEBRAE aims to foster the competitiveness and sustainable development of micro and small enterprises (Sebrae, 2022). Following the recommendation of the European Commission, enterprises should be classified according to their size (Bradaÿc and Hudek, 2023). Such a classification provides a basis for understanding the challenges and opportunities of each type of enterprise. In the Brazilian context, information from SEBRAE from 2013 reinforces that an enterprise is considered medium-sized when it has between 50 and 99 employees in the trade and services sector, whereas in industry it falls within this criterion when it has between 100 and 499 employees.

In the market environment, the size of an organization is measured through a series of arguments that indicate certain challenges and opportunities regarding competitive advantages that may influence the development of supply and demand (Shah et al., 2024). Creating a category to differentiate the size of each enterprise proves useful as an essential tool for understanding how the SME economy works, point out Bradaÿc and Hudek (2023).

To be considered a small enterprise, the total business balance sheet must not exceed 2 million euros, and there must be a maximum limit of 10 employees (Bradaÿc and Hudek, 2023). Understanding the size of an enterprise is important for a variety of information, understanding the market, comparing performance and defining public policies (Sebrae, 2022). Data from Sebrae (2022) show that small enterprises constitute important points of interconnection in the representation of the business fabric. Also based on this concept, in Brazil,



small enterprises are situated in a context of strategic relevance in the economic sphere and in the economy's value creation chain, with the small enterprise becoming a major link.

Some adaptation skills stand out in the market, such as the ability to understand trends and identify opportunities, thereby transforming products and responding to constant market changes, enabling income generation and social impact, point out Marinho and Melo (2022). Creating means of keeping constantly updated on the latest technological trends and participating in courses and training in the context in which they operate. These are innovative ways of finding solutions to market demands, enabling the creation of new means and processes to differentiate themselves from competitors (Prakasa and Jumani, 2024).

The term digitalization in organizations is linked to task automation and occupying an online space, enabling increased visibility (Bradaÿc and Hudek, 2023). Kääriäinen et al. (2023) believe that digitalization provides ways of making businesses last longer. In this regard, the next section sought to gather information on the role of digital transformation in small and medium-sized enterprises.

Digital transformation in SMEs

The main objective of digital transformation is to create an improvement that provides momentum for the organization, has characteristics specific to each small or medium-sized enterprise and is identified by the combination of strategy, information technology, computing, communication and connectivity, point out (Birkel and Wehrle, 2023). As a result of these changes, processes are optimized and, consequently, productivity improves, customers feel more satisfied and SMEs develop their innovative capabilities (Packmohr, Brink and Paul, 2023). There are various contexts that contribute to the adoption of digital transformation by small and medium-sized enterprises, and the capacity to innovate has been constantly encouraged (Birkel and Wehrle, 2023).



Using technological resources fosters Innovation and internal organizational processes, tends to improve the strategies underpinning decision-making and results in better experiences for both the customer and the SME (Espinosa and Soriano, 2023). Digital transformation fosters organizational productivity, enabling organizations to combine their objectives with digital forms of transformation (Gaglio, Mbula and Lorenz, 2022).

Dealing with the digital sphere is currently proving to be a crucial skill for business growth (Gaglio, Mbula and Lorenz, 2022). It is not merely a matter of knowing how to use one tool or another, but rather understanding the combination of knowledge, skills and attitudes that enables SMEs to benefit from the entire framework of advantages that technology offers (Zhang, Xu and Ma, 2022).

In the context of implementing new digital tools in SMEs, education plays an essential role in organizational development. Continuous training for employees and managers enables not only the efficient assimilation of these technologies but also the promotion of a culture of innovation and adaptability within the company (Clemente, Nicoara and Pastor, 2024). In this regard, some competencies link DT and small and medium-sized enterprises, such as management capability, adaptation to change and efficient techniques for implementing digitalization (Packmohr, Beink and Paul, 2023).

It is also apparent that digital transformation offers certain benefits for SMEs. As reported by Skare, Obesso and Ribeiro-Navarrete (2023), companies that invest in digital innovation may gain advantages such as increased production and reduced costs. Furthermore, for Eller et.al (2020), SMEs emphasize the need for competencies to manage innovation data across various organizational sectors, with the aim of promoting greater business opportunities and attracting new management models.



