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DIGITAL TRANSFORMATION FOR SME DEVELOPMENT AT FOUR LEVELS OF UNIT ANALYSIS –A LITERATURE REVIEW

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Abstract

SME development requires digital transformation in order to create inclusive growth. In light of the scarcity of studies on digital transformation in the context of SME development, this study evaluates available research on the subject using four levels of analysis. The primary goal of this research was to learn about the various determinants of digital transformation. A four-level unit analysis was carried out. A systematic literature study was used to analyze in depth the extant body of literature on various levels of topics linked to unit analysis. Scopus Preview literature sources from 2018 to 2022 were examined using typological agenda unit context, unit analysis, and digital transformation research techniques. The findings of the current study underline the scarcity of comprehensive research studies on digital transformation, particularly those with mixed-method research methodologies, from emerging and developing countries. It is concluded that more studies on SME digital transformation must be conducted across all analytical units. It is therefore proposed studies be conducted in the context of four levels of intervention—individual, organization, ecosystem, and sociocultural—to support DT.

Keywords: Digital Transformation, SME Development, Literature Review

1. INTRODUCTION

As business transformation becomes harder, digital transformation strategies grow in difficulty and complexity, requiring that the organization change its culture, remodel itself and its actors, and integrate technology through human expertise support (Hess et al., 2016). The ultimate contributions of DT to an organization are efficiency and greater customer satisfaction. Achieving digital transformation can therefore be more difficult due to high costs, a lack of sources of knowledge and skills, and resistance to

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change (Sousa-Zomer et al., 2020). This topic is usually fragmented into the issues of digital transformation, digital capability, and digital transformation capability, as these are interrelated concepts for organizational competitiveness in the digital era. Due to their contributions, these issues have been subject to numerous studies (Pan et al., 2022). However, there remains a lack of comprehensive knowledge of digital transformation strategies. This research, aims to fill this gap by conducting a systematic literature review of these issues.

Since the 1950s, businesses have actively pursued digitalization (Lele, 2019). Wilhelm even foresaw the coming of the digital age in 1703, but researchers did not take interest in the subject until the early 21st century (Khin and Ho, 2019). Later, a suitable study was expanded to include a definition of "digitalization" (Pan et al., 2022).

Digitalization itself refers to the conversion of reference data into a form that can be stored, processed, and transmitted by computers (Dougherty and Dunne, 2012; Loebbecke and Picot, 2015). Data is transformed through "digitalization", also called "digital adoption". Digitalization does not exist in isolation; enabling the required technological strategies allows digitalization and change to occur. Digitalization includes plans to automate certain business processes with computers (Li et al., 2021). Digitalization uses computer-assisted automation to change current business processes and introduce business automation (Li et al., 2016), including rapid changes in business networks such as communication channels and customer communication strategies (Ramaswamy and Ozcan, 2016).

Digital capability (DC) refers to the ability to employ digital automation to reshape business strategies (Khin and Ho, 2019). DC is the ability to apply computerized automation to produce rapid business mechanisms. DC includes not only digital technology competency and emotional skills (Teece et al., 1997), but also competency in data management, agile development, and IT infrastructure adoption (Levallet and Chan, 2018).

The use of computerized automation to develop technological modernization and revolution of company types, organizational operations, and other aspects, to improve automated work is known as digital transformation (DT) (Aguiar et al., 2019). As digitalization is fundamental in business mechanisms, it signifies a confirmed beginning for organizational automation processes. DT fully utilizes different automated processes to build and modernize various elements such as company types, organizational types, and essential variables such as high-tech revolution, deep integration of technology, and real economics (Schuh et al. al., 2020). This encompasses both digitalization and digital transformation (Gebayew et al., 2018), as well as the implementation and consequences of automated modernization processes (Bounfour, 2016). The research focus has shifted from digital technologies to organizational change (Ilvonen et al., 2018). This is a cross-system transformation of approach, organization, and IT (Verhoef et al., 2021). In the context of digitalization, DT includes a broader spectrum, greater volume, and deeper scope.

Digital transformation capability (DTC) refers to an organization's ability to create, improve, or tailor data-driven capabilities objectively and use data as primary signals, such as information and control strategies (Li et al., 2018). DTC includes the ability to produce, modernize, or objectively develop the organizational, business, and managerial skills, to take a digital approach to innovation in a digital situation (Warner & Wäger, 2019). It is a type of dynamic management capability (DMC) that exists in digital revolution and includes both technical capabilities and multiple-components functions such as organizational transformation and management (Vial, 2019).

Based on the above literature explanation, the concepts of digitalization are intercorrelated, but there are also differences. Recent research also describes ideas related to digital transformation, but researchers have yet to reach a consensus and there is

need for further explanation (Aguiar et al., 2019). This research aims to explore this topic more deeply.

Successful businesses today are actively modernizing their business processes and business models by implementing digital technology (Fitzgerald et al., 2013). Digital transformation refers to detailed improvements in organizational capacity and performance, driven by IT stimuli across the entire human resource body (Li et al., 2018). Additionally, small- and medium-sized businesses (SMEs) are now going through a considerable shift due to digitalization (Frau et al., 2022). The rapid advancement of digital technology and the vast amount of information a machine can acquire in a single day are forcing SMEs to alter their business strategies to provide proper value (Frau et al., 2018). Literature from the past indicates that technology supports SMEs, boosts primary strategy transition, and improves consumer recognition (Li et al., 2018). Technology may assist SMEs in becoming more agile in their responses to market developments, increasing their value (O'Connor & Kelly, 2017). In the current environment, digital transformation offers crucial growth opportunities for SMEs (Garzoni et al., 2020).

This statistic is based on research and reports (Nwosu et al., 2016) showing that SMEs are essential for the world; SMEs are central to economic growth, job creation, and poverty reduction. On the other hand, the lack of advanced technology and human digital infrastructure means the death of advanced entrepreneurship, especially for new ventures (Bullini Orlandi et al., 2021).

