Advantages of Digital Transformation Models and Frameworks for Business: A Systematic Literature Review

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Abstract—**Digital Transformation (DT) is a vital change in the way an organization utilizes processes, people, and technology to provide value to its ever changing customer expectations over products and services. Researchers developed models and frameworks to tackle concerns in this area, and existing literature improved our understanding of digital transformation. However, there are not enough comprehensive systematic literature reviews to picture a clear portrait of the advantages of related works and point out the major gaps for future studies. This study aims to evaluate how these models and frameworks affect business while highlighting their advantages and pointing out their gaps for future improvements and studies. A Systematic Literature Review (SLR) applied and collected and reviewed seven models and nine frameworks over five years between 2017 and 2021 from four databases of IEEE, Web of Science, Scopus, and Science Direct. These models and frameworks were reviewed and their advantages for researchers and practitioners were pointed out while picturing a clear vision of what is done in the Digital Transformation development of models and frameworks. The findings in this SLR indicated that the rising trend of DT studies has increased by 275% solely from 2020 to 2021 with 62% of those studies conducted in Europe.**

Keywords—Digital transformation; digitalization; model; framework; business; SMEs

I. Introduction

Digital Transformation (DT) is a vital change in the way an organization utilizes processes, people, and technology to provide value to its ever changing customer expectations of products and services [1]. Corporations that effectively use DT appreciate enhanced yields of resources and therefore received higher profits [2]. The DT concept was announced in the year 2000 [3], as the DT can be characterized in a broad sense as the adoption or modification of business models or frameworks as an outcome of the fast quotient of technological progress and innovation, which triggers alterations in customer and social behavior. It is necessary to point out that a framework, also called a model in the literature, is a graphical depiction of an occurrence comprising its main factors, variables, and the interactions among them [4]. Today's DT trends are transforming the business landscape, over the past decade, researchers have focused more on designing DT models and frameworks and provided guidelines on how these models and frameworks can function in various businesses [4], mainly the previous studies in this area were to develop or modify DT modes and frameworks to address business needs while explaining the implementation process of DT as a whole or a part of the business model. This study was focused on a novel perspective and hoped to fill the gap between prior studies by gathering the latest DT models and frameworks and identifying their advantages for businesses by tending to the business needs while examining the offered value and applicability of DT models or frameworks in today's business ecosystem. The literature showed that there are numerous DT models and frameworks and it is important to choose the most suitable among all the proposed models, however, this SLR can be a guideline for the leaders and decision-makers in the organization who are responsible for approaching the DT to select the most suitable DT model or framework for their organization based on their DT strategy. As society is leaning toward digitizing countless aspects, businesses feel the rising significance of DT. Small Medium Enterprises (SMEs) may approach DT for numerous causes, DT has the power to enhance customer experience by bringing extra data-based insights for business decision-making. Another reason for taking on DT is the superior collaboration that it brings to the business by offering noble opportunities, agility, and alignment throughout the body of the firm, however, this study approached an unsolved gap in this area, and gathered the most recent DT models and frameworks developed by the researchers [4], [9-23] for businesses and analyzed them to bring their advantages to the surface, this approach helps the practitioners to address related concerns more swiftly, also it will provide the researchers with a more clear vision for their future studies in this area.

The purpose of this systematic literature review (SLR) is to collect and review the proposed models and frameworks for DT and encapsulate their approaches toward businesses, additionally offering a better understanding of the DT for future studies. The significance of improving the DT lies within the modifications of business models or frameworks for responding to technological, digital, and social changes [5], as it can be viewed as a revolution to a fresh organizational arrangement that matches better performance in the digital economy with the rapid growth of digital properties. On the other hand, the scope of this study is to find the answers to the following research questions.

RQ1: What is the distribution of publications over time?

RQ2: What is the geographical distribution of the studies?

RQ3: What are the latest developed models and frameworks for business?

RQ4: What advantages are embodied in each model and framework?

RQ5: How future studies can improve the DT models and frameworks?

