Roadmap for Portraying Digital Transformation Framework for Small and Medium Enterprises (SMEs) - Building Organizational Dynamic Capabilities

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"I agree that the work in this assignment is my own work and that I have given credit to all sources of information used in my assignment by including citations and references in the APA format. I acknowledge that I am expected to exercise the utmost academic integrity in all work submitted for this course."

Abstract

Purpose: Digital Transformation (DT) is considered critical to the success of business empowerment, thus allowing competition within various industries. However, the different internal and external factors affecting organizations have influenced the longevity and sustainability of businesses, especially SMEs. This paper aims to explore digital transformation research in small and medium-sized enterprises (SMEs), taking into account their importance in the economic development of countries.

Design/methodology/approach: Utilizing the various research contributions revolving around the relationship between DT and SMEs, the authors used a scientometric analytical approach using Biblioshiny that included 391 documents indexed in Scopus. PRISMA guidelines allowed a systematic and structured approach to establishing the various keywords used in the study (PRISMA, n.d.). The literature analysis of DT in SMEs provided the needed research framework to identify the practices related to or associated with implementing DT strategies in SMEs.

Findings: The Technology-Organization-Environment (TOE) framework was used to categorize the findings. DT strategies and success factors such as management and culture were associated with the organizational context, while financial capability was linked to the technological context. In addition, the authors appreciated the increase in publication numbers that have studied the DT process in SMEs

Practical Implications: Researchers and academics in fields such as IT and decision-makers in DT within SMEs find this research useful. Governmental organizations associated with DT adoption for SMEs would also benefit from the research study, thus allowing SMEs to achieve a competitive edge and productivity.

Originality/Value: Biblioshiny in the survey was used to conduct a bibliographic analysis to explore how researchers have focused on maturity models and frameworks for measuring SME readiness and the impact of Industry 4.0 on SMEs. It also provided evaluation guides for managers in their 4.0 positioning and developing and implementing DT strategies for SMEs by presenting SME cases utilizing DT and future research opportunities.

Keywords: *Digital Transformation, Digitalization Framework, Digital Maturity, Digital Transformation and SMEs, Dynamic Capability, Small and Medium Enterprises.*

Table of Contents

Abbreviations

CRM	Customer Relationship Management
DT	Digital Transformation
GDP	Gross Domestic Product
IoT	Internet of Things
IT	Information Technology
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analysis
RO	Research Objectives
RQ	Research Questions
SDG	Sustainable Development Goals
SLR	Systematic Literature Review
SME	Small and Medium-sized Enterprises
TOE	Technology-Organization Environment Model

Introduction

Digitization, digitalization, and digital transformation are concepts that are increasingly becoming top priorities for both contemporary managers and organizations in today's world. Despite being synonymous, these notions have contrasting meanings and always entail a divergent radical approach. Digitization is considered the process of transitioning from analog to digital (Gobble, 2018). Digitalization refers to leveraging digitization to create values through actions and creating change (Gobble, 2018). Digital transformation (DT) is regarded as the action that aims to improve any given entity by causing significant changes to its priorities using information, communication, computing, and connectivity technologies combinations (Mikalef & Parmiggiani, 2022). The onset of the Fourth Industrial Revolution has provided an opportunity for growth that organizations consider unique. It has also allowed them to increase their competitive advantage and productivity by changing their business models. However, in the case of small and medium enterprises (SMEs), incorporating DT is considered a slow process compared to those developed by big companies, mainly due to their technology, human resource readiness, and economic limitations. Therefore, SMEs must successfully implement and integrate digital transformation to utilize proper management and resources to ensure the strategies are correctly implemented (Omrani et al., 2024).

Tarute et al. (2018) describe the various elements that determine the overall DT of SMEs, reflecting on the usage and concept of different DT in organizations of different sizes and types. Parra-Sánchez and Talero-Sarmiento (2022) provide an intrinsic assessment of communication and information technology policies for DT in the trading centers within Colombian SMEs. Silva et al. (2022) gave a model proposal assessing organizational readiness for SMEs utilizing digital transformation. Omrani et al. (2024) provided an analysis

and identification of the various factors that determined the overall digital technologies implemented and used in SMEs hinged on their overall TOE Model.

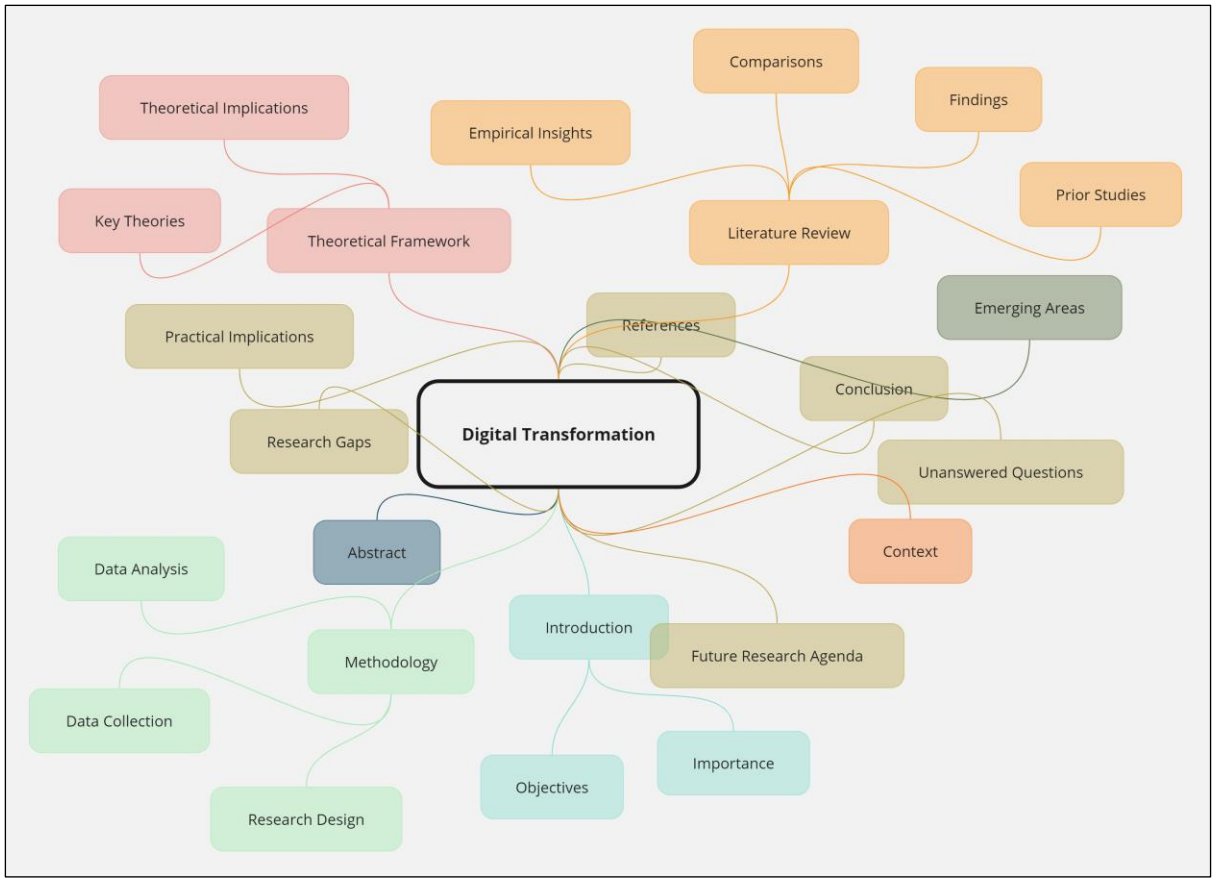
The research offers a comprehensive overview of digital transformation elaborated in two phases within the paper. The overall structural mapping of the DT framework is shown in Figure 1.

Phase I provides the overall conduction of the SLR process and procedure, highlighting DT about management within SMEs and its importance in SME core elements. A literature review on digital transformation and maturity and the ability of SMEs to utilize operational capabilities to achieve a competitive advantage is highlighted in this section.

Phase II provides an intrinsic understanding of SMEs, utilizing Canadian enterprises and showing their contribution to the country's economy through their employment generations, GDP contribution, growth rate, and survival rate (CFI, 2024). Furthermore, DT in SMEs is elaborated by designing a comprehensive framework, thus allowing the research to expound on the proposed methodology for DT and the opportunities and challenges associated with adopting such strategies in SMEs.

Figure 1

Structural Mapping for Digital Transformation Framework



Note. Figure generated by the author using MIRO. This mind map designs the structure of the research agenda and provides an intrinsic overall flow of this research.

Background

Digital Transformation (DT) and SME Management Roles

Today, most SMEs will continually adapt and implement strategies that will allow their overall growth and increased competitive advantage in any dynamic environment. Various aspects such as information, communication, research, and easy working processes will always utilize digital transformation components (Aras & Buyukozkan, 2023). Therefore, companies need to address the reaction to different modifications such implementations bring, primarily when it influences their overall organizational dynamics. In most cases, the use or implementation of such technological advancements usually see SMEs act in two directions; one is their adapting to their overall business models, and the other is

the rethinking of their entire industries. Digital transformation always focuses on changing roles and business offerings caused by adopting such technologies within the organization and the operational environment, thus allowing SMEs to create sustainable value (Bounfour, 2015).

However, various challenges have been associated with implementing such technological advancements within SMEs. Its advancements have provided various challenges for businesses, mainly within their implementation and influence over organizational dynamics. Digitization sees the dematerialization of information and information decoupling from various transmissions, physical storage, carriers, and processing equipment (Mikalef & Parmiggiani, 2022). Such development, together with multiple user connections, allows them to enjoy the arrangement and negotiation of the meaning of such bits, thus providing the basis for interoperable commons and standard meanings of application and service interfaces.

Matt et al. (2015) argue that it is the prevalence of the use of such advancements pushes organizations, especially SMEs, to transverse new DT and thus utilize their benefits, which involve the transformation of their organizational operations and hence affect production, processes, organizational management, and structure concepts. To realize the probable benefits such as increased productivity, sales, or innovation within such businesses, SMEs should always open themselves to changes within their structure and overall operations.

Riasanow et al. (2018) define DT as the probabilistic change in an organizational culture where digital technology transforms the business model. It also entails the management of internal efficiency, opportunities, and the changes associated with it. It,

therefore, allows SMEs to utilize technologies to ensure their overall business improvements and operations.

The effect of digital transformation is always considered similar to that of the Industrial Revolution. Research has shown that entire organization models are changed, reshaped, or replaced by the "big bang" disruption. Conventional models, such as physical newspapers, could become obsolete and suffer significant losses as new digital technologies are necessary for the organization. It means that such organizations need to re-evaluate and adapt their overall operations.

Digital Transformation (DT) Strategy Importance and SME Core Elements

Through digital transformation, organizations constantly strive to improve and have a competitive advantage by using and implementing digital innovation and transformation. Therefore, managing the challenges brought about by using such technological innovations in their business operation models is necessary. The execution of such DT yields to the rise of various obstacles. Henriette et al. (2015) argue that any DT project always involves using technological capabilities that support such business model transformation. It thus calls for collaboration and interaction within an organization across all relevant operational procedures and resources and its internal and external users. It thus affects the organizational culture through the influence of employee's working habits.

Previous research (Yeow et al., 2018 and Teece, 2014) has always focused on implementing IT strategies, which must be aligned to the company’s strategy but not necessarily be considered subordinate to it, mainly in SMEs. However, a new type of digital business strategy has been claimed over the years. A call for an evaluation from the "normal" IT strategy utilized by SMEs to a digital one, comprising of the combination of IT and business strategies, is a phenomenon that defines any organizational strategy that is made and

implemented through the leverage of digital assets in the creation of differential values (Bharadwaj et al., 2013). Others require an individualized digital-edge strategy, accounting for the specified nature of technologies and incorporating physical and digital resources while focusing on business outcomes compared to huge strategies. Furthermore, it has been found that not all technological advancements are accepted, such as the adverse effects of transparency in gaining a competitive advantage. Organizations must choose an individual optimum of digital infusion in their organizational strategy (Ellstrom et al., 2021).

Research conducted by scholars such as Perea Muñoz et al. (2022), Depaoli et al. (2020), Chavez et al. (2020), Wang et al. (2023), and Korachi and Bounabat (2020), by providing a foundation framework for industries in their digital transformation strategy configuration, have identified the need for necessary strategic actions in digital transformation. For instance, online music content makers and providers would utilize a digital business strategy that calls for an integrated view of technology and operations on a company's strategic level. Other case-study-based literature (Sommer, 2015) provides the guidelines for digital strategy implementation and business implications, focusing on newspaper and publishing companies. Research results show that the exploitation and exploration of an organization's DT strategy and innovation capabilities and capacities, such as processes, resources, and values, are necessary. Various industries, mainly retail-based organizations (CFI, 2024; Ifeoluwa et al., 2022), show that the need for intra and inter-organizational change attributes in DT are presented. For instance, a toy producer's list is always distinctive in the characteristics of its business model and strategy; a necessary mindset, a business platform, corporate IT, and an organizational environment are necessary to generate digital leadership.

Matt et al. (2015) provide a digital foundation representing a complete DT Strategy approach. Their approach argues that every DT project should be founded or made along four key dimensions that should be well aligned. The use of technology is the first dimension and entails that an organization's strategic position and future endeavors are based on its capacity to absorb and utilize new technologies. Researchers, such as Rogers (2016), based on various cases, have explored these key four dimensions, with the strategic configuration dimension combinations of “structural changes,” “utilization of technologies,” and “financial aspects” as integral aspects for generalization potential. In contrast, the "value-creation changes" as a dimension does not permit any transfer across various sectors. It thus brings about the challenge of the transference of existing knowledge on DT strategies revolving around SMEs, which is becoming more accessible and complicated than usual.

Problem Statement

Implementing digital transformation in Canadian SMEs is unsuccessful due to the lack of proper management strategies in such organizations, which results in low productivity in their operations.

Research Questions

RQ1: *Are SMEs optimally prepared to enter the era of digital transformation?*

RQ2: *What are the optimal implications for SMEs in terms of shifting toward digital transformation?*

RQ 3: *What are the most notable barriers to digital transformation for SMEs identified in the review?*

RQ 4: *Considering the future research agenda proposed by the authors, which areas of digital transformation for SMEs most require empirical investigation, and why?*

Systematic Literature Review

The need for organizational growth and progress is always met with changes within the overall business environment over time through the implementation of absolute changes to both the company's capacity and strategies. The development and use of DT over the past years have been considered a significant force that has influenced and reshaped significant business models in various industries. Today, most organizations have embraced digital transformation, and their opportunities are being considered more significant than ever, with more digital solutions coming up within the market than ever (Ellstrom et al., 2021). Warner and Wagner (2019) argue the need for more studies on how digital transformation strategies are utilized in firms, considering that this area is associated with limited conceptual and empirical research studies.

Importance of Digital Transformation (DT)

Verhoef et al. (2021, p. 889) define DT as how an organization utilizes or uses DT to formulate new business models that help generate and appropriate a company's value. Other scholars would argue and emphasize that DT is brought about by digital technologies and is used to attain their needed competitive advantage (Verhoef et al., 2021). Furthermore, digital transformation impacts an organization's model through changing aspects such as organizational tasks, value generation processes, and how the overall business is done.

Today, many organizations, such as online retail stores such as E-bay and Amazon, need to see the potential DT has in their operations, and those who recognize such potential find it challenging to make the required organizational changes in their overall culture to grasp the maximum advantages of such efforts. One primary reason that contributes to the failure of DT implementation efforts is that managers and leaders find it challenging to create

the needed urgency that allows them to shift their focus or let them decide on what course of action to take in such situations (Parviainen et al., 2017; Fitzgerald et al., 2014).

In that case, digital transformation can be considered a positive and significant role in improving the organization's performance (McLaughlin, 2017). Thus, such organizations must implement and formulate an appropriate DT strategy (Liu et al., 2011). Organizations need to better place digital technology with their overall business strategies, which requires them to rethink and re-evaluate how they see and use such technologies in a manner that builds a capacity for the organization on a complete level. Utilizing such technologies in internal processes or consumer offerings should not be considered a goal. DT should be considered to improve the overall business models, especially those associated with SMEs, and thus lead to efficiency and better consumer experiences (Rogers, 2016).

DT aims to create a competitive edge for a firm (Liu et al., 2011) and increase an organization's value (Verhog et al., 2021), thus making it an essential strategic development aspect mainly for SMEs. Digital transformation within a managerial aspect could be either conflictive or competitive, evolutionary, frame-breaking continuous, or episodic. It, therefore, means that the implementation of DT can be radical or incremental, especially within SMEs.

For instance, when digital transformation strategies are related to speed or time as a perspective, it is considered a crucial aspect in various ways. It may influence aspects such as production speed or services and their efficiency. Thus, it allows the provision and access of data, which might affect the need for administrative processes to make them optimized and coordinated within the overall operational process of an organization (Aspara et al., 2013). Therefore, such technologies are considered to influence the overall strategic development of SMEs, and thus, the need for DT in such organizations to create the needed competitive advantage, which should be a thought-through process (Bharadwaj et al., 2013).