METHODOLOGY

This research was developed through an integrative systematic literature review. For Botelho, Cunha and Macedo (2011), the integrative review enables researchers to approach the problem in detail, making it possible to understand the evolution of a topic over time and identify new research opportunities in the gaps found. Furthermore, for Souza, Silva and Carvalho (2010), the integrative review is a method that allows knowledge to be synthesized and the results of significant studies to be applied in practice.

The integrative systematic review seeks to summarize what has occurred in the past in the empirical and theoretical literature, providing a broader understanding of a given phenomenon (Botelho, Cunha and Macedo, 2011). In this regard, this research was developed based on the six stages, as presented in Chart 1.

Chart 1 - Stages of the Integrative Systematic Review

Stages of the Integrative Review					
1st Building the research foundation: Topic and guiding question	2nd Inclusion and exclusion: Defining the criteria	3rd Selection of studies: Preselection and final choice	4th Organization by themes: Categorization and analysis of information	5th Analysis and interpretation of results	6th Review findings

Source: Prepared by the authors (2024)

Search protocol

Searches were conducted in Web of Science using terms such as "pme", "sme", "small business" and "pequena empresa" in combination with "digital transformation" and "transformação digital", (pme OR sme OR small business OR pequena empresa) AND (digital transformation OR transformação digital). After applying the search terms, it was possible to analyze the titles, abstracts and keywords in articles addressing the topic of Digital Transformation in SMEs.

Data collection began in May 2024 and ended in June 2024. The first search identified an overall total of 1,048 studies related to the keywords of this



study. From this total, other filters were applied, such as: filtering by topic, yielding 763 studies, and by the period from 2014 to 2024, at which point 753 studies were preselected. Finally, the articles-only filter was applied, resulting in a total of 546 articles, as detailed in Chart 2.

Chart 2 - Results of the filters in Web of Science

Keywords	Filters	Filter results
me OR sme OR small business OR pequena empresa) AND (digital transformation OR transformação digital)	Overall	1.048
	Topics	763
	2014 a 2024	753
	Articles only	546

Source: Prepared by the authors (2024).

As mentioned in Chart 1, three filters were used to select the 546 articles for review. Initially, the topics, abstracts and keywords related to the descriptors presented in the table were analyzed. This initial filter was crucial to ensure that only the most relevant articles, aligned with the topics of interest, were considered for the subsequent stages of the review. It is important to highlight that articles specifically addressing the impact of Covid-19 were excluded from the search.

We identified 87 relevant studies on digital transformation in SMEs in Web of Science. Following detailed analysis, we selected 33 articles that met the criteria for relevance to the research topic and were read and analyzed. These studies, carefully reviewed and discussed throughout the paper, provide the theoretical foundation for our investigation.

To analyze the articles, the synthesis matrix developed by Botelho, Cunha and Macedo (2011) was used. This matrix offers researchers an organized and efficient structure for conducting research, encompassing statistical analyses, cataloging factors that demonstrate the impact of variables throughout the study period, and selecting studies for inclusion or exclusion, as shown in Chart 3.



Chart 3 - Synthesis matrix developed for analyzing the articles

Synthesis matrix

FILTERS	No. OF FILTER RESULTS	SOURCE/ JOURNAL	TOPIC	KEYWORDS	METHODOLOGICAL APPROACH	DATA COLLECTION TECHNIQUE	CONTRIBUTIONS	LIMITATIONS

Source: Prepared by the authors (2024)

The analysis of the results will follow a qualitative approach, developed through descriptive content analysis, which, according to Bardin (2016), can be conducted through the selection, reading and interpretation of the articles analyzed. Thus, this research aims to identify the contributions of digital transformation to small and medium-sized enterprises. The first category created by the authors is Innovation, the second category is understanding digital business strategies, the third category refers to the Challenges and Opportunities in adopting digitalization that companies encounter when choosing to adopt digital transformation, and the fourth and final category is Sustainability and Social Responsibility.

ANALYSIS AND DISCUSSION OF RESULTS

This section presents the contributions of digital transformation to SMEs, divided into four categories. These are: Innovation adopted by SMEs; Digital business strategies; Challenges and Opportunities in adopting digitalization; and Sustainability and Social Responsibility. Based on the main results of the articles analyzed in this integrative systematic review, the aim is to contribute to other research agendas on this topic.