II. LITERATURE REVIEW

A considerable amount of literature has been published on Digitalization in SMEs and Industry 4.0 (I 4.0) to determine the salient recommendations for their adoption [27], [30], They made use of the Technology Organization Environment (TOE) framework and determined that SMEs must place a high priority on integration IT systems along the entire value chain and human capital with a focus on proficiency in data analysis and knowledge exploration. A comparative literature review by [28] looked into the DT for transportation with regard to the product-service system lifecycle. Another study [29] only focused on the links between digitalization, company culture, and sustainability in SMEs, researchers were able to identify ten such interdependencies and develop a new analytical framework in the process. The researchers derived six key propositions to aid SMEs in their quest for sustainable digital development via corporate culture development, such as having managers raise awareness and positively shape employee perceptions of the prospect of DT, practicing leadership, culture, and digitalization for sustainability, and prioritizing the integration of DT into the SMEs culture by having the organization's mission and vision statements reflect DT commitments. Another existing study [30] explained the requirements necessary to implement DT in the Smart Manufacturing assessment models. The study [31] undertook a literature review of 204 articles to determine how Big Data and the Internet of Things affect businesses and how they carry out DT. They noted that the growing prevalence of Big Data and IoT increased the amount of disorganized knowledge available to businesses and companies seeking to implement them should learn how to make sense of this noise.

However, these researches do not take into account the advantages of the most recently developed and redefined DT models and frameworks for businesses, also they did not point out the presence of the numerous existing DT models and frameworks waiting to be tested and improved by the practitioners and the enthusiast researchers in this area, this systematic literature review aims to fill this gap.

III. METHODOLOGY

The research made use of a systematic literature review to find and choose relevant articles while simultaneously minimizing the chances of conducting the review process [6]. The study consisted of a systematic search undertaken in April 2022. Table I showed a keyword search was employed with the selected keywords being relevant to the subject matter of the study. The keywords used were "digital transformation" OR "digitalization" AND "framework" AND "business" OR "enterprise" in tandem with the synonyms listed in the following table. These keywords were then used to search through four high-quality databases, namely ScienceDirect, Web of Science, Scopus, and IEEE. These were selected as

they adequately covered the fields of digitalization, management, and entrepreneurship.

TABLE I. KEYWORDS SEARCH QUERY

	Keyword	Synonyms
MAIN	"digital transformation" OR	"digitalization"
AND	"model" OR.	"framework"
AND	"business" OR	"enterprise"

Table II portrayed inclusion and exclusion criteria used as part of the selection process to identify articles that were relevant to the research's aims. The inclusion criteria stated that only documents published within the last five years were to be utilized in the study. As it was merely after 2014 that the DT expression was rapidly nurtured in recognition both by experts and researchers [7]. The business world concentration has reformed significantly for facing the businesses DT from 2017 to 2021 [4]. In order to narrow down the search results to the most recent and cutting-edge research in the field of DT, the inclusion criteria are set to be restricted to only journal articles that were published in English and open access type. Records that did not meet these criteria were excluded from the review.

TABLE II. INCLUSION AND EXCLUSION CRITERIA OF THE STUDY

Inclusion Criteria
Documents published within the last 5 years from 2017 to 2021.
Journal articles published in the English language.
Documents that are related to the "Business" and "Management" subject areas.
Full-text studies that are accessible and downloadable (open access).
Studies that present models or frameworks for digital transformation.
Studies that include matching keywords with our research.

Exclusion criteria
Any records published before the year 2017 and after 2021.
Only published journal articles and review articles.
Journal articles published in any language other than the English language.
Relevant studies in which the focus areas are business or management.
"Digital transformation" OR "Digitalization" OR "Digitalisation" don't exist in the title, abstract, or keywords of the studies.

The PRISMA statement was used to screen records for the primary study selection process. The acronym PRISMA is an abbreviation of, the "Preferred Reporting Items for Systematic Review and Meta-Analyses" [6]. In [8]author stated that it is capable of exclusion of duplicated studies between databases. It also enabled the researcher to remove studies without clearly defined aims, studies that are not relevant to the research questions, and studies that only focused on one keyword as opposed to all of them, e.g. digitalization, model, and business. In this SLR the updated version of PRISMA, PRISMA 2020 is utilized.