The most challenging components of the effort to overcome this obstacle will be the inclusive connection of the determinants at the individual, organization, ecosystem, and socio-cultural contextual levels. The fragmented and disconnected nature of the determinants leads to a lack of coordination and collaboration in DT efforts. Due to the scarcity of theoretical and practical research on digital transformation and SME development (Aguiar et al., 2019), the questions raised in the current study are "What is the current state of the art of digital transformation for SME development?" and "What are the precursors of digital transformation for the development of SMEs?"

Previous investigations have failed to totally examine these determinants. This limitation has set a research gap which requires further investigation. Thus, this study was conducted with the objective of exploring the determinants of digital transformation and the methods used to study DT in the context of SME development.

2. METHOD

This research aims to identify the knowledge associated with the current gap in the literature on digital transformation and its antecedents. Consequently, it is critical to focus on "digitalization" and "SMEs" as components of the setting for the literature review.

This study employed a systematic review, a method for identifying, assessing, and compiling information on a particular issue, subject, or field of study (Kitchenham, 2004). This method was used based on the PRISMA technique, which counts, categorizes, and rates learning-appropriate work.

Shown in Figure 1:

Step1: Identification

Scopus Preview searches for an online bibliometric analysis were conducted in June 2022 using the keywords "digital transformation" and "SME development". In this step, searches for articles published during the 2018–2022 period were conducted. Scopus was selected for its comprehensive database with contents comprising natural and social sciences literature (Colevins, 2007).

Step 2: Screening

Articles on "digital transformation" and "SME development", as well as their determinants, were selected based on their titles and abstracts. This process reduced the number of articles to 128, with the scope restricted only to the areas of sociology, economics, and management.

Step 3: Eligibility

In this step, 63 articles were selected. Articles were counted as eligible (meeting the inclusion criterion) if they explored "digital transformation" and "SME development", as well as their drivers, in the perspectives of sociology, economics, and management. Additionally, the articles were required to discuss the determinants of the digital transformation of SMEs.

Step 4: Inclusion

In the final step, 38 articles meeting the specified criteria were selected. As this research focused on "digital transformation" and "SME development", the research themes of priority were "digital transformation" and "SME development". Given that "digital transformation" and "SME development" are relevant in various sectors, the selected papers will help with the implementation of "digital transformation" in various fields. As the focus of this study was the digital transformation of SMEs, other articles on unrelated issues were eliminated. The papers reviewed in this study were chosen from particular research bibliographies. Figure 1 depicts how research catalogue selection was carried out in this study. Scopus Preview was used due to its extensive collection of bibliographies. Reliable and relevant research papers were carefully picked and examined. Many strategies can be used to classify papers, including the use of paper citations. However, when this strategy is used, multiple reports may be suggested and therefore a more effective strategy is needed for categorizing articles.

Keywords were organized in advance, establishing the basis for document sources, in order to limit the paper results. To confirm the quality and reliability of the current systematic review, it was critical to limit the findings only to relevant research papers meeting the inclusion criteria. However, this was not done to an excessive extent to avoid bias (Pudovkin & Garfield, 2002). The search strategy employed was to read carefully the content of each of the selected papers and then evaluate and classify only articles relevant for discussion. The bibliographic search was limited only to articles published in the period 2018–2023 which involved discussion of DT from the perspectives of sociology, economics, or management. However, bias could not be completely eliminated due to the tendency of the author as an evaluator. A limit was applied to ensure paper relevance as suggested by the PRISMA technique.

The chosen research papers were analyzed in depth. Each selected paper was investigated at specified stages to extract its content, objectives, and results. The selected

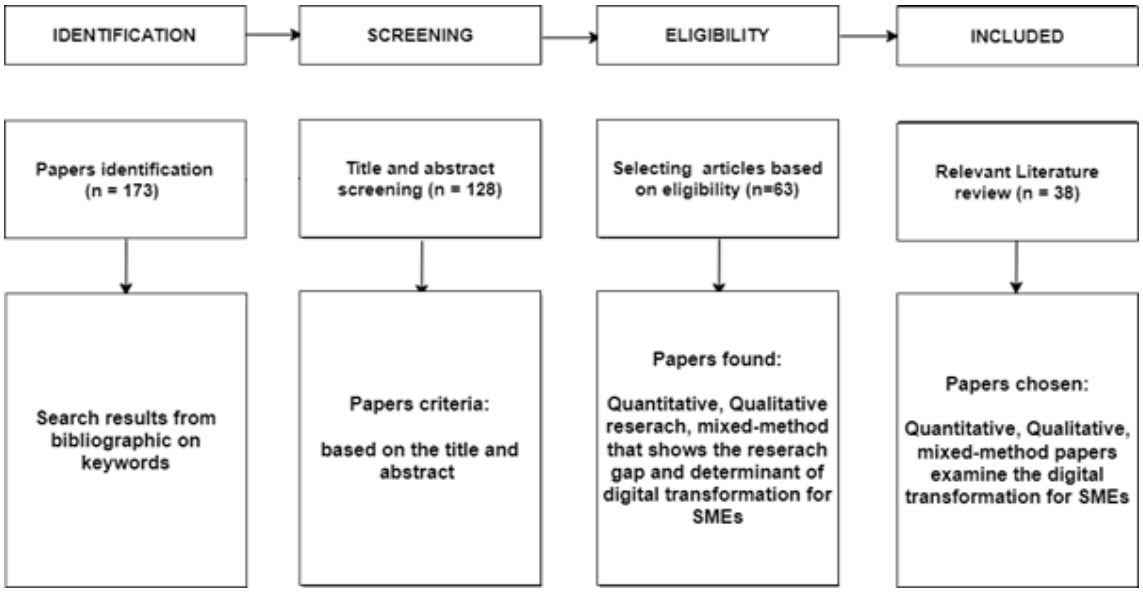

Figure 1 Flow of Literature Search Using the PRISMA Approach (Moher et al., 20009)