Dynamic Capabilities in DT

Any organization managing digital transformation would be considered successful in its overall operations. Therefore, to better understand such dynamic capabilities, the following study will rely on the assumptions that organizations, mainly SMEs, need to make dynamic capabilities associated with digital transformation. In most cases, when challenges such as the disruption of current skills and resources (Parra-Sánchez & Talero-Sarmiento, 2023) within the business are presented by digital disruption, making them obsolete, the need for management and the organization to shift their focus is necessary to facilitate change. Teece et al. (1997) first expressed the ideology of dynamic capabilities within organizations, explaining how they can attain and sustain the needed competitive advantage today. Dynamic capabilities center on organizations' actions to change their assets for effective adaptations

The dynamic capability could be a firm's ability to create, modify, and extend its resource base. DT, which implies changes to, for instance, organizational tasks and value creation with the main aim of creating a competitive edge, can be deduced that dynamic capabilities are essential to use these changes successfully. Most would consider that problem-solving might be considered enough in some instances; dynamic capability allows the systematic adaptation to change and may be chosen when changes within the business environment endanger the overall value of a company's capability to create and sustain a competitive edge in today's market (Hilliard & Goldstein, 2019).

Thus, for organizations to engage in DT successfully, a set of skills to ensure change facilitation within their overall models is necessary. Teece (2007) implies that sensing, capturing, and reconfiguring such capabilities are necessary to create dynamic capability. While he (Teece, 2007) utilizes micro-foundations in elaborating on the content of sensing, capturing, and reconfiguring capabilities within the organization, Hillard and Goldstein

(2019) utilize routines to measure and capture dynamic capability constructs. Using Hillard and Goldstein's (2019) approach, one can argue that dynamic capabilities would be considered a routine set essential to follow and implement to achieve continuous change management. Continuous change, in this case, is represented by digital transformation within an organization. Therefore, the need to identify, sense, capture, and reconfigure dynamic capability routines that enable digital transformation within SMEs is necessary and thus provides the focus of the research.

Despite numerous studies that have tried to find recent dynamic capabilities in different settings, a few targets of DT information and cases are present. It might be hard for managers and leaders to know what an organization needs for a successful DT. Yeow et al. (2018) provide information on the specific actions that organizations can use to ensure general micro-foundations. According to Warner and Wagner (2019), micro-foundations are relevant for digital strategy implementation and overall DT. Therefore, organizations need to build dynamic capabilities to create a competitive advantage.

Dynamic Capabilities Enabling DT

Research conducted by Jacobi and Brenner (2018) shows that businesses in reasonably firm markets also require dynamic capabilities to get, develop, reconfigure, and integrate their various responses as a response measure to these market shifts. The dynamic capability framework addresses the deployment, development, and protection of any firm's resources, competency skills, and combinations required to make these change adaptations possible within the business environment. Eisenhardt and Martin (2000) argue that dynamic capabilities should be considered as routines needed to change an organization's resource base, and since they are considered as drives necessary for the creation, recombination, and evolution of other assets into new ones, thus increasing their competitive edge.

Hess et al. (2016) highlight the need for organizations to consider DT as a strategic priority, and risks such as being left behind would be present if no continuous evaluation of their options is done regarding technology use or utilization. Digital transformation and dynamic capabilities merge as such technologies can change traditional organizations and thus require businesses to respond to upcoming opportunities in the dynamic market. It thus implies that dynamic capabilities would be considered a paramount strategy, which management should consider mainly, even though it needs to be fully understood through the lack of intrinsic research information (Warner & Wagner, 2019, p. 334). According to Teece (2007), dynamic capabilities are categorized into three inclusive groups, which have been widely used in literature and thus provide research explorations around the routines required for DT within SMEs, as elaborated below.

Sensing Capabilities for DT

Knowing and shaping new opportunities requires creating, learning, scanning, and interpreting, which entails identifying, assessing, developing, and assessing opportunities in technology about consumer needs (Teece, 2014, p. 335). Larger and more mature organizations face significant challenges when building sense capabilities. These actions are used to foresee and use the recent technology within the business (Matt et al., 2015). Therefore, digital sensing attributes or capabilities should be built by organizations so that they can better know and understand all the unanticipated developments within a dynamic business environment and thus allow them to act when mitigating and addressing such changes. (Jacobi & Brenner, 2018).

Seizing Capabilities for DT

Seizing capabilities are associated with sensing capabilities as anticipated possibilities or opportunities that need to be addressed within an organization through new processes,

products, or services. It may entail the use of all these alternative combinations. A seizing capacity lets a business seize the potential value of any given business opportunity and make the necessary decisions about what changes should be made based on the firm's needs to seize such opportunities (Yeow et al., 2018). Such a capability allows firms to seize the value of untapped opportunities for the business and agree on what changes need to be made within the organization to seize such opportunities. Organizations often lose sight of such opportunities due to failure to seize their value from challenges such as avoiding financial losses and risks or lack of commitment (Wijnen, 2020). Consequently, organizations must build up their management and improve their strategies to seize and evaluate such opportunities. When introducing such digital technologies within firms, the potential for the presence of a capability gap might be seen. Therefore, the need for organizations to utilize and size capabilities within their operations will allow them to capitalize on upcoming opportunities (Liu et al., 2011).

Reconfiguring Capabilities for DT

Reconfiguring is a continuous transformation and renewal of business routines. Reconfiguring capabilities to change or transform business assets and structures as an organization grows is necessary since its environment changes. Thus, reconfiguration capabilities are integral in changing existing business resources to position them with upcoming strategies, creating and building new ones, and supporting any resource gaps within a business (Yeow et al., 2018). However, such changes are always considered costly and risky. Organizations always refine their overall asset base and build on existing resources to avoid such risks (Ellstrom et al., 2021). Whenever market environment or condition changes happen more rapidly, the need to ensure more substantial configuration is needed. Due to the new and undefined research on digital transformation, most organizations might need all the integral internal resources considered essential, such as digital expertise, to

achieve digital transformation (Yeow et al., 2018). Thus, developing reconfiguring capability is necessary for such organizations to build and access new resources within their overall operations.

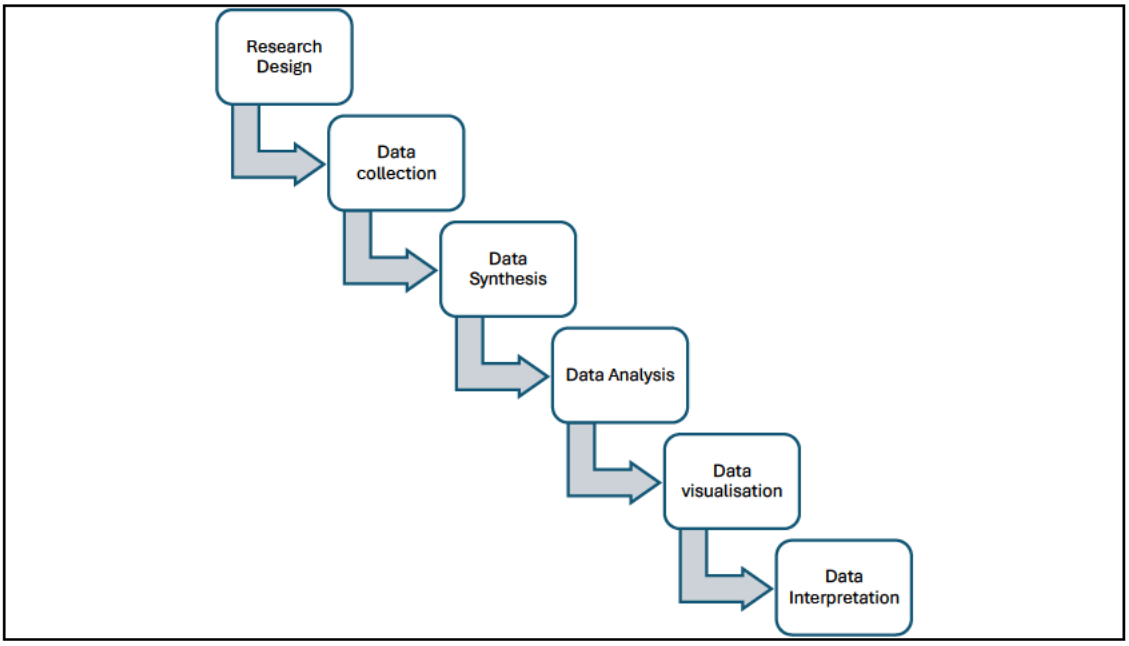
Methodology

In this paper, "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" guidelines (Page et al., 2021) have been followed to conduct the Systematic Literature Review (SLR). This structured approach ensures a transparent, comprehensive, and replicable review process. The review protocol includes defining research questions, setting inclusion and exclusion criteria, and detailing the search strategy.

Figure 2. shows the steps approach used in the research methodology – 1). Research Design 2). Data Collection 3). Data Synthesis 4). Data Analysis 5). Data Visualisation 6). Data Interpretation.

Figure 2

Research Methodology



Note. Figure generated by the author.

The research methodology commenced with the research design phase, during which the keywords were established to conduct the search on the databases. The keywords were carefully selected to be pertinent and augment the research on comprehending the DT framework about SMEs.

The data collecting phase involves gathering articles by screening keywords against credible and reliable database sources such as Scopus. Next, the process proceeds to the data synthesis stage, during which papers that were non-English, conference proceedings, non-peer-reviewed, or unimportant to addressing the journey of digital transformation for SMEs were excluded. Next, the procedure proceeds to the data analysis phase, where the articles were analyzed using bibliometric, an R-based programming language. The bibliometric visualization tools, such as Biblioshiny, Bibliometrix, and Vosviewer, were used in tandem with data analysis to comprehend bibliometric data visually. Therefore, the research methodology led to the culmination of data interpretation and the discovery of insights that were considered valuable within the research.

The methodology used in the literature analysis of DT in SMEs provided a systematic and thorough framework. The research aim is to provide valuable framework insight and help identify practices related to the implementation journey of DT strategies in SMEs. Through the adoption of a structured methodology, the following research aims to guide future studies and practice implementations in the research subject.

Research Design

The Chen and Xiao (2016) strategy was employed during the study. Chen and Xiao (2016) suggest that using imperative keywords allows for a wider scope of research in database exploration. The other approach involved using high-level publication keywords

such as "SMEs" and "digital transformations," including others, as shown by Table 1, which produced a vast collection of database results. Moreover, the keywords have been utilized to create strings that have been created to extract the relevant research papers from the database that are related to the area of study.

Table 1

Related Keywords and Strings Used for Extraction of Exiting Literature

Related Keywords Used for Conducting Research
“Digital Transformation”
“SME”
“Digitalization Frameworks”
“Digital Maturity”
“Dynamic Capability”
“Small and Medium-sized Enterprises”
Related Strings Used for Conducting Research
“SME” OR “Small and Medium-sized Enterprises”
(“Small and Medium-sized Enterprises” OR “SME”) AND (“Digital Transformation”)
“Digitalization Frameworks” OR “Digital Transformation Framework”
(“Digital Maturity” OR “Digital Maturity Model”) AND (“Digital Transformation”)
(“Digital Transformation” AND “SME”) OR (“Digital Transformation” AND “Small and Medium-sized Enterprises”)
(“Dynamic Capability” AND “SME”) OR (“Dynamic Capabilities” AND “Small and Medium-sized Enterprises)

Note. Table generated by the author.

Data Collection

We have explored the Scopus database as part of our research. The databases are well-known and reliable and offer a vast volume of research papers that are essential to the conclusion drawn for our investigation. The Scopus database is a highly comprehensive repository of peer-reviewed research articles, providing extensive coverage of content and detailed profile bases of authors, institutions, and serial sources (Pranckute, 2021).

From the Scopus database, the author has collected 391 research papers. The search was limited to peer-reviewed articles published from 2016 to 2024 to ensure the reliability and credibility of the data. Moreover, since English is the world's most widely used language and corresponds with the author's learning abilities, we have chosen it as our preferred linguistic medium.

Data Synthesis

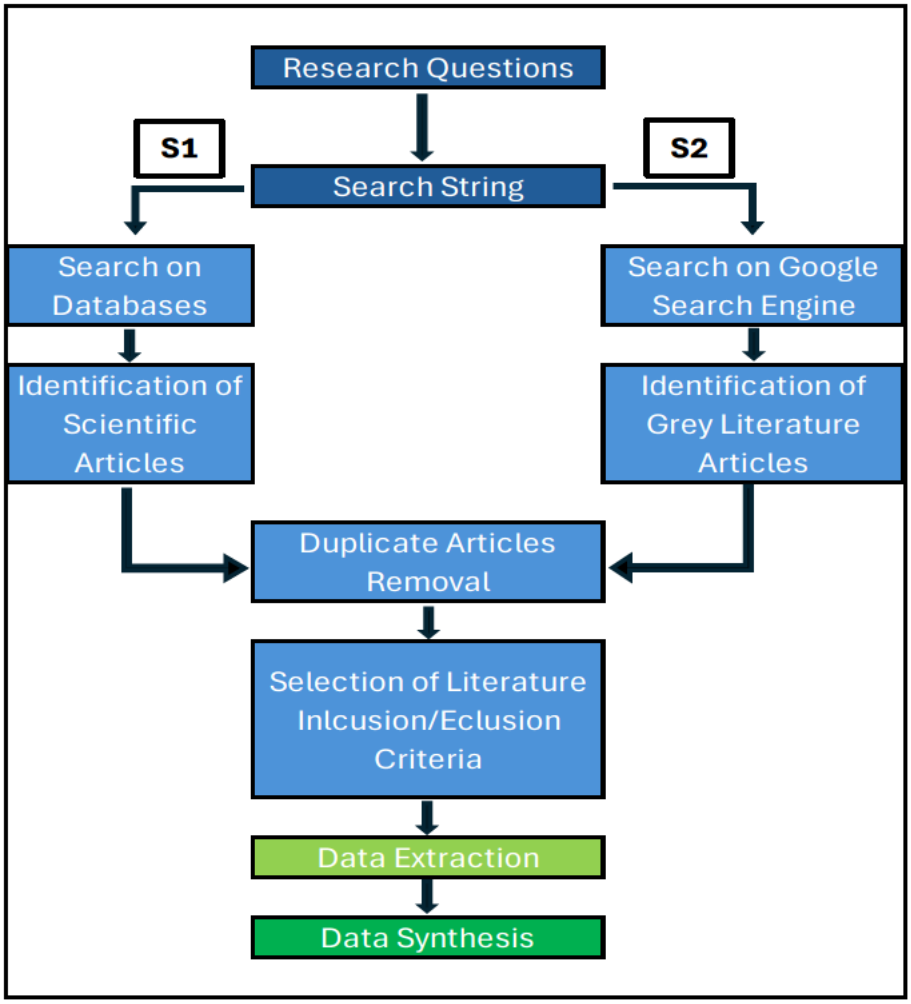
After data gathering, the analysis process moves on to data synthesis. The search strategy process used in the research comprised two stages: S1 (automatic) and S2 (manual). It is illustrated in Figure 3.

The S1 process utilized the Scopus database. The research database was considered to have the highest impact on journals and research information on the research topic. According to Kitchenham and Charters (2007), electronic databases provide research information with a broad perspective compared to limited conferences and journals. The keywords were carefully selected to be pertinent and augment the research on comprehending the DT framework about SMEs.

The S2 stage (manual) is performed on references of all initial searched materials. Kitchenham (2004) states that manual search applies to all primary study references.

Figure 3

Data synthesis process



Note. Figure generated by the author.

Using string keywords, 521 research papers were derived from automatic research. The research papers underwent these inclusion and exclusion criteria within the research process. Kitchenham and Charles (2007) note that irrelevant and recommendation studies should be excluded from the research process. The research selection process is used to pick out all relevant research materials associated with the study's research questions, as represented in Table 2.

Table 2: Inclusion and Exclusion criteria

Research papers – Inclusion and Exclusion Criteria

Inclusion Criteria	**Exclusion Criteria**
Peer-reviewed research papers	Book chapters, notes, short surveys, letters, and editorials
The papers are written in the English language	Articles with theoretical frameworks without empirical data collection
Full text available online	Papers written in non-English language
The paper contains empirical data (qualitative or quantitative)	

Note. Table generated by the author.

The author then studied all the 391 research papers from the Scopus database and categorized them into various categories, as depicted in Table 3, based on the relevancy of the article in accordance with the conducted research for our study.

Table 3

Research Papers Categorisation

Scopus	**Status**
Total Researched Articles	391
Extremely Relevant*	44
Medium Relevant	136
Less Relevant	98
Irrelevant	113

Note. Table generated by the author.

Extremely Relevant*

These research papers highlight excellent insights into the subjects that closely correspond with our goals and are extremely pertinent to our study. The offer has been crucial in determining the direction and has significantly contributed to our understanding. Table 4 shows the papers that were found to be extremely relevant to our study.