A total of nine thousand, eight hundred and ninety-six (n=9896) articles were retrieved from a preliminary search of the four databases, with the individual databases contributing records as follows: Scopus (n=3921), IEEE (n=5888), ScienceDirect (n=71) and Web of Science (n=16). No duplicate records were found via automation tools, although two duplicate records (n=2) were removed manually by the researchers. Out of these results, records published before

2017 and after 2021 summed four thousand seven hundred and forty-seven (n=4747) were removed. Records other than journal articles were also removed, and these totaled three thousand four hundred and forty-two (n=3442). Records whose full text was not accessible on the Internet totaled eight hundred and forty-three (n=843) and these were excluded as well. Records were excluded as they did not have the main keywords in the abstract or title or keywords section of them were ninety in number (n=90). Records not in the English language totaled nine (n=9), and these were removed in the process. A combined master list of the remaining retrieved articles summed 238 which three (n=3) could not be retrieved over the internet, this left us with 235 studies in number that were consolidated on a Microsoft Excel report after the articles were selected beside the inclusion and exclusion criteria. At this stage, the researchers independently assessed the articles to make sure that they were relevant to the study topic, search terms, and research questions. In order to deal with disputes in the selection process, the researchers conducted video conference sessions for reviewing critical materials and also used a WhatsApp chat discussion to supplement this. As the final results of the screening and eligibility scan following records were excluded, Records that don't have main keywords in abstract/title/keywords (n = 47), Records that are not in the field of business and management (n = 58), Records that do not present a digitalization model or framework (n = 114), ultimately a total of sixteen (n=16) studies remained as principal studies for examination (Fig. 1).

Data extraction was carried out on the remaining articles that met the selection criteria. This was conducted in accordance with a number of parameters as shown in Table III. After the data was collected and extracted from the articles, it was synthesized through the construction of a summary table and subsequently evaluated to better perform a literature review.

TABLE III.   DATA EXTRACTION

Data Item	Description
Source	Name of the database the article is from
Author, Year	Give the author names, year of publication
Proposed Model OR Framework	What model or framework was proposed in the study
Aspects and Activities	What aspects and activities were featured in the proposed model or framework
Key findings	Show the main results from the articles
Advantages	Show the advantages of each study for business maturity
Recommendations	Show research gaps and areas of improvement

IV. RESULTS

A. The Distribution of Publications over Time

Fig. 2 showed the compiled set of selected studies that dealt directly with DT and proposed a framework or a model. However, in the screening and selection process this SLR didn't find any paper within the research criteria from "IEEE" and "Web of Science", and all the 16 records that were included in the study for further analysis were from "Scopus" and "Science Direct". In the past five years ranging from 2017 to 2021, the trend identified in Fig 2 depicted that within the criteria of this SLR no models or frameworks were proposed in 2017 and 2018. On the other hand, an increase in the number of publications over time from 2019 to 2021 is indicated, with the quantity peaking at 11 total publications in 2021 alone, this shows the focus of researchers on this topic amplified 275 % only over 1 year from 2020 to 2021. Also, displayed that DT and its relationship with businesses and SMEs was a particularly rich area of study for researchers, and deducing this to later years suggests continued interest in the topic. Indeed, [4] highlighted that DT has grown to the point of becoming critical to the survival of companies, with a survey conducted concluding that 84% of such organizations regard it as a necessity for their continued operations in the coming five-year period.
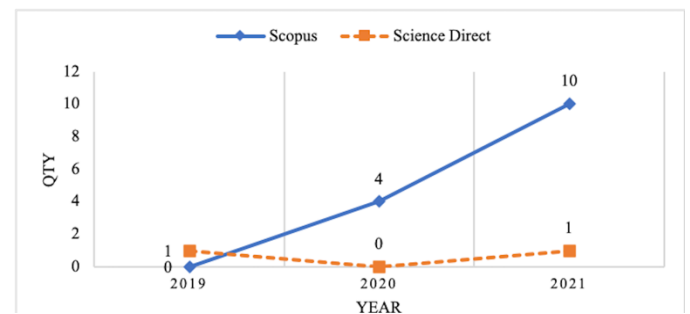

Fig. 1.   PRISMA 2020 flow diagram of the study.

Fig. 2.   Publication distribution over time.