Table 1 Reviewed Papers

No	Author	Country	Objectives	Unit Analysis				Method	Determinant
				Individual	Organization	Ecosystem	Context		
1	Jafari Sadeghi et al., (2022)	Iran	To find out DT in individual level of internationalization SMEs	√				Mixed-method	Owners' behavior and action
2	Ates & Acur, (2022)	China	To define DT in a high-tech manufacturing SME		√			Qualitative - a case study	Non-cognitive dynamic capabilities
3	Ben Slimane et al., (2022)	Global	To define the salient managerial dimensions of building a DT strategy		√			SLR	1. Digital infrastructure and process; digital management involvement 2. Organizational and managerial mechanisms 3. Responsibility of senior management
4	Brodny & Tutak, (2022)	Bulgaria, Czech, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, Slovakia	To know the level of digitalization and its impact to economic level		√			Qualitative-multiple case studies	Organizational capabilities
5	Candelo et al., (2022)	Italy	To know the DT in small retailers via stakeholder theory			√		Mixed-method	Stakeholder affair founded on trust, collaboration and empowerment
6	Chatterjee et al., (2022)	India	To define the determinant of DT	√				Quantitative-survey	Perceived usefulness, perceived ease of use, willingness to change, and adoption
7	Dąbrowska et al., (2022)	Global	To explore multi-level research agenda for DT	√	√	√	√	Qualitative-conceptual	1. Individual level: Behaviors, perceptions, emotions, skill, capabilities Top management team and leadership

Table 1 (Continued)

No	Author	Country	Objectives	Unit Analysis				Method	Determinant
				Individual	Organization	Ecosystem	Context		
									2. Organizational level: Strategy and strategic responses to digital transformation Change and organizational design Building (digital) capabilities Changes in value creation and capture logics 3. Ecosystem level: Digital affordances Orchestrator-centric view vs. systems community view 4. The geopolitical-level: Data The geopolitical transformation Intellectual property rights Digital competitive strategies
8	Endrodi-Kovács & Stukovszky, (2022)	Hungary	To find scale of DT of SMEs				√	Qualitative	Government's support
9	Heider et al., (2022)	Germany	To examine the role of family capability and family willingness for DT		√			Quantitative	Organizational ability and family willingness for DT
10	Huang et al., (2022)	China	To examine the impact of government policy to digitalization				√	Qualitative	Government policy
11	Kolagar et al., (2022)	Global	To examine how manufacturing firms engaged in DT		√	√		SLR	Organizational level: Culture, business model and capabilities Ecosystem level: Synchronizing with fast paced market change, novel customer demands and

Table 1 (Continued)

No	Author	Country	Objectives	Unit Analysis				Method	Determinant
				Individual	Organization	Ecosystem	Context		
									readiness, and filling technology and resource gaps
12	Khurana et al., (2022)	India	To explore DT for SME during a crisis		√			Qualitative multiple case studies	Dynamic capabilities
13	Kraft et al., (2022)	Switzerland	To know the position of SME's director understanding of DT	√				Qualitative - multiple case studies	SMEs' manager knowledge on DT
14	(Martín et al., (2022)	Spain	To explore the determinant that affect the DT in the restaurant industry	√	√			Quantitative	Individual level: Characteristics of entrepreneurs/manager Organization level: Characteristics of businesses and Locational factors
15	Pan et al., (2022)	China	To build DT for SME		√			Qualitative	Technological change capability, strategic and organizational change capability, and management change capability
16	Raimo et al., (2022)	Italy	To explore the determinants of DT		√			Quantitative	Firm size, firm profitability and financial leverage
17	Rupeika-Apoga et al., (2022)	Latvia	To explore public support for DT		√			Mixed-method	Staff training, mentoring and increasing the potential workforce to tax relief and direct financial support
18	Sassanelli & Terzi, (2022)	Europe	To know the role of ecosystem in supporting DT			√		Qualitative-conceptual	Multiple inter- and intra-communications and collaborations among stakeholders
19	Straková et al., (2022)	Czech	To know digital transformation of business model		√			Quantitative	Value-creating processes and supporting processes
20	Tajudeen et al., (2022)	Malaysia	To know the role of DT and the impact of IT		√			Quantitative	Digitalization vision, and Information technology strategy

Table 1 (Continued)

No	Author	Country	Objectives	Unit Analysis				Method	Determinant
				Individual	Organization	Ecosystem	Context		
21	Yu et al., (2022)	China	To know how SMEs DT during re-internalization		√			Qualitative multiple case studies	Strategic digital transformation and new product development
22	Buck et al., (2021)	Global	To develop an integrated framework for DT		√			SLR	Customer, value proposition, operations, data, organizational structure, human resource, transformation management, culture
23	Del Giudice et al., (2021)	Italy	To investigate determinants of DT		√			Quantitative	Agility, adaptation, and ambidexterity
24	Ismail et al., (2021)	Malaysia	To explore the mediating role of creativity in DT	√				Quantitative	Creativity
25	Matarazzo et al., (2021)	Italy	To examine the impact of DT on customer value creation		√			Qualitative multiple case studies	Sensing and learning capabilities
26	Moi & Cabiddu, (2021)	Italy	To know the role of agility in leading a DT		√			Quantitative	Agile marketing capability
27	Porfírio et al., (2021)	Portuguese	To know the impact firms' characteristics, associated with management characteristics in DT		√			Quantitative	Firm characteristic and management characteristic
28	Rusly et al., (2021)	Malaysia	To know internal forces that formed the DT for SME		√			Qualitative	Business strategy, value creation, digital leadership and digital talent
29	Scuotto et al., (2021)	Europe	To know the relevance of individual digital capabilities for SMEs' growth	√				SLR	Individual digital capabilities: information, communication and software skills
30	Singh et al., (2021)	India	To identify the determinants of DT		√			Quantitative	Competitive pressure, organizational mindfulness, IT readiness, and strategic alignment

Table 1 (Continued)