Table 4

Analysis of Extremely Relevant Papers

Main Topics	Author(s)	Summarisation of papers
Digitalization	(Cravotta & Grottke, 2019), (Klohs & Sandkuhl, 2020), (Dethine et al., 2020), (Queiroz et al., 2022)	These papers focus on key themes, changing trends, benefits, and challenges associated with adopting Digitalization.
Organisational Changes	(Brodeur et al., 2023)	This paper investigates the effect of several organizational elements in influencing Digital Transformation.
Digital Maturity Approaches	(Amaral & Peças, 2021), (Di Felice et al. , 2022), (Mittal et al., 2018), (Holzner et al. (2023), (Sándor & Gubán, 2022), (Chen & Wang, 2022), Chonsawat & Sopadang (2020), (Szedlak et al., 2020), (Hamidi et al.,2018), (Pan Nogueras et al., 2022), (Reascos et al., 2023), (Sinyuk et al., 2021)	The research papers analyze the level of digital maturity in SMEs through the application of several methodologies.
Digital Transformation Methodologies	(Perea Muñoz et al., 2022), (Depaoli et al., 2020), (Chavez et al., 2020), (Wang et al., 2023), (Korachi & Bounabat, 2020)	These papers explore various methodologies that enterprises can employ to adopt DT.
DT Implementation Challenges, Need for and its Importance	(Alexopoulos et al., 2022), (Bollweg et al., 2020), (Wahid & Zulkifli, 2021)	These papers center around the importance and implementation challenges encountered by enterprises in incorporating DT
Impact of adopting DT by enterprises	(Guo et al., 2023), (Liu et al., 2021), (Kokuytseva & Ovchinnikova, 2020), (Aghazadeh et al., 2023), (Chen et al., 2016), (Pfister & Lehmann, 2023), (Teng et al., 2022), (Pascucci et al., 2019)	These papers analyze the impact of DT on SMEs in terms of financing alleviation, innovation incentives, and international integration of SMEs
Drivers of DT and Trend Analysis	(Phiet, 2024), (Thi Thu Thuy et al., 2023), (Harini et al., 2023), (Martin Martin et al., 2022), (Zhang et al.,	These papers analyze the current trends and factors that influence DT in SMEs.

	2022), (Fauzi et al., 2023), (Okfalisa et al., 2021)	
Application of DT in different industries	(Fehér & Varga, 2019), (Turcu & Turcu, 2021)	These papers analyze the implementation of employing DT in various SME industries.

Note. Table generated by the author.

Medium Relevant

Research papers classified as “medium relevant” are ones that implicitly advance our knowledge while being only moderately important to our understanding of the subject. Despite not being the major focus of the study, these research papers have been extremely helpful in providing important information and in developing a thorough framework in the chosen domains.

Less Relevant

These are the research papers that only slightly advance our analysis. These studies focus more on using DT in other segments or applications, which is not as relevant to our study.

Irrelevant papers

Research publications that do not add anything to our study are considered irrelevant. These papers have completely distinct topics. However, they appeared because our research methodology uses the same keyword. They have been excluded from our study because they do not contribute to our expertise.

A highly systematic and comprehensive methodology was employed for the examination of the papers in order to capture the multidimensional nature of design theory. The creation of bibliographic text and Excel files marked the end of the data synthesis process, preparing it for the data analysis.

Data Analysis

During the data analysis stage, the study used a bibliometric tool based on R Programming language to generate visual maps (Aria & Cuccurullo, 2017). Without requiring knowledge of the pregaming language, the bibliometric tool offers a smooth web-based user interface called 'Biblioshiny' that efficiently compiles and completes the bibliometric analysis of research publications.

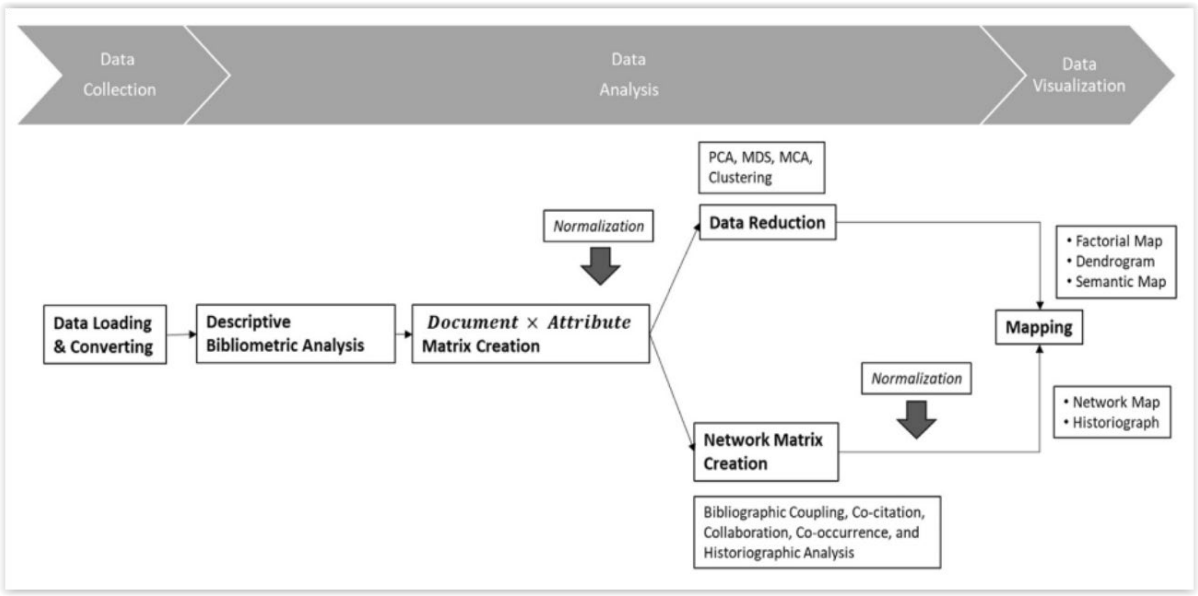
The bibliometric Excel file created during the data synthesis step was fed into the Biblioshiny interface to provide a wide range of visual analyses, including cumulative occurrence charts, word clouds, tree maps, and overview dashboards.

Figure 4 depicts the Bibliometric analysis process using the 'Biblioshiny' tool. It comprises of 3 stages – 1. Data Collection, 2. Data Analysis 3. Data Visualisation (Bibliometrix - Home, n.d.).

The Data Collection stage entails inputting the BibText file (.bib file), received from data sources, into the Bibioshiny tool. The data analysis stage carries out tasks such as normalization, data reduction, and network matrix generation in order to filter out vital information from the dataset. The data visualization stage entails the graphical depiction of data, including the analysis of trends, maps, and other significant illustrations.

Figure 4

Bibliographic Analysis using the Bibliometrix Tool



Note. Bibliometric analysis step-by-step procedure. From "Bibliometrix-Home, From Data Collection to Data Visualization," by Bibliometrix, 2024 (https://www.bibliometrix.org/home/). Copyright 2024 by K-Synth Srl, Academic Spin-Off of the University of Naples Federico II.

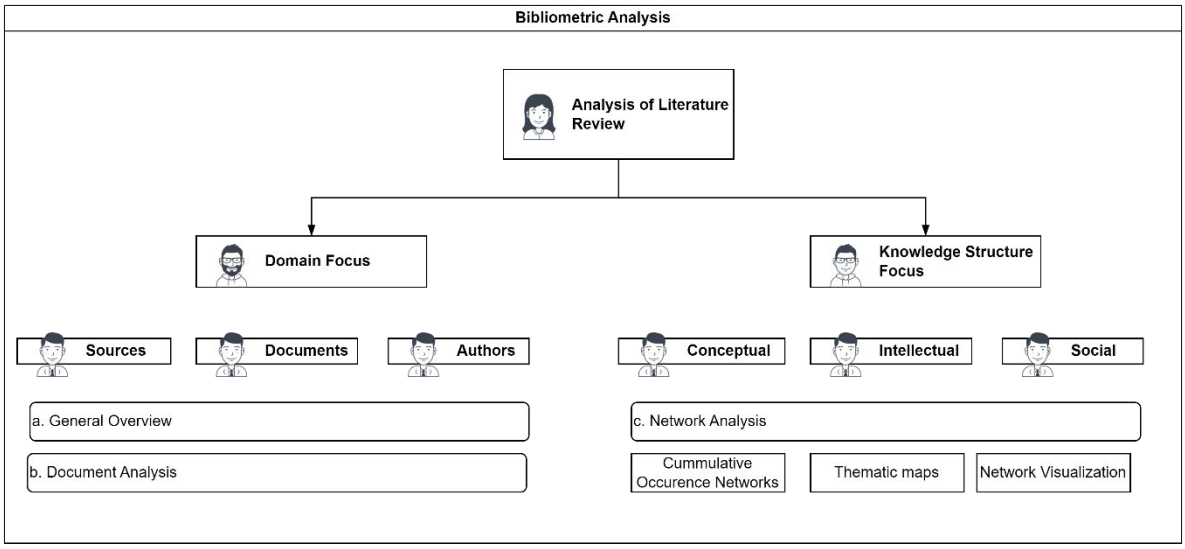
Methods for Literature Review Analysis

The literature review analysis in this research employs two kinds of analyses offered by the Biblioshiny software: domain-focused and knowledge structure-focused, as demonstrated in Figure 5. The domain-focused analysis uses relevant sources such as journals, conference papers, other documents, and authors' expertise. On the other hand, knowledge-structure-focused analysis concentrates on conceptual, intellectual, and social aspects. This research paper examines the sources and documents based on their domain to understand the publications and conduct a deep document analysis. The general overview concisely describes the number of publications, sources, and citations that may be classified as metadata. Keyword-based document analysis was done as well. In this research, the conceptual framework has been focused on utilizing the knowledge structure. Therefore, the connections and patterns between the ideas have been examined by analyzing network

diagrams generated through Biblioshiny, such as Treemaps, Cumulative occurrence networks, Trend topics analysis, Co-occurrence networks, thematic maps, and Network visualization.

Figure 5

Literature Review Analysis through Biblioshiny Tool for Bibliometric Analysis



Note. The figure is generated by the author using the Draw.io platform for design.

Data Visualization

In our journey of research analysis of DT for SMEs, apart from Biblioshiny, various other tools, as shown in Table 5, were used to visualize the bibliometrics data effectively.

Table 5

Visualization Tools Used for Literature Review

Software/Application	**Functions/Features**
Biblioshiny	Three Field Plot, Word Count, TreeMap, Cumulative Occurrence, Trend Chart
VOSViewer	Network, Overlay, and Density Visualisation
Bibliometrics	Scientometric analysis of bibliographic data generating systematic reviews and meta-analysis.
MIRO	Organizing Themes, Collaborative Brainstorming, Mind Maps, and Project Workflows

Tableau	Data Visualization and Creating Infographics.
Excel	Data Visualization for statistical information.

Note. Table generated by the author.

Data Interpretation

The methodology process ended with data interpretation. The author examined information from multiple data visualization sources to get a deeper understanding. This critically helped the author develop a thorough and all-encompassing grasp of the process for creating a roadmap for SMSs' DT Journey.

Biblioshiny has conducted a thorough analysis of the research papers and has generated insightful findings:

- Overview
- Annual scientific production
- Word Cloud and Tree Map
- Cumulative Occurrence
- Trend topics
- Thematic Map

By displaying the connection between various nodes and enabling the author to pinpoint clusters inside the network, the VOSviewer has aided in the creation of a network visualization chart for investigating intricate patterns.

Bibliographic Analysis

The bibliometric data analysis obtained from the Biblioshiny software offers a more comprehensive perspective of the different research parameters, including timeframe,

sources, documents, etc. Figure 6 displays the research summary based on 391 articles examined from 2016 to 2024.

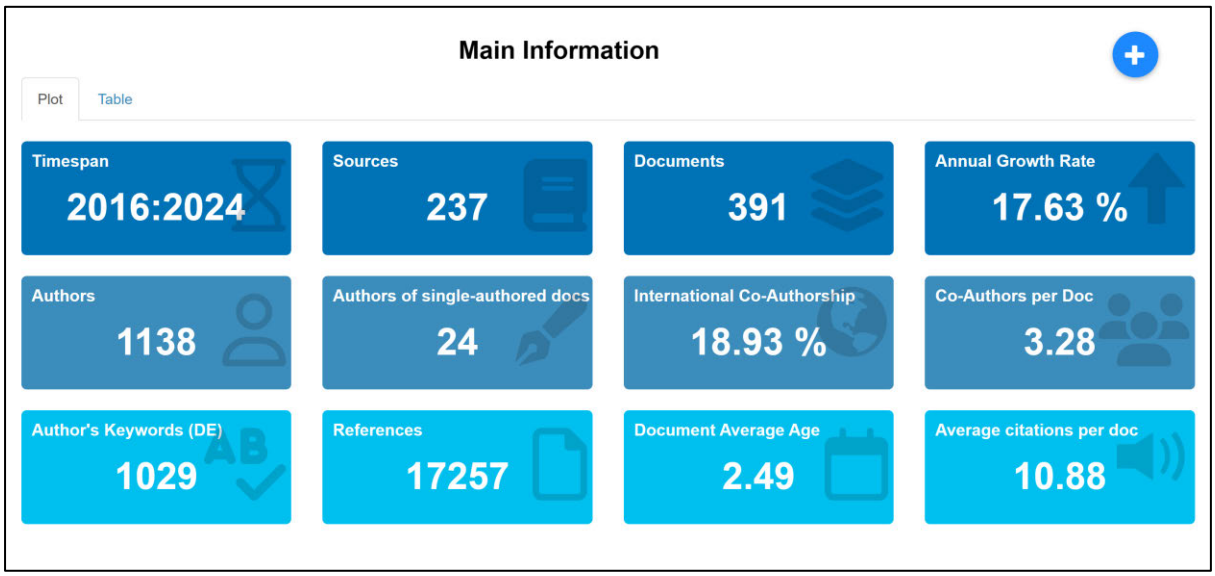
Ghobakhloo and Iranmanseh (2021) provided the needed guidelines for understanding digital transformation success in SMEs. The research material offered eleven successful determinants necessary for the success of SMEs' DT efforts, emphasizing that obtaining support from external players in digitalization allows overall success. Carrijo et al. (2021) focused on the need for SMEs to adopt digital technologies, which will enable them to gain a competitive advantage within today's industry. The research material and study emphasized the need for organizations to implement such strategies to allow them to seize and transform their overall operations and thus gain a competitive advantage in today's economy. Ellstrom et al. (2021) elaborated on the utilization of knowing, seizing, and reconfiguring routines within SMEs to create the needed dynamic capabilities to ensure SME success through digital transformation. It also showed how organizational change methods could positively influence SMEs.

Aras and Buyukozkan (2023) and Teng et al. (2022) provided a systematic literature review that identified the various organizational, technological, and environmental aspects that allow the adoption of a digital transformation roadmap within SMEs. It also provided other elements, such as the driving forces associated with digital transformation in such organizations and the barriers affecting their overall operations. Gokalp and Martinez (2021) provided the overall impact of DT on SMEs, as well as the employee digital skills and the strategies used in SMEs. Various books provided the foundation of knowledge on the different organizational change models necessary for implementing digital transformation in SMEs. Hilliard and Goldstein (2019) study how SMEs could enhance their operational performance through digital platforms. The article, written by Tam et al. (2022), published on

the website of Statistics Canada and data published on websites such as Canada (2024) and CFI (2024) provided intrinsic and up-to-date statistical information on SMEs in Canada, which was integral in understanding the correlation between DT and SME operational success (Figure 6).

Figure 6

Overview of the Bibliometric Analysis



Note. Figure generated by Biblioshiny.

Timespan: It refers to the specific period during which the research is conducted, in this case, from 2016 to 2024.

Sources: It shows that 237 sources have been referred to in creating the dataset.

Documents: It refers to the total count of 391 documents inside the dataset for the study investigation

Annual Growth Rate: This reflects the annual growth rate in publications, which is 17.63%.

Authors: It indicates that 1138 authors have contributed to the researched articles in the dataset.

Author of Single-Authored Docs: This indicates that there are 24 authors who have researched the articles independently.

International Co-Authorship: It refers to the collaboration of authors from different countries. In the dataset, the rate of international co-authorship is 18.93%.

Keyword: It indicates that a total of 1,029 keywords have been utilized in the dataset.

Reference: It shows that the dataset comprises 17,257 references.

Documents Average Age: It shows that the average age of the documents is 2.49, indicating their recentness.

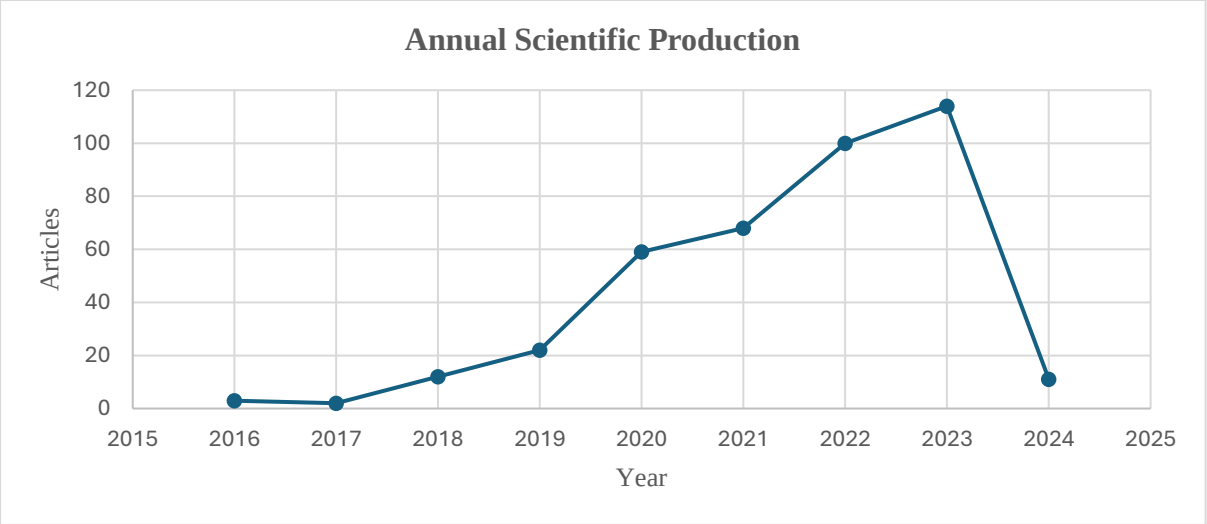
Average Citations per doc: It indicated that the documents have received an average citation of 10.88, reflecting the rate at which the publications are being referred.