B. The Geographical Distribution of the Studies

It is depicted in Fig. 3, the studies included in this SLR were a cosmopolitan blend, the 16 proposed frameworks and models presented in the findings were from 5 continents, with studies being authored in eleven (n=11) different countries. Germany was the country with the highest number of articles, with a total of three (n=3) published studies, followed by Italy,
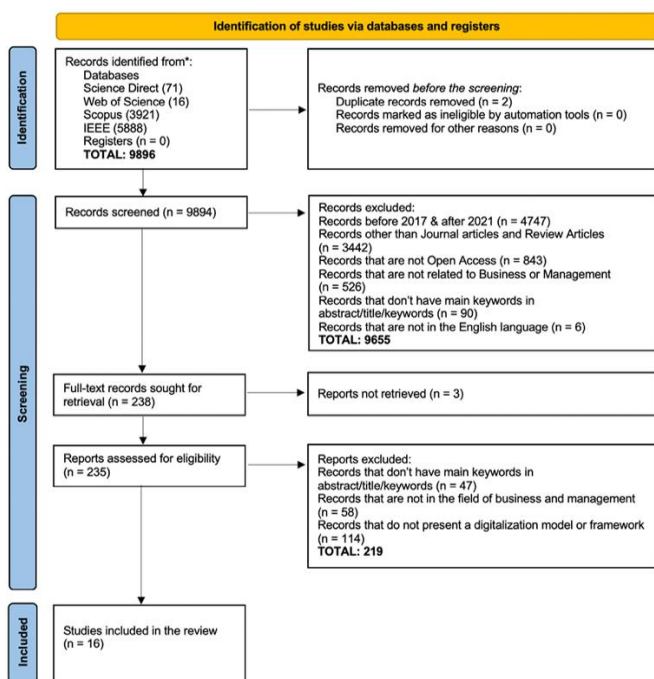
Austria, and Brazil each producing two (n=2) studies apiece, also, Finland, Poland, China, Spain, Vietnam, South Africa, and the USA each published one (n=1) study on the subject. This SLR noticed a trending focus on the subject more in European countries with 62% of them conducted in Europe.
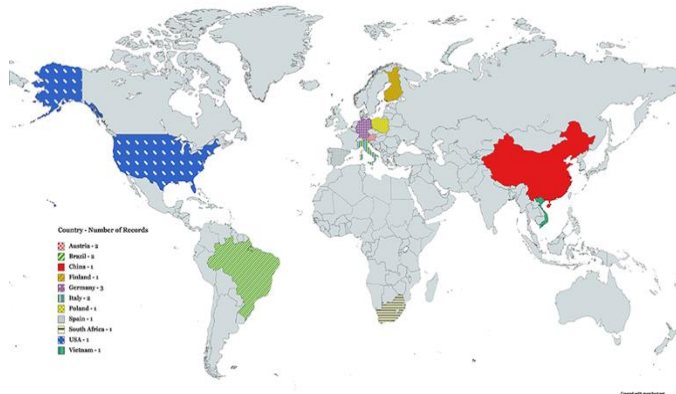

Fig. 3. Geographical distribution of the studies.

C. The Latest Developed Models and Frameworks

The results of this SLR showed that various DT models and frameworks were developed, and widely the focus was on tackling the related issues by proposing a novel model and framework, also revising the prior versions to address other concerns in this area. However, there were not enough comprehensive systematic literature reviews to point out their advantages for businesses or organizations or to picture a clear portrait that enables the comparison among the existing models and frameworks. Table 4 depicted the name of the proposed models, and showed the main aspects and activities that researchers presented in their studies on DT models [9–15] Moreover, Table V portrayed the name of the proposed frameworks, and displayed the main aspects and activities that researchers presented in their studies on DT frameworks [4], [16–23]. Aspects and activities in the mentioned tables are stages, or phases that the researchers suggested in their studies, these are the steps to be taken by the practitioners in order to implement the model or framework.