No	Author	Country	Objectives	Unit Analysis				Method	Determinant
				Individual	Organization	Ecosystem	Context		
31	Anim et al., (2020)	Ghana	To know the concept of the DT process		√			Qualitative-multiple case studies	Managerial cognition, social capital development, human capital development, and organizational capacity building
32	Becker & Schmid, (2020)	Germany,	To know DT strategy		√			Qualitative-case study	Lack of available resources, low perception of external pressures, low intentions to use and low current use of digitalization
33	Fachruninisa et al., (2020)	Indonesia and Malaysia	To know the role of agile leadership and strategic flexibility to DT	√	√			Quantitative	Agile leadership, workforce transformation and dynamic capability
34	Lin et al., (2020)	Singapore	To define a dynamic capability-based framework		√				Dynamic capability–process, technology, organization, and transformation
35	Bouwman et a., (2019)	Europe	To know the determinant of DT		√			Quantitative	Business model
36	Hansen, (2019)	China	To know digital entrepreneurship and the impact of digitalization				√	Qualitative cases study	Supportive political, economic and social environment
37	Nair et al., (2019)	India	To develop and test a framework to analyse the antecedents to organisational preparedness for adoption of DT	√	√			Qualitative cases study	Pressure from customers, owner's age, sales of SME, owner's attitude towards IT and owner's knowledge of IT
38	Busquets, (2018)	Spain	To explore the challenges of DT			√		Qualitative cases study	1. New digital entrants 2. The digitalization trends 3. The digital effects on financial system

publications were then categorized the into "advanced-country" and "developing-country" articles employing approaches relevant to the results, methodologies, and objectives of the articles. Finally, the issues of the works were covered. The systematic review process is illustrated in Figure 1.

To conduct classification, it is crucial to limit this study by publishers and paper editions. For this classification to be valid, techniques like information retrieval and text-checking were required to ensure the fulfilment of applicable criteria. In addition, expert opinions were also elicited from the study's co-authors, which is imperative according to Walczak & Kellogg (2015) This explains why research requires a strict article classification structure (Denyer et al., 2008). Numerous studies use small business owners and entrepreneurs as research subjects to investigate initiatives for supporting SMEs (Ferdilan et al., 2021).

Social research involves a number of analytical units. Although the individual is the most common test unit, many research questions may be better addressed by examining other units. Thus, social scientists may examine social activities through the lens of individuals, groups, organizations, or institutions in physical, cultural, and social environments (Rosenberg, 1968). John and Lofland (1995) analyzed roles, organizations, linkages, and the social environment, while others have proposed that these units may be people, groups, locations, or cultures (Babbie, 2007; Yurdusev, 1993). DT studies persons, organizations, ecosystems, macro-socio-cultural situations, and political settings (Autio et al., 2018; Dbrowska et al., 2022; Vial, 2019; Hanelt et al., 2021; Hess et al., 2016; A. Singh et al., 2020). In this research, the four main units of analysis were the individual, organizational, ecosystem, and socio-cultural contexts.

3. RESULTS

Table 1 contains 38 publications on the elements of management impacting "digital transformation" and "SME development" that used quantitative, qualitative, or blended methodologies. The individual, group, organizational, and societal management elements that contribute to "digital transformation" and "SME development" are examples of management factors. Most of the 38 research works conducted unit analysis at the European and organizational levels.

Using the keywords "digital transformation" and "SME development", the Scopus search generated 1749 articles. Due to the issue-based limitation applied, the arti-

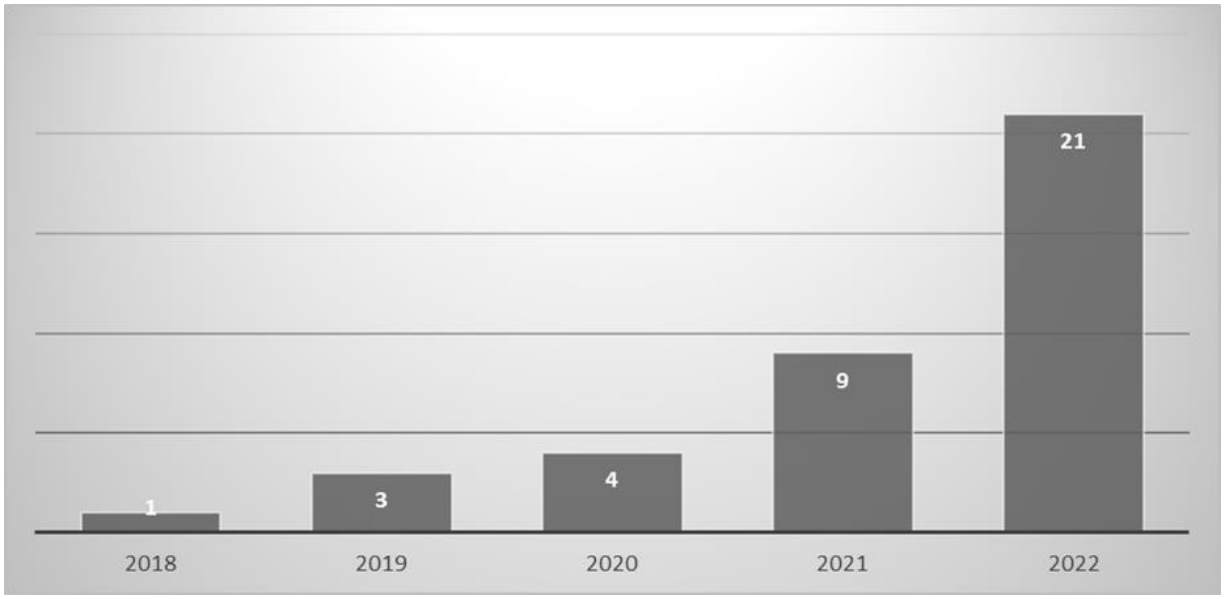

Figure 2 The Papers Selected by Year

cles were sorted and studied. The next stage was to select publications based on peer-reviewed titles, abstracts, and duplicates. The total number of selected papers in this stage was 173. The final stage involved skimming, scanning, and thoroughly studying the papers on "digital transformation for SME development". It was discovered that some studies had keywords irrelevant to the issue of this study, were too far from correlating with "digital transformation for SMEs development", or did not discuss the issue of this study, which were then removed. An example of such a study was an article on how capital markets and government policies affect SMEs in the digital age by Sogah et al. (2022). Thirty-eight papers on digital transformation for SMEs development published between 2018 and 2022 were ultimately selected for review The current research was limited as many of the selected publications required scheduling for further scrutiny, causing the study to take longer to complete. The topic classification was based on the notion that digital transformation concept execution is related to the development of SMEs. Individuals, organizations, ecosystems, and social, cultural, and political settings were chosen as units of analysis as they are known to alter in practice depending on how the unit analysis is performed. Table 1 lists the papers that were chosen.