Publication

The scientific output of publications on digital transformation from year to year, based on a dataset of 391 researched articles, is illustrated in Figure 7. While the number of published articles climbed progressively from 3 in 2016 to 114 in 2023, it dropped to 11 in 2024. The cause of the decline in the articles on digital transformation can be attributed to a trend shift in the research industry in 2023 from DT to other topics such as Performance, Industrial Research, and Data Analytics, as evidenced by Figure 11 under the Trend topics section.

Figure 7

Yearly Production of Articles Related to DT



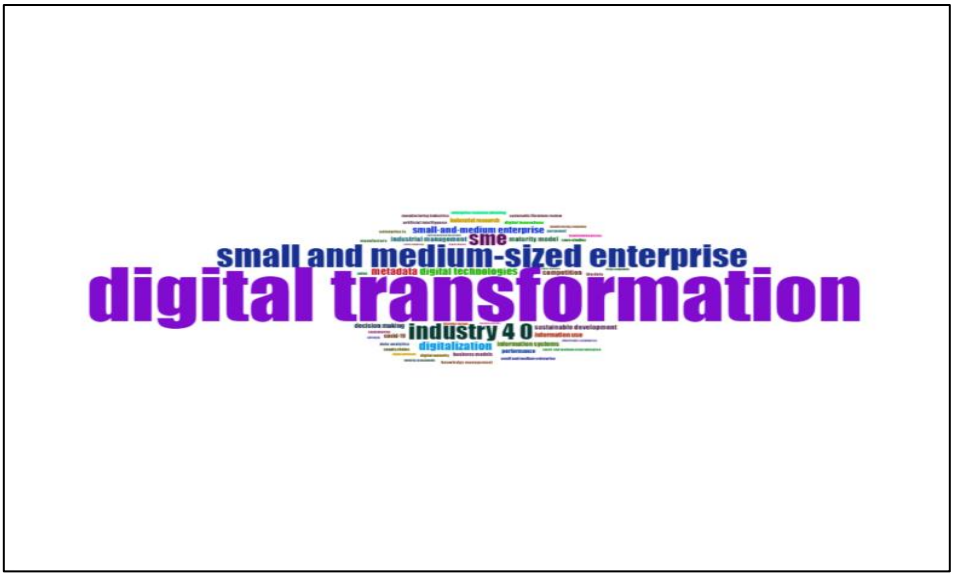
Note. Based on a bibliographic analysis of 391 articles in the Biblioshiny tool, the graph depicts the progression rate in the Annual Scientific Production. The figure is generated by the author in Excel; Data is extracted from Biblioshiny.

Word Cloud and Tree Map

Figure 8 depicts the word cloud generated using the Biblioshiny tool. It uses text size to indicate the frequency in the dataset. The keyword ‘digital transformation,’ with the most significant text size, represents the most used keyword in the research publications, followed by ‘small and medium-sized enterprise’ as the second most prevailed keyword.

Figure 8

Word Cloud

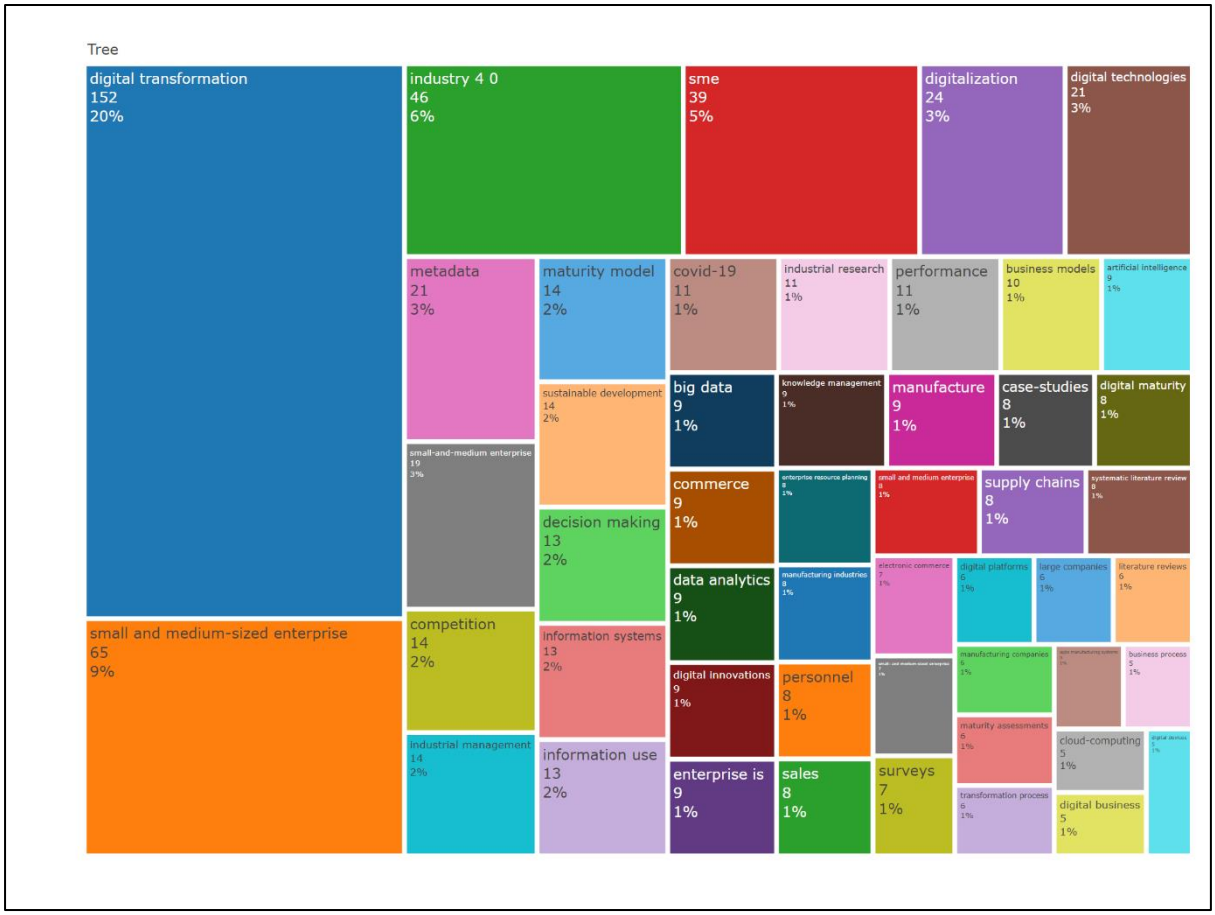


Note. Figure generated by Biblioshiny.

The Treemap provides a more organized method for visualizing keywords using rectangles to represent the data. In contrast, the Word Cloud represents the keyword information based on the size of the text. The Treemap employs rectangular shapes to depict hierarchical data, as illustrated in Figure 9. According to the tree map, the ‘digital transformation’ keyword has the highest frequency at 152, followed by ‘small and medium-sized enterprises’ at 65.

Figure 9

Tree Map



Note. Figure generated by Biblioshiny.

Cumulative Occurrence

The cumulative occurrence of the keywords is displayed in Table 6, and the graphical representation of the cumulative occurrence network has been plotted and presented in Figure 10, which is created using Tableau and data obtained through bibliometric analysis. Between 2016 and 2024, digital transformation and digital maturity have been found to have the highest cumulative occurrence rates at 152 and 65, respectively.

Table 6

Word's Frequency over Time

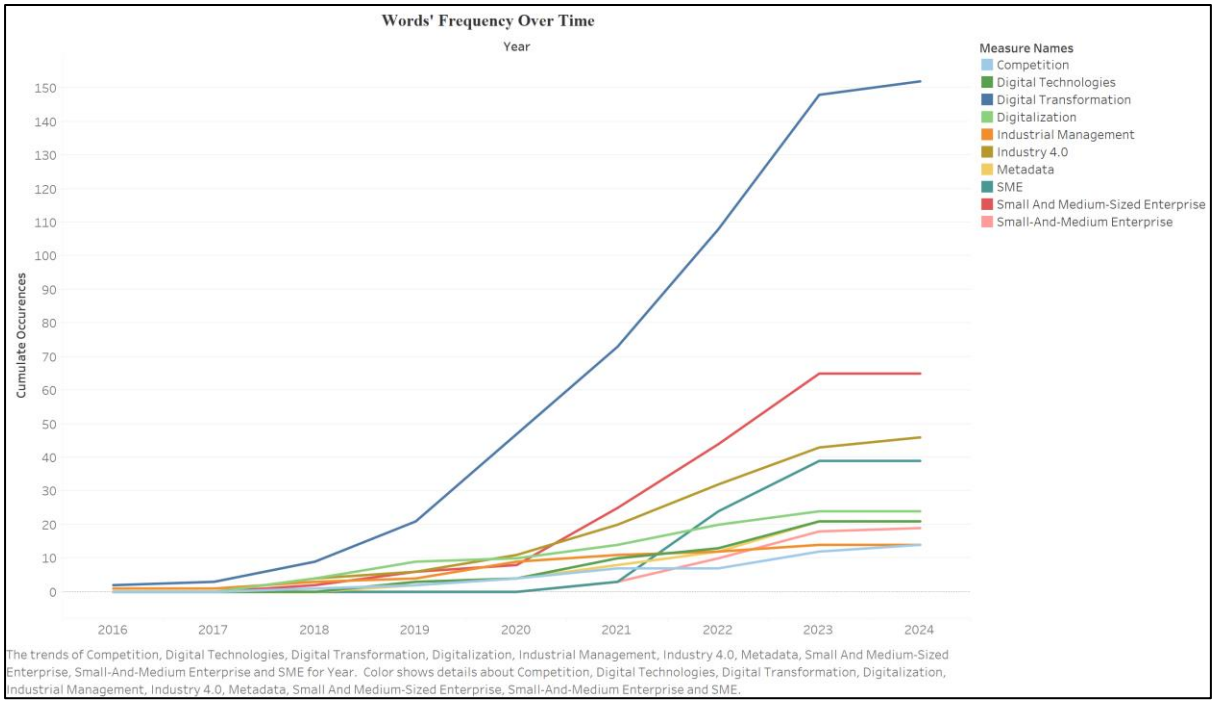
Year	DIGITAL TRANSFORMATION	SMALL AND MEDIUM-SIZED ENTERPRISE	INDUSTRY 4.0	SME	DIGITALIZATION	DIGITAL TECHNOLOGIES	METADATA	SMALL-AND-MEDIUM ENTERPRISE	COMPETITION	INDUSTRIAL MANAGEMENT
2016	2	0	0	0	0	0	0	0	0	1
2017	3	0	0	0	0	0	0	0	0	1
2018	9	2	4	0	4	0	0	0	1	3
2019	21	6	6	0	9	3	2	0	2	4
2020	47	8	11	0	10	4	4	0	4	9
2021	73	25	20	3	14	10	8	3	7	11
2022	108	44	32	24	20	13	12	10	7	12
2023	148	65	43	39	24	21	21	18	12	14
2024	152	65	46	39	24	21	21	19	14	14

Note. Table generated by Biblioshiny.

The bibliographic analysis generated from Biblioshiny, which included 391 documents, showed that “Digital Transformation” is the most commonly used terminology associated with the research activity. It was used over 150 times in 2024, and it has been increasing over the years since 2016. “Small and Medium-Sized Enterprises” was the second-highest term used within the research activity. The abbreviation “SME” was also relatively used in the research process. It thus provided a guideline on the relevance of data and resource materials for the activity. Recent years (2021 -2024) provided the relevant research materials necessary for the activity, with words such as ‘Digital Transformation,’ ‘SMEs,’ ‘Industry 4.0’, ‘Digitalization,’ and ’Digital Media’ being used as keywords.

Figure 10

Cumulative Occurrence Network



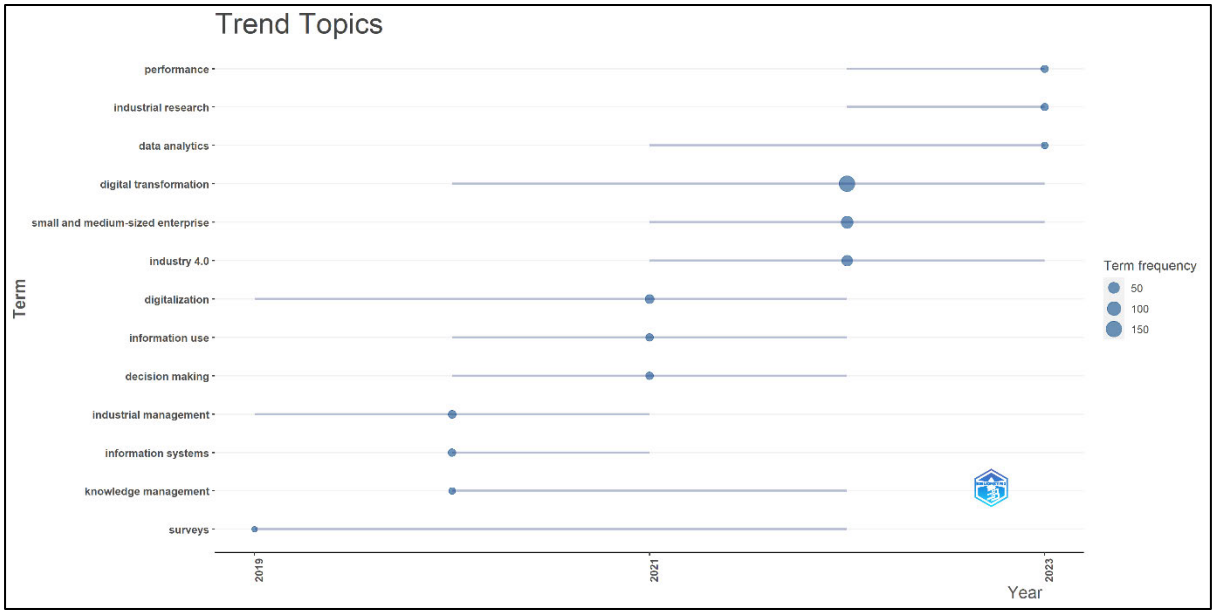
Note. The figure is generated by the author using Tableau; Data is extracted from Biblioshiny.

Trend Topics

The graphic depiction of the themes' historical trends is presented in Figure 11. In the market between 2021 and 2022, digitization, information use, and decision-making were the main trends. The emphasis changed to Industry 4.0, small and medium-sized industries, and digital transformation as of 2022. This change reflects how the industry changed its perspective from just going digital to embracing digital transformation and using cutting-edge technologies provided by the fourth industrial revolution. Research has shown that the success rate of the efforts aimed at digital transformation is abysmally low, at less than 30%, implicating it as being a challenging and complex process (McKinsey & Company, 2018). Consequently, the trend shifted towards performance, industrial research, and data analytics in 2023.

Figure 11

Trend Topics Analysis



Note. Figure generated by Biblioshiny.

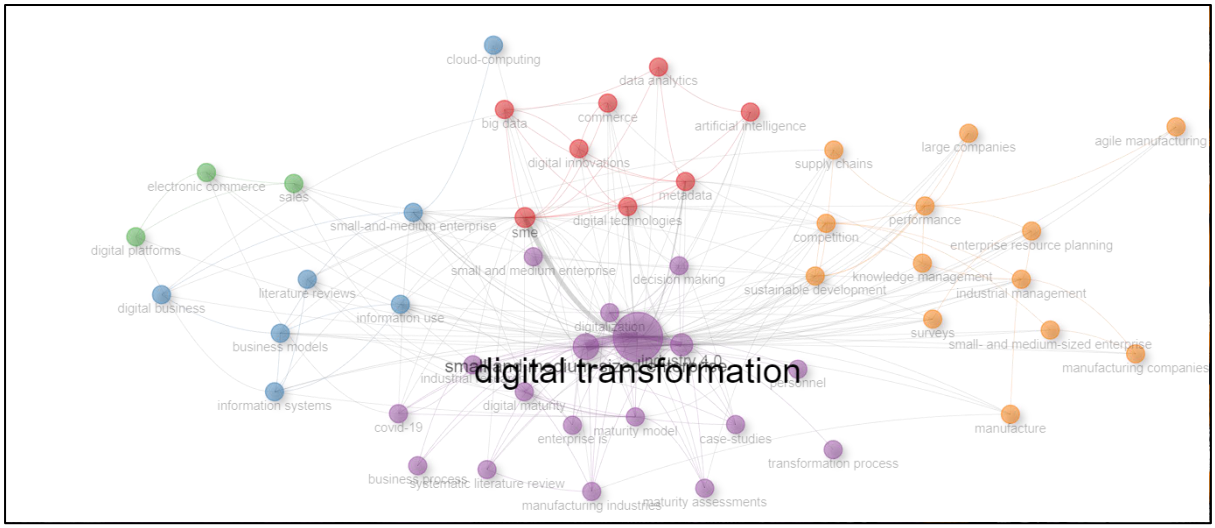
Conceptual Structure

Co-occurrence network

The network of co-occurrence is depicted in Figure 12. It demonstrates the high frequency of occurrence of the terms ‘digital transformation’ and ‘small and medium-sized enterprise’ in the literature. It also suggests a strong connection between the two terms, and SMEs and digital transformation have been extensively discussed.