TABLE IV. DIFFERENT ASPECTS AND ACTIVITIES OF DT MODELS

Proposed Model	Aspects and Activities	Ref
A "Unified" Framework of Competing Forces From COVID-19	"Digitalization, Processes, Cost Reduction, Business Opportunities, Risk and Negative Consequences, Surveillance"	[9]
Econometric Model to Assess A Company's Preparedness Levels for Digital Transformation.	"Enterprise Management, Productivity Management, Digital Transformation Platform, Smart Manufacturing"	[14]
The Refined Model of Organizational Competence for Digital Transformation	"Vision and strategy. Digital leadership, Organizational learning process and organizational knowledge, Organizational alignment and organizational structure. Digital maturity, Personal competencies. Importance of personal characteristics, Technology selection, acceptance and use, Information culture. Organizational effectiveness"	[10]
A Digital Competence Maturity Model (DigiCom)	"Digital Content, Human-Machine. Human-Human, Personal"	[11]
Model of The Impact of DT on Project Management	"Disruptions: New technologies, Customer expectations, Competitive landscape, Data and analytics, Change process, Projectification of activities, Effects: process automation implementation of new technologies remote cooperation world sourcing new structures, Virtual project teams Online, constant communication Agile methods, Customer orientation and incremental product delivery, Project manager as a facilitator, Optimization of processes of project delivery, Constant access to data, IT tools"	[12]
Digital Transformation Model	"Positioning, Roadmap, Implementation, Current State Review"	[13]
Development Approach Industry 4.0 Maturity and Realization Model	"Definition, Maturity model's scope, structure and design, Research and population with maturity items, Development assessment tool and structure of maturity report, Transformation maturity items into realization paths, Definition procedure and rules for deriving action-field, Testing and creation of final step-by-step realization model"	[15]

TABLE V. DIFFERENT ASPECTS AND ACTIVITIES OF DT FRAMEWORKS

Proposed Model	Aspects and Activities	Ref
I 4.0 Emerging countries' DT strategy framework (ECDTS)	"Digital platforms, Ecosystems"	[16]
Interpretative Framework	"Business driver, Supply view, Entrepreneurial model"	[17]
Digitainability Conceptual Framework	"Digitalization, Sustainability"	[18]
Multi-Dimensional Framework	"Contextual Conditions, Mechanisms, Outcomes"	[19]
Digital transformation patterns	"Lean Production, Industry 4.0"	[20]
Conceptual Framework of open innovation to support digital transformation.	"Managerial Strategic and Social Drivers, Digital Technology Enablers, Business Partners, Scientific Partners, Facilitating Factors, Limiting or Challenging Factors, Contribution of collaboration for Digital Innovation"	[21]
The interaction-based digital transformation framework	"Digital Technologies, Business, Society"	[4]
Digitalization and public crisis responses theoretical framework	"Digitalization, Dynamic Capabilities, Response Strategies, Response Performance"	[22]
Construct Map Conceptual Framework	"Digital Transformation, Digitalization, Business Model Innovation"	[23]

D. Advantages that Embodied in each Model and Framework

One of the main goals of this SLR was to find the advantage of the proposed models and frameworks, in order to do that this SLR reviewed and summarized the purpose of these studies. Since the Covid-19 pandemic began it affected all aspects of our environment, and DT is one of these areas. One study recognized the disruptive nature of the pandemic and seeks to utilize its pressure in a way that benefits businesses, i.e. by using it as a catalyst for digital transformation, digitalization drivers and barriers are identified and the study gives organizations a clear picture of the benefits and drawbacks of such a shift, the Conceptual Model proposed by this study offers a roadmap that tackles digitalization in the field of uncertainty i.e. the state of the economic crisis during the Covid-19 pandemic [9]. The research [22] examines the correlations between DT, disaster management strategies during the Covid-19 pandemic, and SMEs' disaster response ability. Using online survey data of 518 Chinese SMEs, the findings in the research perfectly illustrate that, in the long term, digitization may assist SMEs in deploying disaster response as well as responding tactically to public crises, contributing to an increase in SME's capability, an advantage the enormous data set of 518 SMEs in China was used for structuring the presented theoretical framework which is considerable and valuable, especially in times of crisis.