This study covered a variety of publications built on the methodological foundation. In this research, some of the exploratory literature generated from Scopus Preview discussed digital transformation. Due to the nature of the papers, some irrelevant papers were removed and some others were also eliminated. Some studies treated digital transformation as a separate subject and elaborated on it minimally, while others only made mention of the term without any further elaboration on it. As a clear strategy or technique related to digital transformation was required, such articles were not accepted.

3.1 Paper Classification by Context

Table 1 presents the most current DT studies in the context of SMEs. These studies examined a variety of strategies related to DT. These DT for SMEs development research articles were primarily based in European countries, or written from a Western perspective, with established research funding, digital maturity, language barriers, cultural differences, and access to technology. The majority of digital transformation papers were from the West and advanced economies such as Estonia, Lithuania, Poland, Slovenia, Slovakia (Brodny & Tutak, 2022; Straková et al., 2022), Czech Republic (Becker & Schmid, 2020; Heider et al., 2022), Latvia (Brodny & Tutak, 2022; Rupeika-Apoga et al., 2022), and Italy (Kraft et al., 2022). In addition, there are two publications from developing and growing European nations, namely Hungary (Brodny & Tutak, 2022; Endrodi- Kovács & Stukovszky, 2022) and Romania (Brodny & Tutak, 2022).

Other studies were conducted Europewide (Bouwman et al., 2019; Sassanelli & Terzi, 2022; Scuotto et al., 2021). Surprisingly, no articles from the United States and Australia were included. It is possible that the search terms or the specific databases used might have limited the results. The second greatest number of publications originated from Asian nations with burgeoning power and developing Asian economies, such as China (Ates & Acur, 2022; Hansen, 2019; Huang et al., 2022; Pan et al., 2022; Yu et al., 2022), India (Chatterjee et al., 2022; Khurana et al., 2022; Nair et al., 2019; S. Singh et al., 2021), Iran (Jafari Sadeghi et al., 2022), Indonesia (Fachrunnisa et al., 2020), and Malaysia (Ismail et al., 2021; Rusly et al., 2021; Tajudeen et al., 2022), as well as from an Asian developed country, Singapore (Lin et al., 2020). Another DT study was conducted in Ghana, Africa (Anim-Yeboah et al., 2020). Papers with worldwide views were also available (Ben Slimane et al., 2022; Buck et al., 2021; Dbrowska et al., 2022; Kolagar et al., 2022).

According to Table 1, China and Italy contributed 5 papers each, Malaysia and India 4 papers, and the Czech Republic,

Germany, Latvia, Hungary, and Spain 2 papers. The emergence of SMEs in the US, Australia, Africa, "Western" developing nations, "non-Western advanced economies", and other populous emerging countries in Asia outside China and India, such as Indonesia, still requires additional investigation. The "other" viewpoints will add to theoretical and application-related knowledge.

3.2 Paper Classification by Research Methods

The selected papers' methodologies were thoroughly examined to understand their perspectives, methods, results, and limitations. The analysis conducted was concerned with sampling techniques, approaches, and proposed solutions. It is critical to take a look at this categorization to understand the notion of DT in SME contexts from the perspective of the techniques used to determine the positions of contemporary academics regarding this issue. Most prior research has used qualitative methodological viewpoints, with semi-structured interviews and case studies, as they enable academics to thoroughly investigate and comprehend the complex and context-specific nature of digital transformation. Some have also employed quantitative survey methods and mathematical statistical approaches such as regression analysis. Others have utilized blended-techniques approaches as they are wider in assessment scope than the qualitative or quantitative approach alone.

According to Figure 3, most publications were conducted qualitatively. Other studies, on the other hand, used quantitative and mixed-methods approaches. Surprisingly, the