Figure 12

Co-occurrence Network



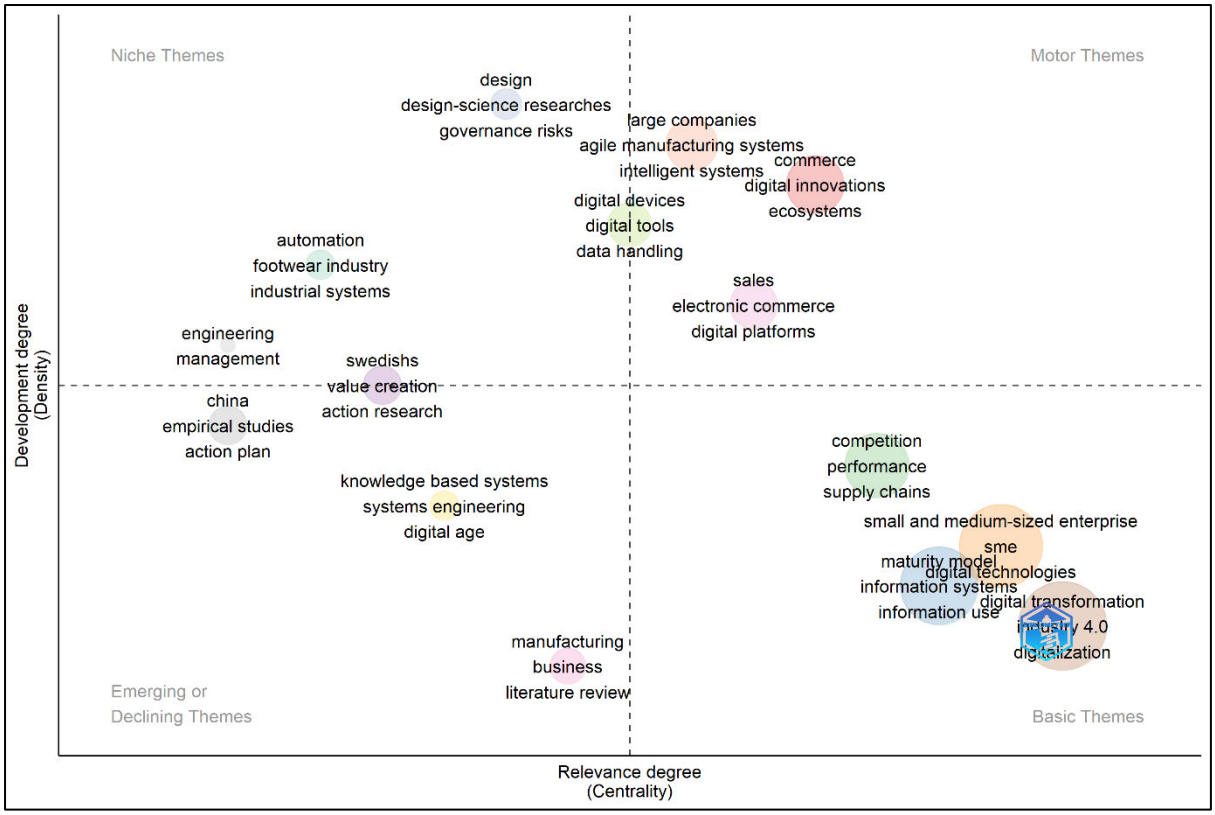
Note. Figure generated by Biblioshiny.

Thematic Map

The thematic map generated by biblioshiny, as shown in Figure 13, depicts that 'digital transformation,' 'small and medium-sized firms' is positioned in the 'basic themes' quadrant, characterized by high centrality and low density (Aria & Cuccurullo, 2022). This implies they hold significance in the area and have strong connections with other topics but have not yet been fully developed.

Figure 13

Thematic Map



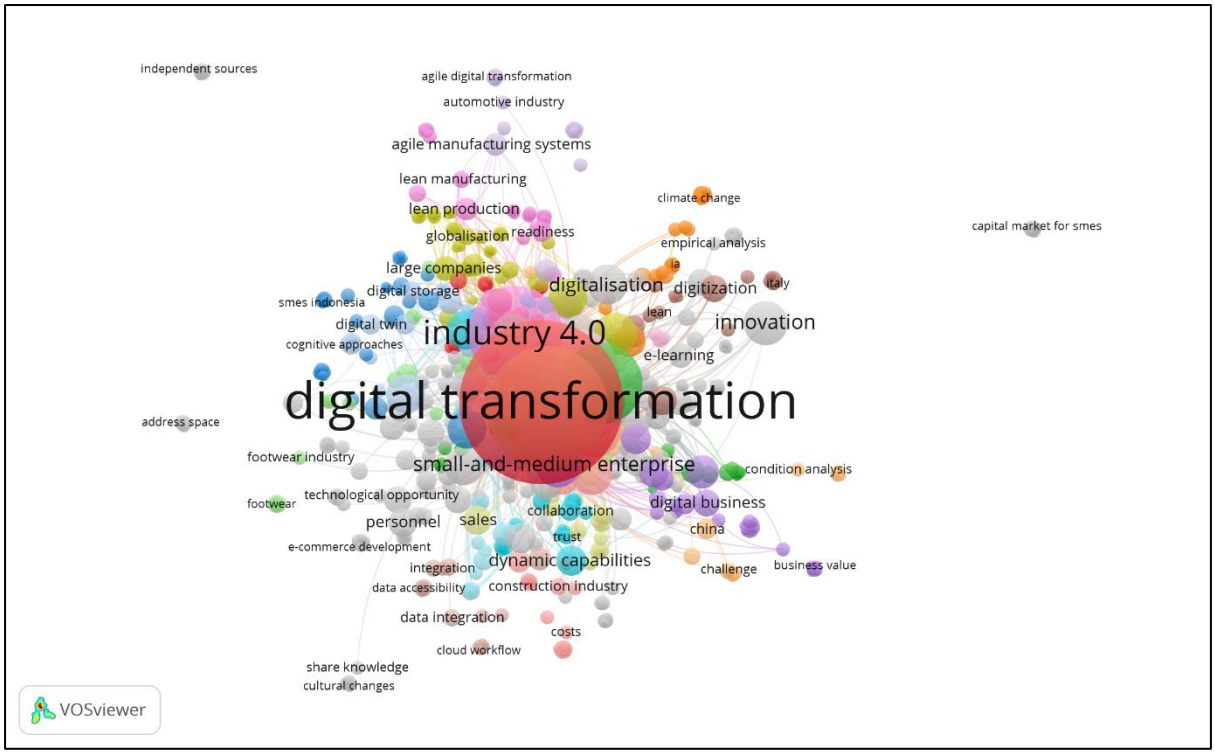
Note. Figure generated by Biblioshiny.

Network Visualisation

The network visualization diagram, produced via Vosviewer, is depicted in Figure 14. Vosviewer is a tool utilized to analyze the bibliographic network. Out of three visualization techniques, network, overlay, and density, the author has utilized network visualization techniques for effective knowledge mapping. This technique involves analyzing the correlation and mapping between objects (Teng et al., 2022). Using this analysis, it has been observed that terms such as “digital Transformation” and “industry 4.0” are the most central concepts in the researched articles. Some other central topics related to this research have also been picked up, like innovation, digitization, digitalization, dynamic capabilities, data accessibility, agile manufacturing, small and medium enterprises, digital business, data intelligence, data integration, agile digital transformation, etc.

Figure 14

Network Visualisation



Note. Bibliographic Network representation depicting central topics used to publish research articles. Figure generated by VOSviewer.

Research Gaps

Digital transformation and its implementation are considered integral to the growth of SMEs today. Research suggests that SMEs need more strategies to ensure that the adaptation and implementation of DT is achieved in SMEs compared to large companies. It, therefore, shows a gap in research that proves it challenging to understand digital transformation and SME success. Another gap is the extent of the research material and information on digital transformation since most researchers have focused on digital technologies rather than digital transformation. The current study would benefit from utilizing organizational change perspectives to understand the role of digital transformation on SMEs. It means that researchers need to find more information on how and why SMEs implement DT

technologies and strategies in their operational transformation within the business, mentioning the opportunities and challenges associated with DT.

The existing research outlines a conceptual model for digitalization in SMEs, focusing on capability building for better production process performance (Chavez et al., 2020). It emphasizes the gradual development of industrial capabilities influenced by a critical literature review and real-case industry application. However, the literature review identifies gaps, such as the lack of practical, simplified guidance for SMEs to integrate performance objectives systematically. It highlights the necessity for models or guidelines on achieving resilience and robustness within the Industry 4.0 paradigm, suggesting that future research could explore the practical aspects of resilience and robustness in the digitalization process of SMEs.

Furthermore, the literature review identifies three significant gaps in the context of Industry 4.0 maturity models for SMEs (Amaral & Peças, 2021). First, these models often neglect the unique needs of SMEs by focusing on higher maturity levels, which are less applicable to the typical operational scale and resources of smaller enterprises. Secondly, there is a notable deficiency in providing detailed guidance and support for SMEs at the initial stages of maturity, leaving these enterprises without a clear pathway to begin their digital transformation journey. Lastly, existing models lack the necessary granularity and holistic approach to thoroughly assess and guide SMEs through the complexities of Industry 4.0 adoption, especially at lower maturity levels. This indicates a pressing need for new frameworks designed explicitly with the nuances and capabilities of SMEs in mind, ensuring these models offer actionable insights and strategies tailored to the early stages of digital adoption.

Subsequent critical gaps exist in existing frameworks for the digital development of SMEs, explicitly highlighting the challenges in adopting e-business models (Depaoli et al., 2020). These gaps include a focus on technocentric models that fail to account for the agile and flexible nature of SMEs, a lack of emphasis on the role of technology concerning business goals and organizational capabilities, and insufficient consideration of the unique paths SMEs might take towards digital adoption. The proposed nonlinear, interaction-based model (Depaoli et al., 2020) aims to address these gaps by emphasizing organizational interactions and integrating digital and non-digital communication methods; however, it is required to explore much in this area.

Small and Medium Scale Enterprises

SMEs are considered integral drivers in modern economies across the globe today, especially in emerging and developing countries. The World Bank considers formal SMEs responsible for the addition of total employment by over 60% and nearly 40% of GDP to economies that are considered emerging. The World Bank also estimates that over 600 million employment opportunities have been made possible with the operation of such SMEs in such economies, mainly in Sub-Saharan Africa and Asia (Ndiaye et al., 2018). Canada (2024) defines SMEs as businesses based on the number of employees being paid. Considering that ‘intermediate’ enterprises are not entirely supposed to have paid workers and self-employment businesses do not have the same, the publication does not entirely acknowledge both groups within its definition scope. The report defines SMEs as entities with between 1 and 499 employees being paid. It represents small businesses as entities that do not have less than one paid individual and do not have more than 99 employees. A medium-sized business is considered an entity consisting of paid employees between 100 and 499. Finally, the report defines a large business as having over 500 or more employees on a

payroll. The Canadian Government report states that as of December 2022, more than 1.2 million employer businesses were registered in the country. About 1.2 million (97.8%) were categorized as small businesses, while over 23,000 (1.9%) were considered medium-sized. Just about 0.3% (<3,100) were large business in nature (Canada, 2024).

Importance of SMEs in the Canadian Economy

As of December 2022, more than 97% of businesses in Canada were considered small businesses, thus comprising the most significant number of SMEs registered in the country (Canada, 2024). SME growth within Canada increased significantly over the years, between 2000 and 2020. However, no growth was recorded in 2013, 2016, or 2020 due to various challenges associated with economic growth. As seen in Canada, SMEs are essential in creating economic growth. It thus brought about positive factors such as employment within the region. About 30% of small businesses within Canada were responsible for the creation of goods-producing industry sectors and survived for at least 20 years. Small businesses contributed about 19% of the overall contribution to the Canadian economy within the services-producing sector (Canada, 2024).

SMEs are considered essential for economic growth in the following ways. One SMEs contribute to economic development within Canada through its ability to favor innovation and flexibility. The ability of SMEs to offer and utilize technological innovations and processes allows them to become flexible, compared to big companies that are mainly focused on improving old products to produce more quantities and generate sales. SMEs create new goods and services, thus allowing them to adapt more easily and quickly to the changing markets (CFI, 2024). It, therefore, enables economies and countries to become positively shaped, with their provision of economic and social benefits as a strategic interest in the Canadian economy.

SMEs allow the creation of healthy, competitive economies and business environments. Canada has seen an increase in the overall growth of the economy and employment. The ability of SMEs to simulate the needed competition for product designs, prices, and efficiency allows other factors, such as monopolies, not to affect the economy negatively (CFI, 2024). SMEs are also known to assist larger enterprises with some aspects of operation, such as supply. Governments also recognize the role of SMEs and thus allow them to be offered incentives such as access to loans. It thus allows a positive contribution to the growth of overall economies.

For instance, in both developed and developing economies, small and medium-sized businesses are critical to any economy in terms of employment and economic growth. For instance, in Canada alone, of 1.22 million-employer businesses as of 2022, 99.7% were comprised of small and medium businesses, with small businesses accounting for 97.8% of businesses and medium businesses accounting for 1.9% of businesses (Tam et al., 2022). The statistics are provided in greater detail in Table 7.

Table 7

Business-wise Statistics in all Canadian Provinces per 1000 individuals

	Small businesses [1–99 employees]		Medium-sized businesses [100–499 employees]		Large businesses [500+ employees]		Total	Number of businesses per 1,000 individuals [18+ Years]
	Number	%	Number	%	Number	%		
Canada	1190027	97.8	23395	1.9	3128	0.3	1216550	38.5

Note. The table depicts a massive 99.7% of employer businesses in Canada are run by small and medium-sized enterprises, data suggested by the Government of Canada, Business Register; Table 17-10-0005-01—Population estimates on July 1, by age and sex; and ISED

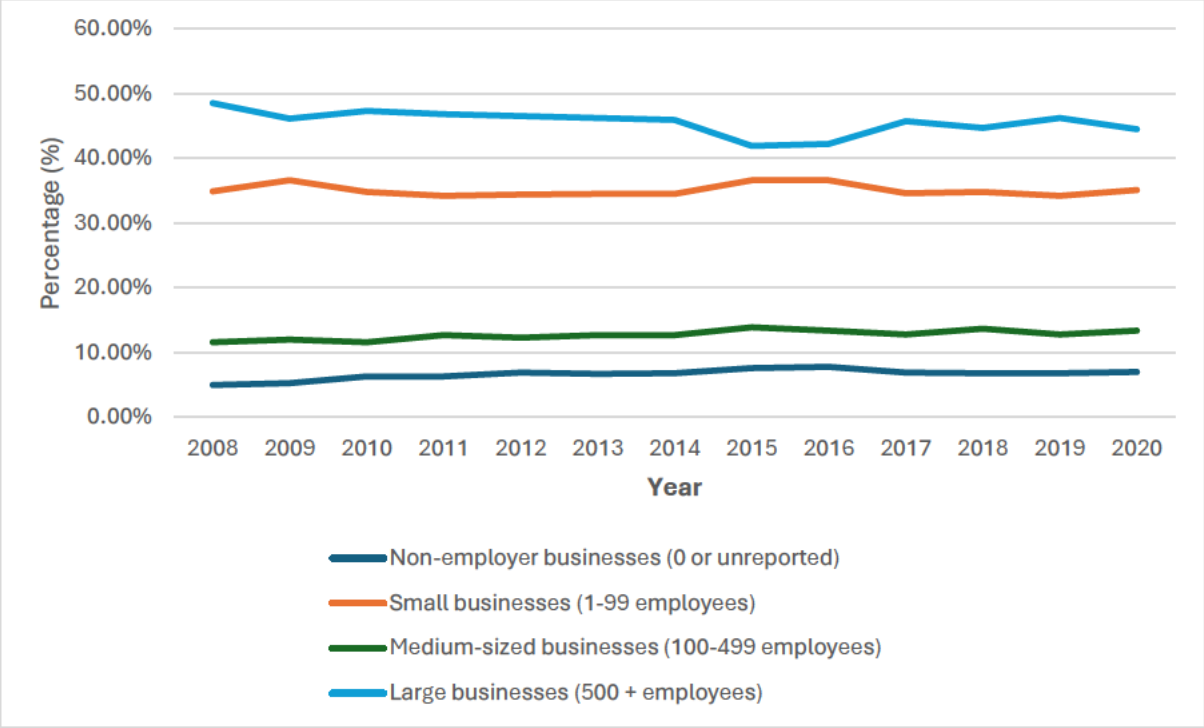
calculations. Data extracted from “Key Small Business Statistics 2023” in Table 1 “Total number of employer businesses by business size and number of SMEs per 1,000 individuals by province, December 2022” by Government of Canada, 2024, *Innovation, Science and Economic Development Canada, Government of Canada* (https://ised-isde.canada.ca/site/sme-research-statistics/en/key-small-business-statistics/key-small-business-statistics-2023). Copyright 2024 by Government of Canada.