Besides the model and framework development, tool development was also an area that received attention from the researchers. One study developed a useful tool for gauging the preparation of an enterprise for Digital Transformation, classifying them as either Newcomer, Learners, or Leaders. This model was used in conjunction with operational efficiency figures and data on the movement of personnel to determine the impact of DT preparation on the sustainability of companies. The analysis showed different results across the three classifications of companies. overall, businesses benefit from tight integration of Digital transformation in the long run as this yields the greatest operational efficiencies and personnel utilization, the benefit is that this model allows for the assessment of a business's preparation and readiness for Digital Transformation on the sustainability of a company [14]. The [10] research led to the creation of an OCDT model that may assist SMEs in identifying and developing DT strengths in order to progress their enterprise model's DT, moreover, the model is more appropriate to the needs of SMEs than other models that enable digital readiness advancement but were intended for large firms, the advantage of this model will enable SMEs to assess and create digital skills that are now lacking, moreover, it will assist in the digital transformation of business models in order to develop competencies that will enable SMEs to effectively adjust to the changing competitive atmosphere created by digital technologies and marked by innovation and rapid change.

This SLR was able to find solely one research that focused on the impact of DT on project management. The author [12] developed a model that is known as the "Model of the Impact of Digital Transformation on project management" and analyzed thoroughly the manifestation of change that was formed into a model explaining the model, things like the "Change Process" which includes objectification of activities, "Disruptions" which includes the following, "Novel technologies", "Competitive landscape", "Customer expectancies", "Data and analytics", and "Outcomes" which includes procedure automation new technology adoption new architecture in the field of distant collaboration, as well as the most essential pro and con characteristics of the changes and identified the influence of Digital Transformation on Project. Moreover, the researchers found that Digital Transformation acts as a significant aspect that is an important element determining contemporary project management, the model that was used in this article has great significance in digital transformation in a general social context, there are several advantages in this study: a. Project effectiveness, which includes cost savings, time reduction on activities that are not useful, proper management and allocation of resources. b. It makes it possible to be able to use the time already saved as a result of the elimination process that took place on repetitive activities and gives more room for more creativity and adding value activities. c. Decrease the delivery time of the project. d. Automation has enabled the duration of delivery projects to be reduced to a minimum through the usage of new automation tools. e. Capacity to depletion of a huge number of existing data, real-time access, and quick and easy data handling. f. Possibility of work and results to remain flexible.

When it comes to DT a significant aspect to focus on is employees, in this regard [23] study has proven that human resources as magnitudes of National Intellectual Capital are cogent features of Digital Transformation and shall be reinforced to enhance Europe's capability to survive the digital world, also it constructed a map towards more robust Business Model Innovation. On the other hand, [11] Construct Map Conceptual Framework provides a historical outlook on European Union Countries in totality and focuses more on working talents as modules of human resource, with more focus on employee training and qualitative vocational training. Also, in another paper researchers proposed the Digital Competency Maturity Model (DigiCom) which consists of 49 attributes in four dimensions which are Digital Content, Human – Machine, Human - Human, and Personal to measure the maturity of individual employee levels in industrial enterprises with five steps developmental methodology in use. The proposed model approach used, makes digital competencies more visible, realistic and measurable and modify the basis for competence development in employees that will enhance the performance of their enterprise. The DT DigiCom model focuses deeply on the digital competency of employees in industrial enterprises because it's essential in the manufacturing sector to have digitally equipped clients with the knowledge of managing machines.

Some researchers worked their idea around Industry 4.0, for instance, Digital Transformation Patterns Framework, pointing out that lean production is a concept that is not considered as often as it should be when it comes to digital transformation, this study is an important step in this new area and shows that I4.0 and LP are related when it comes to transformation and that firms committed to lean achieve better digitalization outcomes than those that are not, and the framework takes into account Lean Production