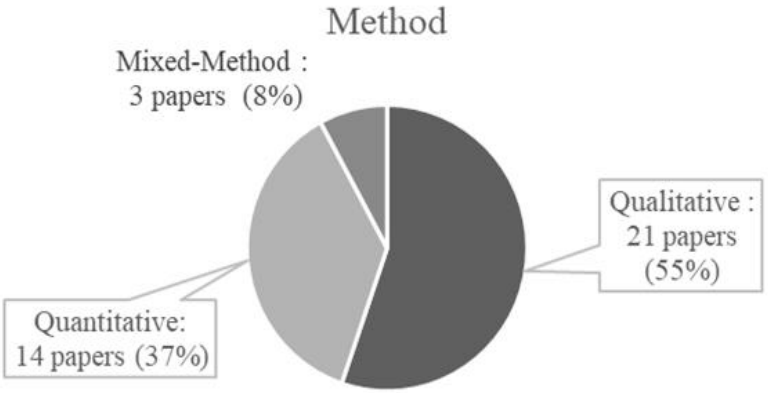

Figure 3 Research Methods

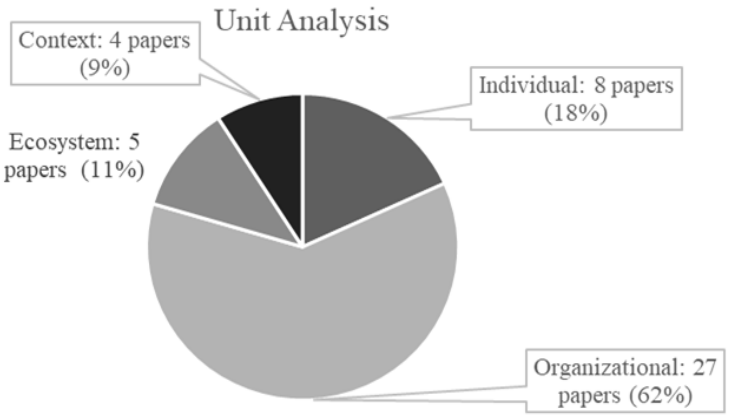

Figure 4 Units of Analysis

Table 2 Determinants of DT at Four Levels of System

Individual	Organization	Ecosystem	Social Cultural Context
1. Behavior and action	1. Non cognitive dynamic capabilities	1. Synchronizing with fast paced market change	1. Data
2. Perceived usefulness	2. Digital infrastructure and process	2. Novel customer demands and readiness	2. The geopolitical transformation
3. Perceived ease of use	3. Digital management involvement	3. Filling technology and resource gaps	3. Intellectual property rights
4. Willingness to change	4. Organizational and managerial mechanisms	4. Multiple inter- and intra-communications	4. Digital competitive strategies
5. Adoption of DT	5. Responsibility of senior management	5. Collaborations among stakeholders	5. Government's support
6. Perceptions	6. Organizational capabilities	6. New digital trends	6. Government's policy
7. Emotions	7. Strategy and strategic responses to DT	7. The digitalization trends	7. Supportive political, economic and social environment
8. Skills	8. Change and organizational design	8. The digital effects on financial system	
9. Capabilities	9. Building (digital) capabilities		
10. Leadership	10. Changes in value creation and capture logics		
11. Knowledge on DT	11. Organizational ability and willingness for DT		
12. Characteristics of entrepreneurs / manager	12. Organization culture		
13. Creativity	13. Business model		
14. Digital capabilities: information, communication and software skills	14. Dynamic capabilities		
15. Agile leadership	15. Characteristics of businesses		
16. Owner's age	16. Locational factors		
17. Owner's attitude towards IT	17. Technological change capability		
18. Owner's knowledge of IT	18. Strategic and organizational change capability		
	19. Management change capability		
	20. Firm size		
	21. Firm profitability		
	22. Financial leverage		
	23. Staff training, mentoring and increasing the potential workforce		
	24. Tax relief		
	25. Direct financial support		
	26. Value-creating processes		
	27. Supporting processes		
	28. Digitalization vision		

Table 2 (Continued)

Individual	Organization	Ecosystem	Social Cultural Context
	29. Information technology strategy		
	30. Strategic digital transformation		
	31. New product development		
	32. Customer		
	33. Value proposition		
	34. Operations		
	35. Data		
	36. Organizational structure		
	37. Human resources		
	38. Transformation management		
	39. Organization culture, agility, adaption and ambidexterity		
	40. Sensing and learning capabilities		
	41. Agile marketing capability		
	42. Firm and management characteristic		
	44. Value creation		
	45. Digital leadership and talent		
	46. Competitive pressure		
	47. Organizational mindfulness		
	48. IT readiness		
	49. Strategic alignment		
	50. Managerial cognition		
	51. Social capital development		
	52. Human capital development		
	53. Organizational capacity building		
	54. Perception of external pressures		
	55. Intentions to use and low current use of digitalization		
	56. Workforce transformation		
	57. Dynamic capability-process, technology, organization, transformation		
	58. Pressure from customer		

majority of publications investigated digital revolution and presented frameworks without quantitative validation. However, these qualitative publications did provide validating frameworks for future study (e.g., Buck et al., 2021). As digital transformation is complex, most previous research has been conducted qualitatively to explore the issue.

3.3 Paper Classification by Unit Analysis

The methodologies of the selected articles were thoroughly examined to determine the articles' stance and the units of analysis regarding digital transformation for the development of SMEs. Classification by unit breakdown was performed to identify research gaps.

Figure 4 shows that most papers discussed the issue at the organizational (62%) and individual levels (18%). Only a few papers discussed the issue at the ecosystem (11%) and social, cultural, and political context level (9%). Digital transformation is not only about the individual running the business or the business itself, but it involves various actors and systems. Additional studies at the ecosystem and social, cultural, and political environment levels are thus required to understand how to promote DT, particularly for SMEs with limited resources.

3.4 Paper Classification by DT Antecedents

The performed search found 38 studies on antecedent factors influencing DT performance, as shown in Table 2. The four categories of DT formulae were individuals, organizations, ecosystems, and social-cultural and political contexts.

As shown in Figure 5, individuals (i.e., owners) are critical in digital transformation as it is these individuals who embrace it. The transition in DT adoption subsequently occurs at the organizational level. Meanwhile, stakeholders ultimately assist at the environmental and social, cultural, and political context levels.

Policymakers might use these findings as instruments to implement DT in their areas. Additionally, these findings will support theories as a framework for DT in a DT-associated four-level system. Individual, organizational, ecological, and socio-cultural context frameworks that incorporate these four levels may help policymakers in achieving digital transformation.

In order to organize the available information on digital transformation in enterprises, policymakers might analyze the current research on digital transformation. Policymakers have the ability to build an

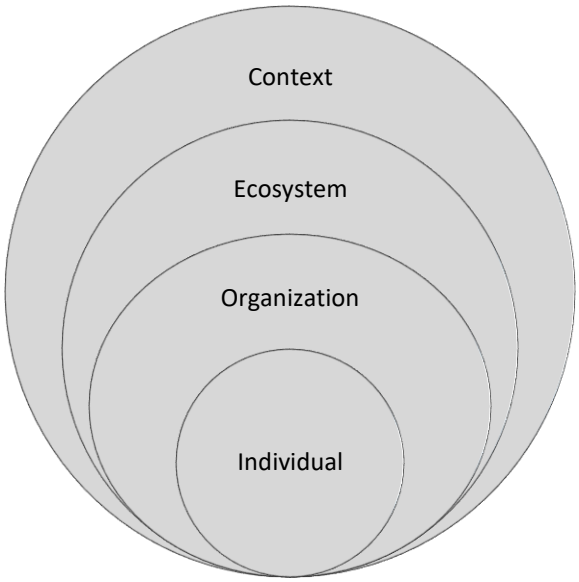

Figure 5. The four levels of an inclusive DT intervention

all-encompassing framework for digital transformation that takes into account all aspects of policy, such as access, usage, innovation, employment, society, trust, and market openness. It is important that the framework be all-encompassing and that it be in harmony with the organization's overarching goal and vision. When putting digital transformation into practice, policymakers should acknowledge the inherent dignity of each person, guarantee that digital transformation is inclusive for all people, and take into account the specific requirements of each person. It is also important that policymakers take the organizational, ecosystem, and sociocultural contexts into account and make sure that all organizational, ecosystem, and sociocultural requirements are considered. Literacy in digital technology may be promoted by policymakers as a means of ensuring that people have the skills required to participate in the digital economy. It is imperative that policymakers address the digital gap in order to guarantee that all persons have access to digital technology and are able to take part in the digital economy. In order to facilitate digital transformation in a manner that takes into account the requirements of society, policymakers should foster cooperation between organizations and stakeholders. Sharing best practices and working together towards similar objectives may be facilitated via collaborative efforts across companies. It is the responsibility of policymakers to provide companies with necessary assistance and resources to assist them in undergoing digital transformation. This may include access to finance and funding for training programs, as well as access to technology and experience (OECD, 2019).