Contribution to GDP

GDP, or Gross Domestic Product, is considered the critical measurement of economic production within a country. It can be used to compare the values added to any comparative industries. It means the value an industry adds to its overall inputs through its operational activities. The Government of Canada elaborates that the GDP contribution from business size varies slightly from 2009 to 2020. Large firms' overall contribution declined between 2008 and 2020, decreasing from 48% to 41 % in 2015 (Canada, 2024). An uptick between 2017 and 2020 followed it. The contributions made by non-employers and medium-sized firms show an increase, while the overall GDP of small SMEs did not change between 2008 and 2020. The overall contribution of small SMEs towards the Canadian GDP was about 35% by 2020, while that of medium-sized businesses was 13% (Canada, 2024). Large firms contributed to over 44% of the country's overall GDP, thus showing that the overall contribution of SMEs to the Canadian economy was over 48%, as illustrated in Figure 15. Moreover, sectors such as agriculture and construction contributed to the Canadian economy, showing 74% and about 77% of the country's GDP, respectively, and food services and accommodation, which are service-producing sectors, contributed to over 78% of Canadian GDP (Canada, 2024).

Figure 15

GDP Contribution as per Business Size



Note. Figure generated by the author using Excel. The figure depicts the SMEs and other sized businesses' contribution from 2008-2020 to Canada's gross domestic product. Statistical data retrieved from "Key Small Business Statistics 2023" in Figure 14 "Contribution to GDP by business size, Canada, 2008–2020" by Government of Canada, 2024, *Innovation, Science and Economic Development Canada, Government of Canada* (https://ised-isde.canada.ca/site/sme-research-statistics/en/key-small-business-statistics/key-small-business-statistics-2023). Copyright 2024 by Government of Canada.

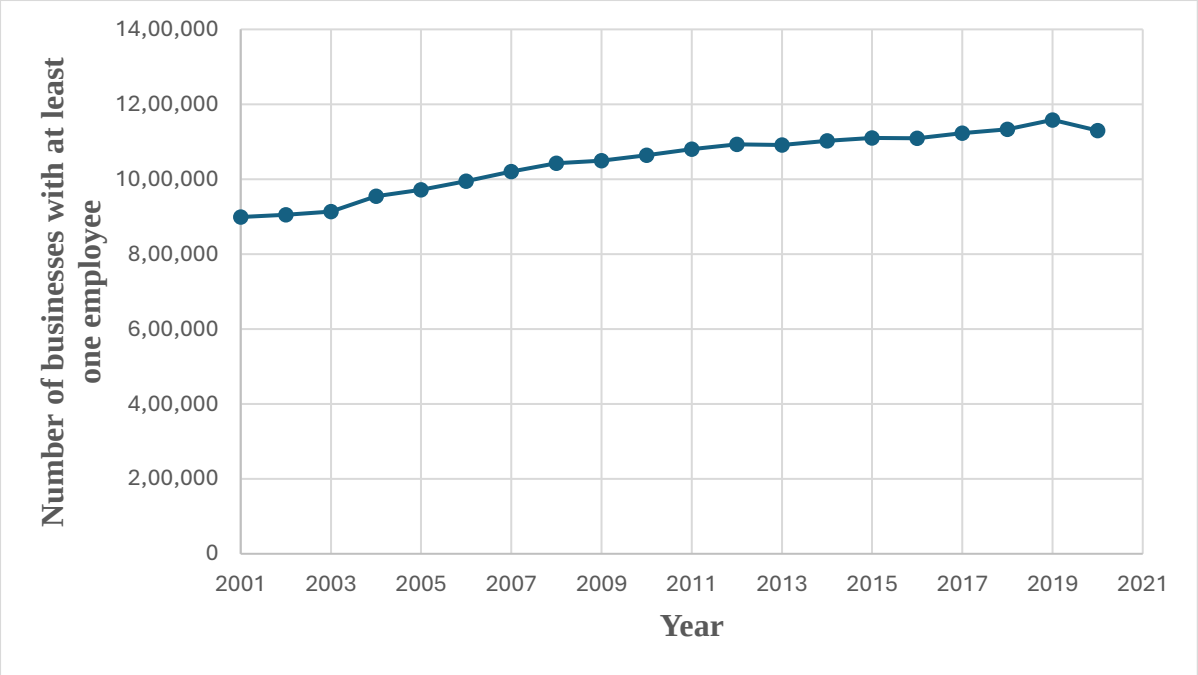
Growth Rate

Organizations and businesses considered to have a high contribution to wealth creation and employment portray high growth within a short time. Canada (2024), the appearance or disappearance of SMEs within Canada is greatly attributed to how businesses are created or seize operations within the economy over time. Such a phenomenon is considered "creative destruction" of the operation capabilities of SMEs. Figure 16 illustrates that the number of small enterprises as of 2019 has increased yearly (Canada, 2024). However, three years, 2013, 2016, and 2020, were considered different in the overall growth

rate of businesses in Canada, where more businesses disappeared (Canada, 2024). The overall creation between these three periods saw over 95,000, 94,600, and 91,000 firms created, compared to over 97,000, 95,000, and 120,00 businesses collapsing in their operations and shutting down in their respective years, as elaborated in the figure below. Between 2016 and 2020, small businesses were created, with an average of over 100,000 each year, while over 96,000 disappeared (Canada, 2024).

Figure 16

Appearance of small businesses within Canada from 2001 to 2020



Note. Figure generated by the author using Excel. The figure depicts a gradual shift in the number of small businesses within Canada since 2001, data sourced from the Government of Canada, Economic Analysis Division, National Accounts Longitudinal Microdata File, and ISED calculations. Statistical data retrieved from "Key Small Business Statistics 2023" in Figure 1, "Number of businesses with 1–99 employees, Canada, 2001−2020" by Government of Canada, 2024, *Innovation, Science and Economic Development Canada, Government of*

Canada (https://ised-isde.canada.ca/site/sme-research-statistics/en/key-small-business-statistics/key-small-business-statistics-2023). Copyright 2024 by Government of Canada.

Problems/Survival Rate

A fluctuation in the number of businesses is considered the net result of the appearance or disappearance of such entities over time and is known as "creative destruction." The number of small businesses between 2000 and 2020 saw that small businesses increased every year. However, 2013, 2016, and 2020 were significant because they showed that more businesses disappeared during these periods. The Canadian economy saw that over 100,000 businesses were created between 2015 and 2020, while over 96,000 disappeared. Business birth rates in goods-producing industries or sectors were lower than in service-producing sectors (Canada, 2024). With challenges such as the COVID-19 pandemic, business creation declined sharply and recorded a low of about 3.5%, the lowest recorded statistic ever. Over the past five years, the average birth rate of businesses in the goods-producing sector was above 6%, different from the >7.5% increase in business creation in the service-producing sector. On average, over 17,000 businesses were created, and over 18,000 businesses went down in the goods-manufacturing sector, while over 57,000 businesses were made in the service-producing sector, and over 61,000 collapsed (Canada, 2024). The variation seen between the rates of these two sectors could be elaborated in part by the different competition levels and the entry costs of businesses. It means that higher birth rates would be seen in industries or sectors with lower entry costs or higher competition levels than other sectors.

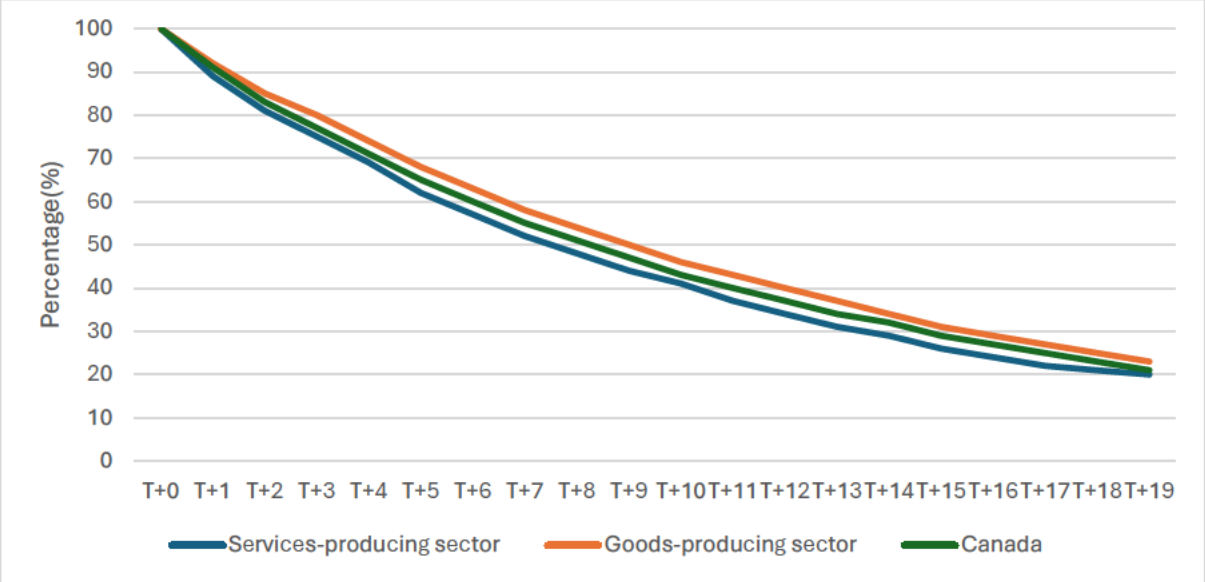
Businesses in both the goods-manufacturing and service-producing industries exhibited similar survival rates in the first two years after their inception. After the third year, the survival rate in the goods-producing sector was higher than in the service industry. Over 68% of businesses in the goods-manufacturing industries were still operational within their

fifth year, compared to 55% of businesses in the service industries. After ten years, the service businesses showed a lower survival rate in their business operations (35%) compared to over 50% in the goods-manufacturing sectors (Canada, 2024). Over 30% of businesses in the goods-producing industries were still operational after 19 years compared to the 19% of service industries and businesses once they entered the Canadian market. Business survival rate and initial business sizes showed a positive correlation in Canada. Business entities that started operations with many employees had a higher survival rate than small, employee businesses. Business operations that began with an employee workforce of less than five were still active after five years (over 62%), and about 40% were still active after ten years (Canada, 2024). Over 25% of businesses were still operational after 19 years, compared to entities that started operations with an employee workforce of between 20 and 99 (over 74%).

Despite SMEs' massive segment of business in Canada, the data shows that the survival rate of small businesses is much less than that of big businesses. The graphical representation of the survival rate of SMEs with time can be seen in further detail in Figure 17.

Figure 17

Sector-wise Survival Rate of Small Businesses within the Canadian Economy



Note. Figure generated by the author using Excel. The figure depicts the decline in the survival rate of small enterprises within Canada, data sourced from the Government of Canada, Economic Analysis Division, National Accounts Longitudinal Microdata File, and ISED calculations. Statistical data retrieved from "Key Small Business Statistics 2023" in Figure 4 "Survival rate of businesses with 1–99 employees, goods-producing sector and services-producing sector, Canada" by Government of Canada, 2024, *Innovation, Science and Economic Development Canada, Government of Canada* (https://ised-isde.canada.ca/site/sme-research-statistics/en/key-small-business-statistics/key-small-business-statistics-2023). Copyright 2024 by Government of Canada.

With the current evolution of current businesses, SMEs opted for external financing decisions to ensure survival. It thus led to other companies not having the capacity to incur debt, as seen by smaller businesses. However, these smaller businesses showed their inability to maintain cash flow, which was sufficient for their operation, and thus hindered them from having liquid cash and the financial capability to operate (Tam et al., 2022). DT increases operational efficiency and thus enhances the business's propensity to save.

SMEs have been considered a significant driver for growth in the Canadian economy. In 2021, small enterprises contributed to over 98% of all employer SMEs within the country. They were responsible for employing over 10 million employees in Canada, almost two-thirds (>63.5%) of the total labor force. On the other hand, medium-sized businesses employed just over 3 million employees (21.1% of the complete labor force), while large businesses contributed to over 15% of the total labor force (2.4 million employees). It thus shows the significant contribution of small businesses in creating Canadian employment as a driving factor within the country's economy (Tam et al., 2022).

Statistics Canada surveyed to find out the various operating business conditions within the country as of January and February 2022. Based on the survey results, small enterprises were considered to have a beneficial outlook. These enterprises were also likely to experience decreased profits and sales. They were less likely to expect consumers demanding their products and services to grow than medium and large businesses in the coming months. Small businesses were also likely to increase their overall employment numbers, increase debt, and have liquid assets to assist their operations (Tam et al., 2022).

Focus Areas and Challenges with SMEs

Small Businesses Show A Less Optimistic Outlook than Larger Businesses

Smaller businesses were likely to record minimal revenues in 2021 compared to the previous two years. Over half the businesses with less than 20 employees showed lower revenues in 2021. In contrast, over 41% of businesses with employees between 20-99 and over 34% of organizations with over 100 employees recorded lower revenues (Tam et al., 2022). Furthermore, small businesses showed less optimism for their operations within the coming year. Over 68% of businesses with less than 20 employees reported having a positive

outlook in the coming year, while over 82% of medium-sized businesses and 84% of large businesses showed the same promising future outlook as well (Tam et al., 2022).

Sales Expectations of Small Businesses Recorded Low Since Last Quarter

Smaller businesses were likely to experience a short-term decrease in sales. Nearly 18% of small businesses with less than 20 employees are expected to experience a sales decrease in the next three months. Less than 9.4% (every 1 in 10 medium-sized businesses) with 20-99 employees and over 7% of businesses comprising 100 or more employees also expected the same outcome. Small businesses were also likely to expect increased demand for their products and services to increase in the next few months (Tam et al., 2022). Over 24$ of small-sized businesses expected an increase in their goods or services demand within this period. In contrast, over 38% of medium-sized and 34% of large-sized businesses expected the same. On the other hand, profitability would see about 35.5% of small businesses and 28.5% of medium-sized businesses experience a decrease in their profitability, compared to about 19% of large businesses.

Financial Constraints affect Small Businesses more than Large Businesses.

As the current business environment within Canada continues to change, external financing is needed to ensure its survival. As a result, some organizations and companies reached a point where they could avoid incurring more debt, and fewer businesses were likely to experience this challenge (Tam et al., 2022). It also saw small businesses needing the ability to maintain sufficient cash flow, which became an obstacle to their overall sustainability and survival. Thus, they needed more cash or liquid assets for operations.

Over 26% of small businesses reported their inability to incur more debt, compared to over 16.5% of medium-sized businesses and over 6% of large businesses who reported the same. The previous quarter saw these statistics being lower than the current numbers, with

over 20% of small businesses, 11.9% of medium-sized businesses, and 5.5% of large businesses reporting that they could not incur more debt to facilitate their operations (Tam et al., 2022). Around 22.9% of businesses (small) and 18.3% of medium-sized businesses experienced steady cash flow maintenance as a financial challenge in their operations over the next few months. It was compared to the 8.7% of large businesses reporting similar concerns (Tam et al., 2022). Over 75% of all businesses had liquid assets and cash for operational purposes, with 82% and 85% of medium-sized and large businesses reporting the same (Tam et al., 2022).

Digital Transformation

A change process is considered fundamental and is enabled by digital technologies to bring innovation and improvement to a business. DT is how an organization utilizes or uses digital technologies to develop new digital operations and business models that help create and appropriate a company's value. It aims to improve any business by triggering or causing major priority changes. Such changes are done using combinations of information, communication, computing, and connectivity systems (Mikalef & Parmiggiani, 2022). Today, most organizations utilize these three definitions in a sequential order of maturity, which allows the overall transformation of their operations digitally. However, various challenges always accompany such changes, and the use of technology is considered the only way to address such issues within the complex puzzle and thus provide the needed comparative advantage in a digital world.

Opportunities Pursued in Digital Transformation

Various opportunities are created by SMEs' utilization of digital transformation. The main opportunities achieved by implementing digital transformation include improved consumer relationships, operational efficiency, and improved products and manufacturing.

SMEs will improve operational efficiency using digital technologies such as ERP and related systems. Using such technologies ensures that HR and logistics functions become efficient in any SME. Cost reduction is another significant attribute associated with improved organizational efficiency, resource management, and consumer and product relationships (Liu et al., 2011). Digital transformation allows various organizational changes within SMEs, such as structural and people changes that can benefit the business (Verhoef et al., 2021).

Challenges for SMEs in Adopting DT

There are various challenges associated with the implementation of digital transformation within SMEs. Most challenges are always associated with the need for more skills, knowledge, and capabilities by either management or employees within an organization. In most cases, larger companies will always face such challenges. However, most will argue that factors such as the organization's size influence attributes such as their ability to attract talented staff (Aspara et al., 2013). SMEs might be challenged in addressing this issue due to their nature and size, and they might not have the resources to recruit or train them. Leadership is also considered a significant aspect that would influence the success or failure of DT within any SME.