Technological innovation adopted by SMEs



This section begins by addressing the first category, technological innovation adopted by small and medium-sized enterprises according to the findings and contributions of the articles analyzed. Based on the analysis, it can be stated that innovative capacity is necessary within SMEs. This digital capability is essential for the organization's innovative performance, as highlighted by (Scuotto et al., 2021). Furthermore, Eller et al. (2020) and Rama and Holl (2023) report that knowledge of digital transformation in small and medium-sized enterprises is related to IT processes and employees' skills. These factors enable the application of strategies that stimulate company performance in the pursuit of new business horizons.

Straková, Talíÿ and Váchal (2022) comment that, in the process of digital transformation in SMEs, there are skills linked to value creation processes, such as inbound and outbound logistics, production, marketing and sales, and other support services that, when successful, enable the introduction of innovative scenarios. From Shah's (2024) perspective, companies are likely to acquire knowledge to create new products or apply innovative organizational methods when analyzing the adoption of digital communication technologies accessible to small and medium-sized enterprises.

One of the main contributions of digital transformation to innovation processes in SMEs is the achievement of competitive advantages, which is synonymous with modernization. Over time, these advantages have translated into successful environments, driven by constant technological innovations (Kaariainen et al., 2023; Gonzalez-Varona et al., 2024). In this regard, it is necessary to pay attention to the importance of the Digital Transformation (DT) process for the development of organizations, whether small or medium-sized enterprises.

The contributions of Teng, Wu and Yang (2022) reinforce that the digital transformation process is linked to innovation and that only in this way can small



and medium-sized enterprises find a model for growth and improvement. Another important point of attention for the development of these organizations is technological aptitude, that is, for a digitally created product or service to achieve the expected innovative performance, everyone involved must have some knowledge of innovation and DT (Shah et al., 2024; Gaglio and Kraemer, 2022).

Human capital is cited by Scuotto et. al (2021) as an inseparable part of the innovative process, and although these actors may show resistance, they put forward the argument that this part of the process must be properly encouraged. Many companies have invested in new tools and training to shape their operations toward digitalization, resulting in different behavior for the organization as a whole (Hervé, Schmitt and Baldegger, 2020).

In the view of Rama and Holl (2023) and Skare, Obesso and Ribeiro-Navarrete (2023), digitalization in SMEs is observed to be a complex aspect, but it brings various benefits to the organization. One of the main benefits is the acceleration of the value stream, despite the challenges inherent in DT adoption processes.

In the studies by Begnini, Oroe Dalbosco (2023), their main contributions concern the extent to which DT brought opportunities for businesses during the adaptation and implementation phase of digital tools. Furthermore, the authors argue that organizations must adapt to digital changes so that they can achieve satisfactory results in carrying out their business tasks, as these actions are part of the innovative process (Crupi et al., 2020).

Digital business strategies following the adoption of digital transformation by SMEs

When it comes to digital transformation, Valdez-Juárez et al. (2024) state that the transition from a traditional business model to an innovative and disruptive business model is entirely interconnected, as it has a major impact on



how barriers challenging the context in which SMEs operate are overcome. The study by Norte (2019) shows that as companies embrace digital initiatives and adopt digital strategies with a growth-oriented purpose, their level of digital maturity increases. The time gap between the writings of the cited authors allows us to understand that the relevance of digital transformation in SMEs is increasingly evident, as its growth proves exponential.

Small and medium-sized enterprises tend to view innovation as risky due to their appreciation of tradition and family influence (Marinho and Costa Melo, 2022). They do not adopt agile methods or modern tools for innovation due to perceptions of age, the gender of leaders, family structure, as well as the influence of their openness to innovation. Improved professional training, more effective policies and new research directions are recommended to stimulate innovation in these companies (Packmohr, Beink and Paul, 2023).

According to Ziółkowska (2021), companies seeking success in the digital era must place customers at the center of their strategies. The author emphasizes that only through careful planning can interactions with products be digitally stimulated, adding value and fostering consumer loyalty. Furthermore, she highlights the importance of the strategic use of digital tools to drive business development (Valdez-Juárez et al., 2024).

In this regard, engagement with digital transformation is increasingly demanded by the competitive environment in which companies operate; promoting change is highly complex, but strategic decisions based on digital technology tend to assist in developing positive effects in small and medium-sized enterprises, emphasize (Merín-Rodrigáñez and Dasí, 2024).