4. DISCUSSION

The current research on DT for SME development shows a crucial need for a solution to encourage SMEs to adopt DT. Most pieces of literature on DT for SME development come from Europe and Asia, with only one paper from Africa, and none from US or Australia. It is interesting that a number of papers originate from Asian countries, such as China, India, and Malaysia, showing that DT has spread not only in Europe, but also Asia. Based on the findings, China, as an emerging economy in Asia, has been expanding DT. By adopting DT, various high-tech manufacturing SMEs (Ates & Acur, 2022) or SMEs that have gone international (Yu et al., 2022) have gained competitive advantages. However, this adoption of DT requires the assistance of various parties, particularly the government as a crucial player in DT adoption for SMEs (Huang et al., 2022), for political, economic, and social support (Hansen, 2019). Malaysia, one of the countries in Asia, has four research publications on this subject. It is intriguing that Malaysia, despite its small population, generates a high number of papers on this subject. It might be due to a policy requiring collaboration with scholars from other nations, including Indonesia. The partnership strategy is an efficient way to pool the resources of all parties (Ferdilan et al., 2022). Other emerging and populous countries, especially in Asia, such as Indonesia, should learn from China on how to implement digital transformation for SMEs, given that China has conducted a digital revolution with an inclusive action that engages various stakeholders to facilitate an environment supportive of digital transformation. This inclusive action is critical since SMEs are a great influence for a country's economic growth as job creators and poverty alleviators (Nwosu et al., 2016).

DT adoption is even more critical. The data shows that mixed-methods and quantitative approaches are essential in implementation. The existing body of literature remains in the exploratory stage, where data have been acquired through case studies and observations. Only three articles used a mixed-methods approach to investigate and validate information, namely those articles by Jafari Sadeghi et al. (2022) in Iran, Candelo et al. (2022) in Latvia, and Rupeika-Apoga et al. (2022) in Italy. This mixed-methods approach should also be carried out in China, which has the greatest number of DT articles.

The results might serve as a foundation for DT in other countries, particularly those in Asia.

Previous research has investigated DT determinants. Such past studies were split by units of analysis. However, they are still in the early stages of inclusion. There has yet to be any study which demonstrates a complete understanding of DT. For practical purposes, this study reviewed articles on DT from four angles. Many scholars, too, have sought to examine this problem from their respective practical experiences. If the nature of DT is considered, this tendency is plausible. Much research related to the definition of DT influences the evolution of the idea of digitalization itself. This study examined DT factors at the individual, organizational, ecosystem, and social-cultural-political context levels. The four levels, according to existing literature, account for DT as follows:

(1) Individual: As DT has a significant impact on individuals, businesses must frequently gain an understanding of human viewpoints of DT (Frankiewicz & Chamorro, 2020; Davenport & Redman, 2020). Existing evolutionary information about individual views is divided into two categories: entrepreneurs organize a precise combination of talents (Karimi & Walter, 2015; Davenport & Redman, 2020) or examine skills, competencies, and reorientation as SME owners (Ritala et al., 2021; Amabile, 2020; Baptista et al., 2020; Pagani & Pardo, 2017; Solberg et al., 2020; Ulhi & Nrskov, 2021; Wang & Siau, 2019).
(2) Organization: DT in an organization involves various changes to the leadership, business model, structure, capabilities, processes, and skills (Cennamo et al., 2020; Hanelt et al., 2021; Orlikowski, 1996). Successful DT requires both individual and organizational strategies that are all-inclusive (Mention, 2019; Nadkarni & Prügl, 2021; Rogers, 2016).
(3) Ecosystem: The combined efforts of multiple parties to articulate and advance an ecosystem aim to combine collective and individual targets (Dattee et al., 2018; Jacobides et al., 2018; Radziwon et al., 2017). The ecosystem enables privileged access to various necessary capabilities, including technology and talents (Aarikka-Stenroos & Ritala, 2017; Cobben et al., 2022). The ecosystem aids DT in ensuring the participation of all parties (Cusumano et al., 2019; Gawer, 2021; Thomas et al., 2014).
(4) The social-cultural-political context refers to the management study's systemic approach as part of society, culture, and politics (Geels, 2002). It relates to the macroeconomic landscape (Brem & Radziwon, 2017; Geels & Schot, 2007). Previously, socio-cultural diversity was covered (Asheim & Coenen, 2005; Nonaka & Takeuchi, 1996). It now also covers the news and political circumstances that drive DT (Brem & Nylund, 2021; McAfee, 2019).

As shown in Table 2, the four factors influencing DT efficacy are relatively new (in 2018). This trend becomes more significant when examined from a practical standpoint. There arises the question of why SMEs choose DT or what advantages DT has. This research considers that most selected publications were not particularly interested in this issue. This study anticipates analysis and research on how to operate inclusive DT inside a country and brings value by employing an inclusive DT model.

Policymakers can create digital transformation through a connection with the individual, organizational, ecosystem, or socio-cultural context by reviewing existing research, developing a comprehensive framework, considering impacts on the individual, organizational, ecosystem, or socio-cultural context, promoting digital literacy, addressing the digital divide, encouraging collaboration, and providing support and resources to organizations. By considering these factors, policymakers can ensure that digital transformation is implemented effectively and efficiently in all contexts (OECD, 2019).

Based on the empirical evidence presented in this research, the following recommendations can be proposed for

professionals, policymakers, or small- and medium-sized enterprise (SME) proprietors.

Small- and medium-sized enterprise (SME) proprietors can strategically prioritize the integration of digital technologies through a systematic four-tier framework. This framework commences with cultivating digital awareness, followed by conducting digital inquiries, starting digital adoption, and ultimately performing comprehensive digital transformation.