Employee resistance has always been associated with management (Rogers, 2016). Their inability to change, adapt, or accept new organizational arrangements or the change of substantive skills within the company threatens overall employment and efficiency. In most cases, the implementation of digital transformation has led to top management and CEOs focusing on the implementation process, compared to their employees, and factors such as training and development to handle such technologies have yet to be achieved within the overall change process.

Other challenges include the efforts of SMEs to influence partners such as their suppliers to improve the use of digital technologies, which is considered a resisting factor for small companies with fewer resources and financial powers.

Other factors, such as cybersecurity and threats, have also been associated with using and implementing digital transformation in SMEs. The reliance on such digital technologies has made organizations vulnerable to cyber-attacks and breaches that have affected their operational capacity and efficiency and thus might have significant effects such as decreased consumer interaction and satisfaction. Finally, financial challenges have also affected SMEs' implementation and use of digital transformation strategies. Financial resources for implementing expensive and current digital technologies might be less readily available to SMEs than to large companies (McLaughlin, 2017).

Organizational Change

Organizational change can be defined as the alteration or adjustment within any organization that has the ability and potential to influence the firm's stakeholders' psychological or physical experiences. Thus, organizational change can take many forms and is always influenced by the organization's leadership and management structures. Various research has been carried out on organizational change and has evolved over the years; several perspectives have been developed. With earlier theories stressing the importance of goal-directed and rational decision-making processes, organizational change needs to be clearly understood within an organizational perspective as an instrumental tool and a means of attaining efficiency needed in the achievement of organizational goals (Hodges & Gill, 2015).

Other theoretical perspectives have been closely associated with organizational change, focusing on the physiological and ecological perspectives and the resource-

dependent aspects related to change, aiming to understand its nature (Smith & Graetz, 2011). Over the years, traditional planned change management strategies have involved various sequential steps in changing and transforming the organization and employee behavior.

ADKAR Model for Organizational Change

Jeff Hiatt, the founder of Prosci, formulated a change management model based on one principle: organizational change can only be made possible when individuals or employees change. In most cases, organizational change always fails because employees resist it, and leaders need to implement the right strategies to engage their employees in accepting and embracing such changes (Hodges & Gill, 2015). Implementing the management model removes these problems by ensuring managers are equipped with the necessary strategies and that employees have the required information and drive to navigate these changes smoothly within the organizations. The overall organizational change model is based on the five main goals – Awareness, Desire, Knowledge, Ability, and Reinforcement, that are embedded in the management process.

ADKAR model is always considered an outcome-oriented change model and thus can achieve organizational change within SMEs to ensure that clear milestones have been achieved throughout the change process. Therefore, to successfully implement such a model, managers need to create awareness of the need for change through communication (Hodges & Gill, 2015). Fostering the desire to make such changes among employees is necessary by elaborating on the benefits of implementing such changes. The provision of knowledge is equally important. It eliminates the chances of employees resisting and thus accepts change implementation readily (Hodges & Gill, 2015).

Opportunities Pursued in Organizational Change

The emergence and implementation of the Internet introduced numerous opportunities for new business models and faster means of communication, revolutionizing aspects such as understanding and reaching one's customers (Parra-Sanchez & Talero-Sarmiento, 2023). Therefore, the purpose of digital transformation was to improve consumer relationships and increase overall consumer satisfaction with new value propositions, which have become more critical.

DT. Roger (2016) implies that for an organization to realize the opportunities of DT, it (companies) must realize that business rules do not apply. There are five dimensions that Roger (2016) considers essential for digital transformation in any given business. They include consumers, competition, innovation, data, and value. Finally, value propositions must be defined by the rapidly changing consumer needs (Hodges & Gill, 2015).

Challenges for SMEs in Adopting Organizational Change from the Perspective of DT

Various challenges have been associated with the implementation and success of digital transformation. Aspects such as how organizations acquire this resource and their developmental capabilities would influence the success of DT and any organization. Other factors, such as leadership style and the cultural aspects of an organization, would also play an essential role in determining the success of DT in an organization (AlNuaimi et al., 2022; Hock et al., 2015). For SMEs, challenges in achieving digital transformation might differ from those of larger companies due to size and characteristics. One major challenge for SMEs is that they have resource limitations that might affect their achievement of digital transformation, mainly in management, skill power, and finance.

Studies related to digital transformation within SMEs focus mainly on large companies compared to SMEs. Li et al. (2017) argue that SMEs' likelihood of aligning their

overall business and digital strategies would allow them to achieve digital transformation. Other studies have shown that using digital transformation in SMEs positively relates to global competitiveness and innovation. Smaller SMEs have a higher risk and thus become victims of digital transformation than beneficiaries (Sommer, 2015). Only some studies are related to exploring the change processes associated with digital transformation within SMEs. The theories associated with the organizational change process can be utilized to provide a clear understanding of all the opportunities and challenges brought about by digital transformation and how they can effectively engage in them.

Proposed Digital Transformation Framework

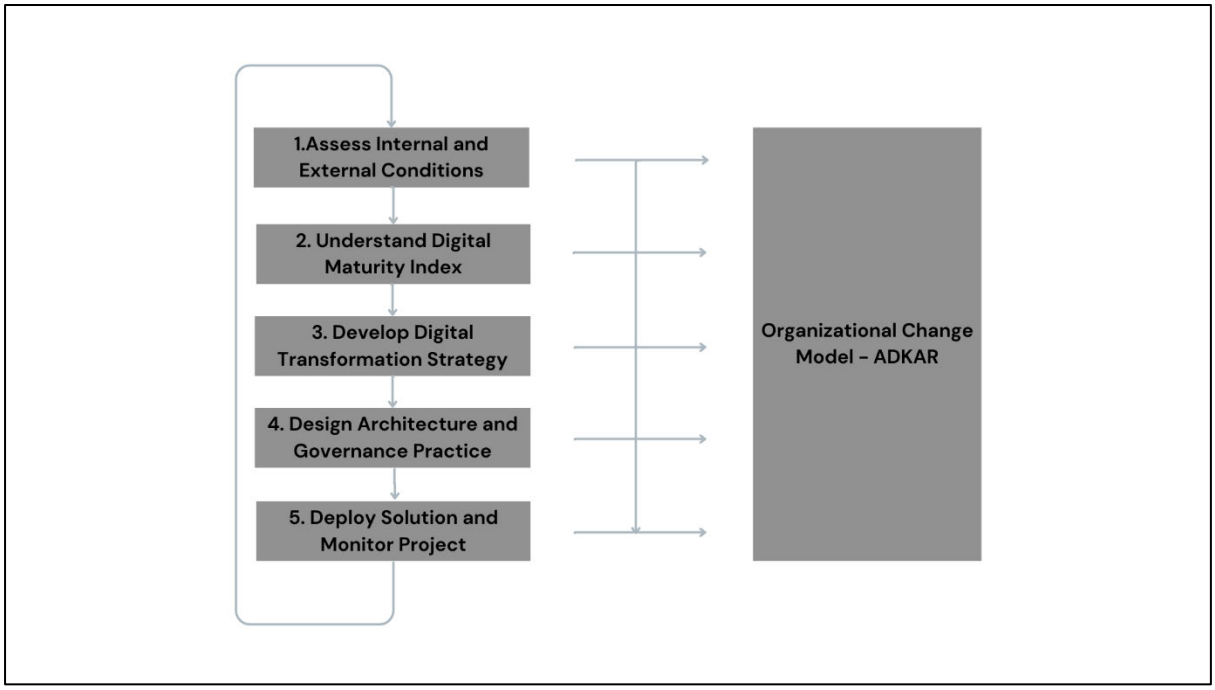
Based on the analysis of research papers, the author has compiled a list of DT framework methodologies, as shown in Annexure B. This has crucially helped the author in proposing a comprehensive DT framework. The framework involves utilizing three different models to comprehensively mount DT for SMEs.

- Digital Transformation framework, as outlined in the book, 'Digital Transformation in Norwegian Enterprises' by Mikalef and Parmiggiani (2022).
- Utilizing the digital maturity index approach to gain insight into the digital readiness of the organization.
- Organisational change models that integrate the techno-social aspect of the organization.

The proposed DT framework for SMEs is shown in Figure 18.

Figure 18

Proposed DT Framework for SMEs



Note. Figure generated by the author using Canva.

Step 1: Assess Internal and External Conditions.

This is the initial stage of the DT framework process, in which the organization will analyze the internal and external factors that will help them successfully implement digital transformation (Mikalef & Parmiggiani, 2022).

Internal condition analysis involves examining the existing business model, organizational culture, and structure and comprehending the workflow of the process (Mikalef & Parmiggiani, 2022).

External condition refers to the analysis of technology advancements and changing customer requirements in the market. It can assist the organization in capitalizing on capturing the appropriate market segment and providing it with proper technologies (Mikalef & Parmiggiani, 2022).

Analysis within SME Environment

Implementing digital tools such as online consumer relationship management (CRM) platforms, which would allow the customers to raise any query or access information about the products they need in real-time, is a means of increasing efficiency and productivity in the company's operations. Therefore, implementing such systems would be necessary for an SME to understand the internal and external environment.

Step 2: Understand the Digital Maturity Index

The second step is the most crucial stage in the DT framework process. Assessing the digital preparedness of the organization is crucial for a thorough understating of its current digital parameters. The author's consolidation of digital maturity models from research papers is shown in Annexure A. Table 8 displays a range of pertinent digital maturity index models that the organization can explore to determine its digital maturity index.

Table 8

Digital Maturity Models Assessment

Feature/Model	**SM3E Maturity Model**	**Multi-Attribute Digital Maturity Model**	**Industry 4.0 Maturity Framework for SMEs**
Model	Smart Manufacturing Maturity Model for SMEs	DIGROW into a multi-attribute digital model	Industry 4.0 Maturity Framework for SMEs
Author	(Mittal et al., 2018)	(Di Felice et al., 2022)	(Amaral & Peças, 2021)
Objectives	To support Digital Transformation in SMEs towards Industry 4.0	To assess the digital maturity extent in SMSs and guide them in DT	To provide SMSs with comprehensive assessments for their industry 4.0 readiness
Determinants	Five Organizational dimensions (Finance, People, Strategy, Process, and product), Seven toolboxes, Five maturity levels	Three Stages - sensing, seizing, transforming	Technology, Production processes, people, change, smart products, and organization

Unit of Analysis	Individual SMEs	Individual SMEs	Individual SMEs
Development Approach	Developed through interviews, literature reviews, and industrial visits.	Utilizing the DEXi software in the transformation of the DIGROW framework	Creation of a comprehensive approach for SMEs through the integration of various framework models associated with DT
Uniqueness	Toolboxes are the preferred practical tools used in SME progression.	An in-depth attribute-based analysis is provided for SME DT	Offers a holistic view across multiple dimensions
Focus Ares	Guiding DT in SMEs towards Industry 4.0	Detailed DT stages if the focus towards SMEs	SMEs are equipped with a comprehensive understanding related to Industry 4.0 readiness.
Limitations	All digital transformation aspects outside predefined dimensions and toolboxes are not fully covered.	Detailed analysis requires significant data and can be overwhelming for SMEs	SMEs without guidance might find it comprehensive in its adoption.
Approach	Primarily qualitative	Qualitative	Primarily Qualitative

Note. Table generated by the author.

Analysis within SME Environment

SMEs can utilize the ‘Industry 4.0 Maturity Framework for SMEs’, proposed by Afonso Amaral and Paulo Peças (2021), to accurately assess the organization’s level of digital maturity. The advantage of employing this model is its ability to assess the firm’s maturity level across six dimensions: Technology, Production processes, people, change, smart products, and organization (Amaral & Peças, 2021). It can assist the SMEs in comprehending digital maturity at a granular level.

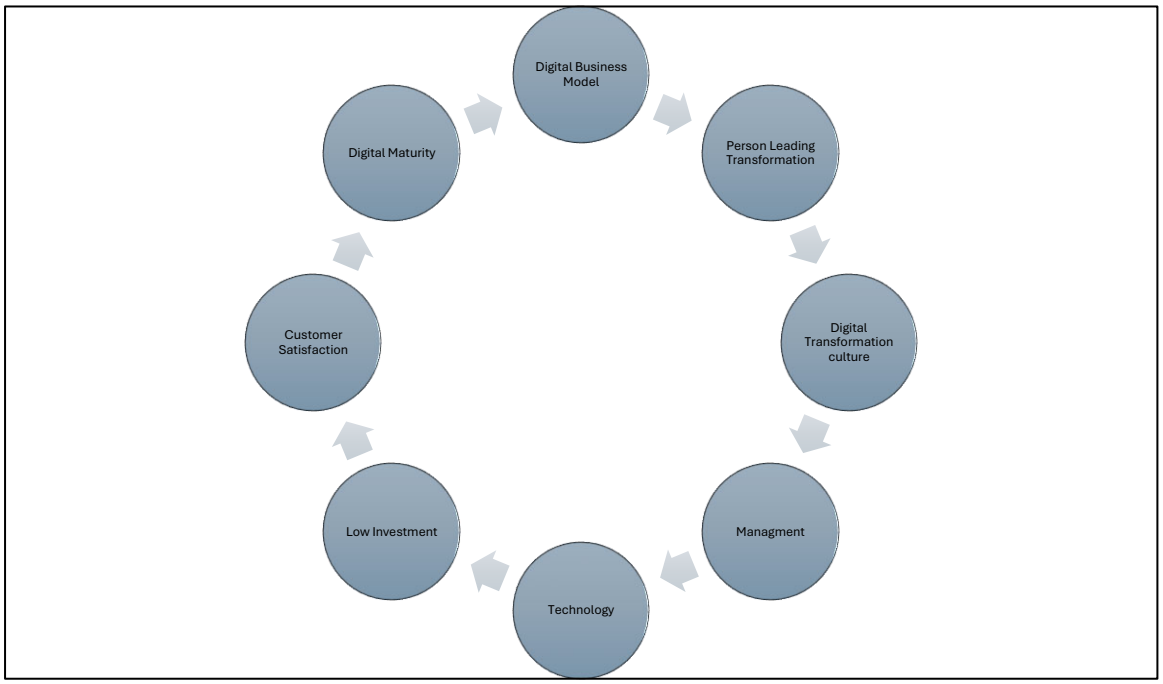
Step 3: Develop a Digital Transformation Strategy.

This step entails creating a digital transformation strategy that aims to allow managers to understand their operational environment holistically while ensuring that short-, medium-term, and long-term organization objectives are considered and explored.

According to a study conducted by Kargas et al. (2023) on Greek SMEs, it has been demonstrated that an effective DT strategy consists of 8 essential components, as shown in Figure 19.

Figure 19

Digital Transformation Strategies – Key Elements



Note. Figure generated by the author.

- **Digital Business Model**: It aims to redefine company models by utilizing new technologies and digitizing old processes to minimize losses and maximize revenues (Kargas et al., 2023).
- **Person Leading Transformation**: Here, the top executives play a pivotal role in spearheading the process of transformation. It is responsible for demonstrating effective leadership abilities, particularly in establishing a clear vision and ensuring its implementation throughout the organization (Kargas et al., 2023).
- **Digital Transformation Culture**: It emphasizes establishing a conducive environment for learning and development, enabling the organization to readily accept change with minimal resistance (Kargas et al., 2023).
- **Management**: It focuses on developing plans, establishing the timeframe, and using key performance indicators (KPIs) to assess performance (Kargas et al., 2023).
- **Technology**: It is the cornerstone of the DT strategy. It entails identifying the appropriate technology to streamline the business (Kargas et al., 2023).
- **Low Investment**: SMSs often face limitations in terms of resources and money. An efficient DT for SMEs should prioritize maximum efficiency in process implementation while minimizing investment (Kargas et al., 2023).
- **Customer Satisfaction**: With the evolving demand of consumers, ensuring customer satisfaction is crucial in formulating DT strategies. Utilizing cutting-edge feedback tools and techniques to improve customer satisfaction (Kargas et al., 2023).
- **Digital Maturity**: It focuses on the digital readiness of the organization. It is an ongoing process where the evaluation of current business models and working on the improvement areas occur simultaneously (Kargas et al., 2023).

The digital transformation strategy should cover all the elements holistically so that DT can be embraced by the organization holistically and implemented at all levels using the top-down approach.

Analysis within SME Environment

In SMEs, aspects such as understanding why consumer satisfaction is low have risen might be due to factors such as substandard goods being produced or low productivity in their operations. Therefore, management in the company should implement mitigating measures (Ellstrom et al., 2021).

In this case, implementing an online customer information portal, for instance, would allow the company to determine its consumer needs and understand the overall market dynamics. Utilizing this DT framework would mean that management will view their core business and reach ‘Horizon 1’ (Lucidspark, 2024) while understanding what business operations are working and which are not. It would allow them to see what products or service-related products are preferred over others. It would also allow them to exploit the various emerging opportunities within their business environment and move towards ‘Horizon 2’ (Lucidspark, 2024).

Understanding trends within the market will enable the company to understand its consumers and make products tailored to their needs. Thus, it will retain and increase its market share, allowing a competitive advantage over other small and medium-sized companies (Carrijo et al., 2021).

Finally, understanding such consumer trends will enable SMEs to focus on opportunities such as creating new products, focusing on new markets, or setting up new divisions within the organization to meet consumer needs. This will help them to establish

long-term objectives and step into the zone of ‘Horizon 3’ (Lucidspark, 2024). Entering Horizon 3 would not generate immediate results; however, it proves to be fruitful in creating novel sources of revenue generation for the company (Lucidspark, 2024).