Within the scope of digital business strategies, DT contributes to expanding business presence and increasing visibility, for example through websites and digital marketing, which generates a broad connection between organizations and their audiences, state Skare, Obesso and Ribeiro-Navarrete



(2023). Nevertheless, there is more than just a positive side: the study by Packmohr, Brink and Paul (2023) warns that SMEs may have some difficulty offering products and services intelligently to end consumers, a finding that surprised the authors in the sense that, generally, this type of enterprise (SME) is closer to the customer. Therefore, overcoming this difficulty proves relevant for the business's digital strategy to work, they reinforce.

There is a significant need to establish effective collaboration between customers and suppliers of information and communication technology. This cooperation is essential to make knowledge accessible to everyone involved, enriching the decision-making process and adding value to tools that are fundamental to solving problems (CRUPI et al., 2020; Deryzemlya and Ter-Grigoryants, 2021).

The study by Xin, Xu and Liang Ma (2022) highlights the importance of this strategic partnership, demonstrating how it can strengthen organizations' ability to adopt and use technologies more effectively, promoting innovation and continuously improving the solutions offered in the IT and communication market.

Challenges and opportunities in adopting digitalization in SMEs

Promoting the adoption of digital means in a small or medium-sized organization proves challenging, as the resources required to meet the proposed objective are not always easily accessible, or these resources are not always made available in an economically profitable manner, state Kääriäinen et al. (2023). The study by Begnini, Oro and Dalbosco (2023) indicates that these barriers include resistance to change, a lack of financial resources and a shortage of digital competencies. It goes on to state that, to help these organizations grow, it is essential to develop strategies that overcome these obstacles, promoting digital training, access to funding and the creation of an organizational culture more open to innovation.



Crupi et al. (2020) point out the need to pay attention to aspects related to the adoption of technological measures, as DT requires a change in the SME's organizational culture. Deryzemlya and Grigoryants (2021) agree and reinforce that this is due to the rapid changes occurring in an increasingly globalized world.

According to Anderson, Wallace and Townsend (2016), before awakening to innovative practices, there is a need to recognize opportunities and stimulate people's creativity and imagination. Thus, when digital transformation is applied to a business, it can enhance task performance. Kallmuenzer et al. (2024) agree and reinforce that the benefits are broad and the company's development increases, but only if there is learning and adoption of the digital guidelines that best meet its needs. In light of the author's contribution, it can be stated that, before undertaking digital transformation, the first decision to be made is to reflect on such impacts on the business.

The work by Kaariainen et al. (2023) represents an important perspective for reviewing challenges and opportunities, as it empirically analyzed practical cases focused on small and medium-sized enterprises. The authors share that challenges are sometimes inherent to the business because they are not always clear to interpret. A well-executed implementation of digital transformation in SMEs is exemplified by Bilal et al. (2024), who emphasize in their studies the need for a holistic perspective, paying attention to technological, organizational and environmental factors.

Part of the purpose of overcoming a challenge is to be aware of and attentive to developments in the sector, to keep the improvement process up to date, state Kaariainen et al. (2023). Varona et al. (2024) agree and corroborate this when they suggest that decision-makers need to identify the digital capabilities that will assist them in the problem-solving process.

In light of the contribution of Ziólkowska's (2021) study, it is apparent that digitalization can bring organizations relatively favorable business opportunities



for their growth. Company marketing has become the key point of organizational strategies, in which technological tools play a fundamental role in optimizing communication and maximizing opportunities for market reach.

The contributions of the study by Clemente, Nicoara and Pastor (2024) highlight that training plays a crucial role in the successful implementation of digital tools. Appropriate training not only enables individuals to use these technologies effectively but also strengthens organizations by promoting a culture of innovation and adaptability. Valdez-Juarez et al. (2024) argue that, by investing in continuous employee training, companies can not only improve their operational efficiency but also open up new opportunities for financial growth and competitiveness in the global market.

Based on the research by Merín-Rodrigáñez and Dasí (2024), it is apparent that, for entrepreneurs to have opportunities, they need to digitalize their activities, adopting tools that promote their growth, whether through improving production or attracting new customers. Kallmuenzer et al. (2024) complement this by presenting three opportunities that SMEs identify through digitalization: 1) learning new business skills; 2) simplifying negotiation/sales; and 3) developing agile service tools.