Organizations may also prioritize efforts to address the technological knowledge gap within their respective areas. In the context of policymaking, it is imperative for policymakers to formulate a comprehensive framework pertaining to digital transformation. This framework should encompass all relevant policy dimensions, such as access, utilization, innovation, employment, societal impacts, trust, and market openness.

In addition, these initiatives have the potential to facilitate digital literacy, mitigate the digital divide, foster collaborative efforts, offer assistance and resources to various entities, and prioritize the cultivation of digital culture and competencies.

For practitioners, it is recommended to prioritize the implementation of cost-effective solutions aimed at enabling small and medium enterprises (SMEs) to adopt Industry 4.0 technologies. Organizations may utilize the strategic framework for achieving a digital transformation success within the context of Industry 4.0 to effectively steer their digital transformation endeavors.

For the benefit of all parties involved, it is recommended that stakeholders prioritize the implementation of a wider range of research methodologies, such as mixed-methods research, case studies, and longitudinal study methods. These approaches will facilitate a more holistic comprehension of the phenomenon of digital transformation within small- and medium-sized enterprises (SMEs). In summary, the research findings can serve as a valuable resource for SME owners, policymakers, practitioners, and other relevant stakeholders, offering guidance for the successful implementation of digital transformation initiatives within SMEs. This utilization of the research findings can contribute to the effective and efficient execution of digital transformation strategies in the context of small- and medium-sized enterprises (OECD, 2019).

5. CONCLUSSION

This research reviewed scientific publications on DT for SMEs. There must be further research on this subject as thorough as this research. The literature assessment conducted indicates that the gap in research on DT for SMEs is relatively new. Despite the fact that digital transformation is a mature field and that there are numerous systematic studies available, there are few detailed articles on DT in SMEs. Not many pieces of literature were discovered when the phrases “digital transformation” and “SME” were inputted for a search. This study gap suggests that policymakers should place a greater emphasis on digital transformation in small- and medium-sized enterprises (SMEs). Reviewing existing research, developing a comprehensive framework, considering impacts on the individual, organizational, ecosystem, and socio-cultural context, promoting digital literacy, addressing the digital divide, encouraging collaboration, or providing support and resources to organizations, can be performed by policymakers to bring about digital transformation that is connected to the individual, organizational, ecosystem, or socio-cultural contexts. Policymakers can guarantee that digital transformation is executed successfully and efficiently in all circumstances by taking into consideration the elements listed above.

In addition, future studies might look at four characteristics that could modify the effects of DT. It is possible to investigate the complexities, but investigations of a fitting DT might provide unique knowledge from a restricted data source by employing inclusiveness. Due to its advantages, DT in SMEs was explored at the individual, organizational, ecosystem, and social-cultural-political context levels in the present

research. As there has yet to be any exclusive study on DT, it is suggested that future research focus on DT in SMEs in populous countries like Indonesia or Brazil.

There are insufficient low-cost real-world implementations of digital transformation for small- and medium-sized businesses. In the future, research may concentrate on finding low-cost solutions for small- and medium-sized businesses to adopt 4.0 technology. According to research, there is a knowledge gap regarding technical advancements among SMEs. In the future, research may concentrate on finding solutions to close this gap and raise the digital maturity level of SMEs. The determinants of successful digital transformation in small- and medium-sized businesses are potential subjects for future studies. This may entail conducting research on the characteristics that lead to successful digital transformation in small- and medium-sized businesses. Future studies may also focus on investigating the connection between digital transformation and the performance of small- and medium-sized enterprises (SMEs). Examining the effect that digital transformation has on the development and competitiveness of small- and medium-sized businesses might be one example of this. The influence of the COVID-19 pandemic on the digital transformation of SMEs is also a recommended subject of future study. This might entail looking at the benefits and difficulties presented by digital transformation when a pandemic is in progress.

The absence of mixed-methods research within the domain of digital transformation carries various implications, including that the user possesses a restricted comprehension of the subject matter. The absence of research combining qualitative and quantitative methods hinders comprehension of digital transformation's intricate and diverse characteristics. Using mixed-methods analysis can enhance the comprehensive understanding of digital transformation by integrating quantitative and qualitative data. The absence of mixed-methods research also restricts the extent to which the findings can be applied to diverse contexts. A mixed-methods study can generate contextualized insights into digital transformation by considering the distinct attributes of various contexts. A more comprehensive understanding or knowledge in this area is required. Additionally, due to the lack of articles applying a mixed-methods approach, deep knowledge regarding the various factors influencing the outcomes of digital transformation endeavors is constrained. Using a mixed-methods analysis can offer a deeper understanding regarding the multiple factors influencing the results of digital transformation endeavors. This is achieved by incorporating quantitative and qualitative data into the research analysis.

To rectify this inadequacy, future investigations into digital transformation can concentrate on the following areas:

Mixed-methods research is a potential avenue for future investigations, in which the utilization of a mixed-methods approach can offer a more comprehensive understanding of the phenomenon of digital transformation. One possible method involves integrating quantitative and qualitative data, which can yield a more comprehensive understanding of digital transformation within specific contexts.

Future research may prioritize the execution of case studies to acquire further insights into the determinants that influence the outcomes of digital transformation endeavors, whether they be successes or failures. This may involve an analysis of the distinct attributes of various contexts and their influence on the digital transformation process.

Future research may also prioritize the implementation of longitudinal studies to acquire a more comprehensive understanding of the enduring consequences of digital transformation on small- and medium-sized enterprises (SMEs). This may involve analyzing the variables contributing to the long-term viability of digital transformation initiatives.

This research also comes with a shortcoming in the present research technique, which was simplified by only

examining material from the Scopus Preview database. As a result, future research may add data from the Web of Science or Google Scholar databases. This study encourages researchers to see this limitation as an opportunity for a comprehensive analysis of the social, cultural, and political backgrounds of DT. The current study's findings, and their practicality for SMEs, can contribute to future DT and the handling of DT-related difficulties. According to this study, it is critical for academics to investigate this topic comprehensively in future research. Such study findings will be helpful both practically and theoretically.

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