Implementing such a framework will allow the SMEs to align their overall goals and objectives with their vision and visualize the future for easy management and operations.

Step 4: Design architecture and governance practices.

After developing the digital transformation strategy, the subsequent step involves designing a detailed architectural plan that outlines specific implementation steps and key performance indicators (KPIs) for assessing performance and deviations. This phase consists of establishing governance practices that determine how technical methods are utilized and how resources are mobilized (Mikalef & Parmiggiani, 2022).

Analysis within SME Environment

In SMEs, addressing issues such as the sourcing of loyal and qualified workers would entail management developing action plans that will allow them to monitor their organization’s performance (Ifeoluwa et al., 2022).

Using KPIs, for instance, would enable them to understand the challenges in employee productivity, or using positive feedback channels will explain why employee turnover is high. Designing such structures should be done in a manner that allows each manager and employee to be assigned roles suited for them and with the needed knowledge and skills to do them. Management could also utilize training and development or incentives to ensure employees are loyal and committed to the organization. This practice would allow SMEs to capitalize on and use their human resources as an emerging opportunity to ensure high productivity and production and meet their consumers’ needs (Aspara et al., 2013).

Step 5: Deploy the solution and monitor the project plan.

Reinforcement of such strategies is essential in ensuring that success in implementing strategies within their operations is achieved. It allows them to have a clear and defined vision of the long-term goals they want to be associated with the success of the business and thus will implement various factors such as initiative prioritization in their process, as well as monitor progress and evaluation of performance (Mikalef & Parmiggiani, 2022).

Analysis within SME Environment

The organization's management is needed to ensure success and competitive advantage, which is essential for an SME. Systems such as implementing an online consumer information platform will allow them to prioritize their initiatives of coming up with new and innovative products that will increase their competitive advantage compared to pushing old or obsolete products, thus moving from proof-of-concept to production (Yeow et al., 2018). When addressing issues such as improving employee performance alongside using digital technologies, the organization will utilize KPIs to ensure that performance evaluation is achieved. It allows the creation of performance measurement criteria and thus makes the organization thrive and achieve its overall goals and objectives.

Step 6: Integrating Organizational Change Model

The ADKAR model would be considered a strategic management measure utilized by the company since it would eliminate various problems associated with change by ensuring leaders are equipped with the necessary strategies and that employees have the required information and drive to address these changes smoothly within the organizations (Parra-Sanchez & Talero-Sarmiento, 2023). The framework relies on the five main goals (Awareness, Desire, Knowledge, Ability, and Reinforcement), which would allow them to achieve an outcome-oriented goal and thus achieve the needed organizational goal within the

company. To address the issues or challenges affecting them, management needs to implement an organizational change framework at every stage of the digital transformation process to achieve positive change and to solidify it.

Analysis within SME Environment

Managers in SMEs need to create awareness among their employees about the need to implement such a change within their overall operations. They will expound on the company's challenges in not achieving overall consumer satisfaction from either underperforming or not providing the consumers with the desired products (Ghobakhloo & Iranmanesh, 2021). Implementing such an online operational tool means that employees would need the desired training in utilizing such digital technologies, and thus create the needed desire for them to learn and see its importance by the ADKAR Model. It, therefore, means that for the company's management to utilize such a change, they need to have a holistic view and understanding of all the internal and external issues within the business that might affect the cost of rising demand of their consumers (Masoud & Basahel, 2023). Therefore, understanding factors such as competition, quality of goods produced, customer relations, or production output status within the organization should allow management to make the needed decisions and implement strategies.

Results for Framework

The utilization of this framework within an SME will have beneficial outcomes in the organization's operations. Some of the main benefits of using such frameworks include the following. One, it will allow the company to align its different visions and objectives with those of the organization by engaging and showing its employees the innovation models and plans they need to achieve, thus making them committed. Second, it allows the overall organization to have a standard and goal-oriented language for the management of the

employees (Ellstrom et al., 2021). It, therefore, provides clear communication and allows growth within the organization. Accessible communication and feedback will also be achieved, thus enabling the SME to monitor their progress and address the issues that arise.

Discussion

RQ1 Accomplished

RQ1) Are SMEs optimally prepared to enter the era of digital transformation?

DT aims to improve any given entity by causing major changes to its priorities using information, communication, computing, and connectivity technologies combinations (Mikalef & Parmiggiani, 2022). Over the years, digital transformation has always been considered a concept increasingly incorporated within the public and private sectors. The overall action in which digital technologies are used to change users' experience by refining their quality of life and how commerce is operated, thus influencing aspects such as their competitive advantage and in line with their Sustainable Development Goals (SDGs). Through digital transformation, organizations constantly strive to improve and have a competitive advantage by using and implementing digital innovation and transformation. Digital transformation aims to create a competitive edge for a firm (Liu et al., 2011) and increase an organization's value (Verhoef et al., 2021), thus making it an essential strategic development aspect mainly for SMEs.

SMEs today have embraced the aspect of digital transformation within their operations to ensure that their overall continuity and success are achieved. Aspects such as the organizational change perspective adopted within the study have provided an exciting view of how digital transformation could affect the organizational dynamic capabilities based on one significant digital transformation aspect: change. With frameworks such as the

ADKAR, among others, the analysis of digital transformation in SMEs can be done as follows: The context of DT in such organizations can be made clear by analyzing both the external and internal drives associated with SMEs and DT (Aras & Buyukozkan, 2023). The overall content of DT will depend on how these organizations will react to these drivers and how they can adapt and manage these change processes, depending on the various opportunities presented. In addition, the content of the DT could affect the overall response and process of various contextual factors (Yeow et al., 2018). These changes might lead to changes within the company's structure, people, and processes (Rogers, 2016).

RQ2 Accomplished

RQ2) What are the optimal implications for SMEs in terms of shifting toward digital transformation?

The various opportunities and challenges associated with digital transformation among SMEs can be understood by analyzing the multiple drivers of the change process and the degree of change experienced. For instance, an organization's digital transformation changes can be considered proactive and transformational (Teece, 2014). The research study shows that using DT strategies in SMEs has improved their overall productivity and increased their competitive edge (R1) by enabling them to serve specific and targeted niche markets (Kindström et al., 2013).

Digital technologies also allow them to have direct consumer interactions, allowing them to engage with their customers fully and thus understand their specific needs and wants (Liu et al., 2011). Overall, increased efficiency from streamlined operations allows SME operations to align with the demands of their consumers. Using DT strategies and digital technologies increases SMEs' overall market share. Digital tools such as CRM systems have

also provided personalized consumer interactions, thus allowing them to improve their competitive edge.

RQ3 Accomplished

RQ 3) What are the most notable barriers to digital transformation for SMEs identified in the review?

Some of the main barriers (R3) that have been established with the successful implementation of digital transformation in SMEs are mainly categorized into three major categories.

Technological and Technical Barriers

SMEs need access to digital infrastructure to ensure that DT initiatives are achieved. However, it is seen that the need for affordable digital technologies among SMEs can be a challenge in achieving such a strategy. Costly software and hardware make it difficult for upcoming or existing SMEs to implement DT strategies mainly because of their rapid evolution (Ifeoluwa et al., 2022). Cloud technology can also be expensive to install and maintain, posing a considerable challenge to certain companies.

Financial Barriers

Insufficient budgets make it hard for managers to support implementing and adopting new technologies within organizations. For instance, an organization can have the capacity to create and provide value to its consumers but would wish to acquire or adopt more sophisticated measures and tools that can allow it to achieve excellent consumer delivery and experiences if it had the budget to achieve it. Other aspects, such as outsourcing digital technologies, are a significant barrier to achieving DT (Kindström et al., 2013). SMEs might

not have the financial capability to outsource such skills due to the lack of in-house specialists as a resource within the organizations. Employees ' resistance to implementing and accepting digital skills is another major issue that hinders the successful implementation of DT in SMEs.

Organizational Barriers

Organizations with senior staff members, mainly in management, might be skeptical about embracing such changes and thus must be encouraged by other leaders to accept such changes. Such a barrier would also contribute to the lack of alignment between the strategies being made and the resources available within the company (Ifeoluwa et al., 2022).

Finally, other issues, such as the government policies (legal barriers) related to supporting DT implementation that are not currently running or present, must be addressed in implementing such strategies. Consumer resistance is also another significant barrier that affects the implementation of DT in SMEs (McLaughlin, 2017). There is also the fact that clients are always unwilling to pay for digital services as an additional cost when SMEs render out their goods and services (Ifeoluwa et al., 2022).

Empirical research on the significance of DT on SMEs has been done over the years, giving a clear understanding and appreciation of the role of digital transformation within organizations. It also elaborates on the various factors associated with DT and SMEs and their influencing role in changing the overall dynamics of such organizations.

Future research should be made possible on the research topic surrounding the relationships between SMEs and the implementation of DT within their operational strategies. One of the future research objectives that should be considered is finding and providing an in-depth analysis of the sequence related to DT processes and identifying

optimal organization-individual strategies to be used in digital transformation (Masoud & Basahel, 2023).

RQ4 Accomplished

RQ 4) Considering the future research agenda proposed by the authors, which areas of digital transformation for SMEs most require empirical investigation, and why?

Further research on digital technologies and DT strategies in SMEs should be integral in providing more information on the topic. Aspects such as conducting similar studies on a specific industry or economy, compared to a generalization of SMEs on the success of DT, would be conducted and thus provide researchers with adequate information on successful DT implementation. Issues such as the cultural aspects of digital transformation within industries other than SMEs could be further elaborated.

Conclusion

The study aimed to understand the various frameworks SMEs utilize to ensure their organizational dynamic capabilities are achieved for operational success. The data collected and analyzed using qualitative methods provided the needed understanding through the results and analysis obtained about how SMEs and organizational change models contribute to their success in implementing DT strategies. SMEs are seen to engage in digital transformations to implement and exploit the various digital technologies and the opportunities that come with them. The various theories on organizational change models also provided the needed understanding during the research, mainly in providing a clear picture of the main drivers, opportunities, and challenges associated with using DT in SMEs. The research showed that DT drivers within SMEs are mainly found within their external environment, in factors such as their competitors and consumers, which allow them

to engage and implement DT strategies. However, various internal drivers also contribute to DT strategies and initiatives within the organizations. The research study elaborates on drivers such as leadership and management, employees, and their interest in utilizing and exploiting DT.

SMEs also capitalize on various opportunities to ensure their success when implementing digital transformation. Opportunities such as improved efficiency within operations, increased consumer relationships, and improved manufacturing and products are essential for the success of any SME. The organizational change models used by managers in implementing change are considered strategic. They are aimed at ensuring that such organizations gain the needed competitive advantage, as well as achieve structural and organizational changes in the process, such as hiring and training of new employees. In most cases, changes in SMEs can be considered reactive since such organizations respond to events that have already happened in the industry. However, the change process of DT is not always considered radical or transformational in degree, despite it involving large-scale changes.

Limitations of the Study and Future Research

The nature of the study provided various limitations within the research process. Other than the general constraints of a qualitative research method in a relatively developed research field, understanding concepts such as organizational changes and digitalization was based on information that needed further grounding in the relevant research study. Understanding organizational change processes and digital transformation strategies would also be considered limited to the research. The research would also be considered biased and limited to prior knowledge of the literature on the research topics. Furthermore, the existing

research dataset offered valuable insights into the extent of digital transformation in small and medium-sized enterprises; however, it lacked the following aspects.

Working Approach: The research analysis employs a variety of qualitative and quantitative approaches to effectively utilize different strategies in transforming small and medium firms. However, it neglected to consider the emerging aspects of an organization, such as remote work and issues posed by different time zones.

Regulatory Framework: With the emergence of the fifth industrial revolution, examining the regulatory framework concerning DT regarding safety and security is crucial.

Ethical Implications: Technologies lack cognitive reasoning capabilities and can potentially violate ethical principles. Therefore, additional research can be conducted to comprehend the ethical ramifications of DT.

New Trend Topics: The trend topics map, as shown in Figure 10, shows that the trending topics in the industry have moved from digital transformation and SMEs to performance, industry research, and data analytics. The existing research analysis has predominantly delved into creating a DT roadmap for SMEs. Therefore, future research must be conducted to measure the performance of organizations after employing digital transformation strategies using qualitative and quantitative measures.

Integration of Change Models: McKinsey's 7S framework could also be utilized to understand organizational change within SMEs while implementing a digital transformation strategy.

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Annexures

Annexure A

Research Papers based on Maturity Model approaches.

Authors/ Reference	Source Title	Method	Description	(Qualitative/ Quantitative)	Proposed/ Implemented	Conditions/Elements	Access/Cited
(Amaral & Peças, 2021)	A Framework for Assessing Manufacturing SMEs Industry 4.0 Maturity	SMEs Industry 4.0 Maturity Assessment	Analysis of Industry 4.0 maturity level of SMEs using a comprehensive maturity model	Qualitative	Proposed	Six Dimensions 1. Technology 2. People 3. Production Processes 4. Smart Products 5. Organization 6. Change	Cited by 63
(Di Felice et al. , 2022)	Transforming DIGROW into a Multi-attribute Digital Maturity Model. Formalization and Implementation of the Proposal	Multi-attribute Digital Maturity Model.	Analysis of digital maturity level of SMEs using DEXi software based on DIGROW Framework	Qualitative	Proposed	DIGROW framework, DEXi Software, DEX method	Accesses by 639
(Mittal et al., 2018)	Towards a Smart Manufacturing Maturity Model for SMEs (SM3E)	Smart Manufacturing Maturity Model	Framework to help SMEs in their journey for smart manufacturing and	Qualitative	Proposed	Elements 1. Dimensions – Finance, People, Strategy, Process, Product	Cited by 36 Accesses by 7309

			industry 4.0 readiness.			2. Toolboxes 3. Maturity Level	
(Holzner et al. (2023)	A CANVAS-Based Assessment Model to Evaluate SMEs Readiness for Digital Business Models	A CANVAS-based assessment model	Assessment model to evaluate the SME's readiness for digital business model	Quantitative (based on the Likert scale for evaluation)	Implemented	Nine CANVAS Block 1. Key Partners 2. Key Activities 3. Value propositions 4. Customer relations 5. Customer segments 6. Key resources 7. Channels 8. Cost structure 9. Revenue streams	Accesses by 462
(Sándor & Gubán, 2022)	A multi-dimensional model to access the digital maturity life cycle for SMEs	Digital Maturity Model	Determination of the Digital Maturity Lifecycle of SMEs using a multidimensional model	Quantitative (based on digital maturity assessment at five levels)	Proposed	Five Maturity level based on CMMI Model and Greiner growth model. 1. Initial 2. Pathfinder 3. Advanced 4. Managed 5. Optimised and Providing Feedback	-

Appendix B

Research Papers based on DT Methodological Approaches.

Authors/ Reference	Source Title	Method	Description	(Qualitative/ Quantitative)	Proposed/ Implemented	Conditions/Elements	Access/Cited
(Perea Muñoz et al., 2022)	An 'End to End' Methodological Framework to Assist SMEs in the Industry 4.0 Journey from a Sectoral Perspective - an Empirical Study in the Oil and Gas Sector	Methodological Framework	A methodological framework to assist SMEs in the adoption of Industrial 4.0 DT	Quantitative and Qualitative	Implemented	Four Elements 1. Self-assessment and diagnostics 2. Basic Capabilities 3. Improvement Opportunities 4. Implementation of Projects 5. Value-added to SMEs	Accesses by 3913 Cited by 1
(Depaoli et al., 2020)	A model for digital development of SMEs: An interaction-based approach	Interaction Based Model	Utilizing the Interaction based model for Digital Transformation of SMEs	Qualitative	Proposed	Digital Development based on the interaction between the environment and SME	-

(Chavez et al., 2020)	A Conceptual Model for Deploying Digitalization in SMEs Through Capability Building	Conceptual Model	Proposes a model for digitalization in SMEs through a conceptual model based on capacity building.	Qualitative	Proposed	Based on industry applications for developing capabilities	Accesses by 4857
(Wang et al., 2023)	What Kind of Configuration Can Facilitate the Digital Transformation? A fsQCA and NCA Study of SMEs	Qualitative Comparative Analysis(fsQCA) and Necessary Condition Analysis (NCA)Study	DT in SMEs through fsQCA and NCA study	Quantitative and Qualitative	Proposed	Six Conditions based on the Technology-Organization-Environment (TOE Framework) 1. IT Capability 2. Digital Technology Adoption 3. Digital Leadership 4. Digital Strategy 5. Government Regulation 6. Government Support	-
(Trenkle, 2019)	Survival in the digital age – A framework for formulating a digital transformation strategy in SME	Based on the case study	Strategies for DT Framework based on four categories.	Qualitative	Proposed	Guidelines for DT strategy 1. Use of Technological Dimension 2. Change in value creation dimension. 3. Organisational change dimension 4. Financial Dimension	Downloaded by 618

(Korachi & Bounabat, 2020)	General Approach for Formulating a Digital Transformation Strategy	General Approach	Formulates DT framework using IT Governance and Management strategy.	Quantitative (Partial Least Square SEM)	Proposed	Based on nine building blocks	Cited by 27 Downloaded by 3016