Social responsibility and sustainable development in SMEs

Sustainability is linked to the possibility of using present resources in a way that maintains the continuity of equitable use for future generations, state Hervé, Schmitt and Baldegger (2020). Thus, the current context in which small and medium-sized enterprises are participating becomes extremely important, as it provides options for growing both economically and sustainably (Selaković et al., 2023).

In an SME, the adoption of technological measures enables the creation of new values, such as social responsibility, for example, to improve its decision-



making capabilities and foster improvements in sustainable development when there is awareness of the uses that digital tools enable (Teng, Wu and Yang, 2022). Technology-related social responsibility, which is intrinsic to the small and medium-sized enterprise, focuses on the local community in which it operates and enables contributions to sustainable development as it begins protecting environmental resources (Zhang, Xu and Ma, 2022).

Both organizational structure and cultural factors become relevant to digital transformation with environmental awareness; factors such as information and communication are major influences on the process of strategically changing business models, as society increasingly demands that organizations take care of social and sustainable responsibility (Zhang, Xu and Ma, 2022). In light of society's demands that institutions use natural resources in a way that safeguards future use. Therefore, Romero et al. (2024) and Straková, Talír and Vachal (2022) reaffirm the importance of thinking beyond finances; adopting responsible measures as an SME tends to positively attract society's perception.

Finally, Skare et al. (2022) argue that the major turning point enabling society to see value in the activities performed by small and medium-sized enterprises lies in digital transformation. In this regard, one of the advantages of digital transformation may lie precisely in external factors (society's pursuit of social and environmental responsibility) that are linked to organizational strategy (an internal factor), with new policies and techniques related to cultural, political and regulatory spheres (Hu et al., 2024).

Chart 4 presents a summary of the main contributions obtained from the 33 articles analyzed in this research.



Chart 4 - Main contributions of digital transformation to SMEs

Categories	Main contributions	Authors
Technological innovation adopted by small and medium-sized enterprises	- IT processes and employees' skills; - Creation of organizational value - Application of strategies to organizational performance; - Creation of new products - Achievement of competitive advantages - Entrepreneurial behavior - Business acceleration	Scuotto *et al.* (2021); Eller *et al.* (2020); Rama e Holl (2023) ; Shah (2024); Kaariainen *et al.* (2023); Gonzalez-Varona *et al.* (2024); Hervé, Schmitt e Baldegger (2020); Straková, Talíÿ e Váchal (2022); Gaglio e Kraemer (2022); Skare, Obesso e Ribeiro-Navarrete (2023); Crupi *et al.* (2020)
Digital business strategies following the adoption of digital transformation by SMEs	- Adoption of digital strategies; - Positive results in SME development - Inclusion of modern tools for innovation; - Need for improvement; - Enrichment of the decision-making process.	Klaus Norte (2019); Merín-Rodrigáñez e Dasí (2024); Xin; Xu e Liang Ma (2022); Valdez-Juárez et al. (2024); Norte (2019) Ziólkowska (2021); Marinho e Costa Melo (2022); Packmohr, Beink e Paul (2023); Birkel e Werhrle (2022)
Challenges and opportunities in adopting technological tools in SMEs	- Resistance to change; - Lack of financial resources; - Shortage of digital competencies; - Creation of an organizational culture more open to innovation; - Stimulates people's creativity and imagination; - Entrepreneurial training; - Attention to technological, organizational and environmental factors; - Identification of digital capabilities for problem-solving. - New business skills; - Simplifies negotiation/sales; - Develops agile service tools.	Kääriäinen et al. (2023); Begnini, Oro e Dalbosco (2023); Anderson; Wallace e Townsend (2016); Bilal et al. (2024); Varona et al. (2024); Clemente, Nicoara e Pastor (2024); Valdez-Juarez et al. (2024); Deryzemly e Ter-Grigoryants (2021); Birkel e Werhrle (2022); Kallmuenzer *et al.* (2024)
Social Responsibility and Sustainable Development in SMEs.	- Options for economic growth; - Adoption of technological measures improves decisions; - Social responsibility in the local community; - Information technologies in the organizational change process; - Advantage over competitors.	Selaković et al. (2023) ; Zhang e Ma (2022) ; Romero et al. (2024); Straková, Talír e Vachal (2022); Hu et al. (2024); Teng, Wu e Yang (2022)

Source: Prepared by the authors (2024)



Based on the points highlighted in this research, a research agenda is proposed so that future investigations continue to enrich theoretical and practical development regarding the role of digital transformation in SMEs. Thus, future research may focus on:

1- Analyzing, through qualitative studies (empirical research), the new dimensions of the role of digital entrepreneurship in the growth and success of SMEs.

2- Investigating how the practical implications of digital transformation for the formulation of public policies aimed at SMEs include the need for tax incentives for investments in technology, training programs for developing digital competencies, and the creation of appropriate infrastructure for technological support.

3- Identifying how companies' digital culture can influence the adoption and implementation of digital technologies in SMEs, promoting a mindset of innovation, adaptability and collaboration that facilitates the rapid integration of new tools and systems, improving operational efficiency and the customer experience and ensuring a sustainable competitive advantage.

4- Understanding entrepreneurs' attitudes toward technology and how they play their role in the impact of innovation on SMEs.

5- Identifying the specific mechanisms through which digitalization contributes to improving productivity in SMEs.

6- Analyzing the critical success factors for implementing digital systems that connect suppliers, manufacturers, service companies and customers in SMEs.

7- Investigating how digital collaboration between SMEs and their value chain partners affects business sustainability and resilience.



FINAL CONSIDERATIONS

This study analyzed the main contributions of digital transformations to small and medium-sized enterprises (SMEs) over the last 10 years. The technological innovations adopted by SMEs were identified, highlighting the management of IT processes and employees' skills as fundamental to organizational success. The effective application of strategies directly affects company performance, optimizing resources and changing operational efficiency.

Furthermore, the creation of new products was identified as crucial for innovation and maintaining market competitiveness. The provision of competitive advantages becomes feasible through well-defined strategies and the organization's ability to adapt rapidly to market changes. Employees' entrepreneurial behavior is decisive in this context, as it encourages innovation and proactivity, essential characteristics for business performance. The combination of these elements contributes to a dynamic environment conducive to sustainable growth.

With the adoption of digital transformation in SMEs, it was possible to identify several contributions of digital business strategies, which are proving increasingly necessary in a constantly evolving corporate environment. However, promoting changes within organizations involves high complexity, which may hinder the implementation of these strategies.

Furthermore, many companies encounter difficulties when attempting to offer products and services effectively in the digital context. To overcome these challenges, it is essential to invest in continuous improvement, both in technology and in team training. This investment contributes significantly to enriching the decision-making process, allowing companies to become more agile and competitive in the market.

When analyzing the authors' contributions, it is possible to identify several points of agreement, for example regarding the challenges and



opportunities linked to everything surrounding SMEs. Another reinforced point of agreement is the resistance many SMEs show to adopting new contemporary updates. In light of this fact, creating an environment that stimulates the generation and updating of the small or medium-sized enterprise's culture facilitates the digitalization process, as does encouraging creative practices in internal environments.

Recent knowledge about each individual's social responsibility so that the planet proves relevant in the contexts in which SMEs operate. To meet social demands, adopting digital business models provides means for conscious social accountability that also offers benefits to the local community in which the small or medium-sized enterprise operates.

The research made it possible to identify the term digitalization, which refers to the term Digital Transformation. This finding contributes to a better understanding of knowledge on the subject. It was also found that Digital Transformation tends to contribute significantly to social transformation. For this purpose, the process must be linear, enables the creation of new business models, optimizes decision-making and allows cost reductions through the automation of processes and tasks.

The time span is the limitation found in this study; despite covering a period of 10 years, a relevant number of publications could only be identified in the last five years, as no publication relevant to the research was identified between 2014 and 2018, while in 2016 and 2019 there was one publication in each year. Another limitation identified by the study is the fact that the research used only one database.

In this sense, future studies may expand the time span of the analyses, covering a longer period to better capture the evolution of digital strategies in SMEs. Furthermore, it would be beneficial to use multiple multidisciplinary database platforms. This would not only increase the amount of material available



for analysis but also enrich the studies with different perspectives and sources of information, providing a more comprehensive and robust view of digital transformations and their impacts on the business environment over time.

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