implementation level as a dimension, a novel metric to inform companies on digital transformation patterns with regards to Lean Production [20]. On the other hand, one study proposed an innovative industry 4.0 realization model i.e. industry digital transformation model which proposes a ten steps method that leads the company in a systemic way from their initial interaction by industry 4.0 (transformation model) till industry 4.0 (transformation model) the planning is well defined by roadmaps, action-field, and realization projects, which benefits to the industrial digitalization through its model by creating well-defined structure and enabled the collection of valuation data from manufacturing businesses to amplified precision when benchmarking the company's maturity among others [15]. The third group of researchers focused on digital transformation in emerging countries of Brazil, Russia, India, China, and South Africa, laying out a novel framework for firms to follow that yielded strategic capabilities to the firm, the I4.0 ECDTS framework was backed by a robust analysis of prior research, though its newness could benefit from the application of the proposed framework in the field, the study also reduces the research legwork with regard to policy features in use for strategic pivots. The I 4.0 ECDTS framework enables firms to evaluate the steps taken toward digital transformation, and the framework increased competitive advantage due to flexibility brought on by digitalization and enables strategic capabilities within the firm [16]. However, [21] examined cooperation between scientists and business partners as a key contributor to fostering Industry 4.0 and enhancing digital transformation, plus drawing attention to the fact that technology collaboration drag more benefit on the business success front than technologies developed and adopted solely internally by practitioners, as a benefit this framework analysis how innovation collaborations with different business and scientific partners integrate with digital transformation and Industry 4.0.

In contrast, some researchers followed by another study that they did in 2017 and proposed the model for tackling the DT and in this study, they focused on the step-by-step implementation of the DT model by providing clear explanations and tools and procedure for this purpose, the DT model is an iterative model and needs to be broken down into small pieces of plan and action to be implemented and is not expected to be a model for tackling all the DT difficulties all at once as they have piloted the DT model in 19 SME's and got brilliant results, the presented DT model is a 4 step which is iterative and can be divided into small steps to be taken by the company, also three tools are provided for better guidance and implementation of the DT model, these tools are The DigiMaturity tool, which answer the question, what is the maturity level of the business, the DigiSWOT tool that provides the questions for analyzing the digitalization strengths, weaknesses, opportunities and threats, and The DigiTriangle tool to let the company categorize their vision priorities [13]. Another study by [17] proposed Interpretative Framework investigates the primary legacy from prior industrial revolutions with a particular focus on business drivers, supply view, and entrepreneurial model. The study hopes to act as a guide for international manufacturing SMEs as they tackle digital transformation by providing a comprehensive framework of prior industrial revolutions from

them to draw lessons, the features considered crucial were those of business drivers, supply view, and entrepreneurial model, the Interpretative Framework provides a historical outlook on the process of past industrial revolutions and may be used to extrapolate lessons for carrying out digital transformation in the present.

Nevertheless, [19] formed a Multi-Dimensional Framework that seeks to bring together all the aspects of Digital Transformation ranging from contextual conditions, mechanisms, and outcomes of the process, the study proposed a far-reaching conceptual framework that builds on past knowledge of the organizational change, as a result, it identified trends in digital transformation and came up with perspectives on digital transformation perspectives namely holistic co-evolution, systemic shift, technology impact, and compartmentalized adaptation, the Multi-Dimensional Framework identified trends that allow for greater understanding of Digital Transformation, namely, the shift towards malleable organizational designs and their integration into digital business ecosystems. This SLR found another research [4] that proposed a novel framework that works on the understated areas by combining the numerous models discovered in the literature, plainly incorporating the role of society, emphasizing the evolution over time, and incorporating the drivers of digital transformation classified in 23 digital transformation interfaces throughout 6 groups, eventually, this study can be the initial stage of a unified concept of digital transformation, because the researchers looked at the evolution of 41 DT models and found four different research possibilities, they pay homage to the DT research by organizing their findings into a fresh, all-encompassing framework that integrates important shifts in business, society, and technology, also, they further emphasize the processes' diversity by categorizing the drivers of DT into 23 DTI and 6 categories, this research brings a clear perspective on DT research, this could aid in a deeper understanding of how change happens and where certain changes interact with each other, by bridging the gap between business and society.

From a different perspective, [18] acknowledged the dark side of digitalization such as increased carbon footprints and energy consumption by firms, and seeks to mitigate these negative effects through its conceptual framework that lends greater weight to sustainability, as an advantage the Conceptual Framework gives greater focus to sustainability in digitalization, provides new findings for sustainability research and regulations and overall offers companies a greater chance at achieving sustainable digital transformation.

E. How Future Studies can improve the DT Models and Frameworks

To answer the last proposed research question, this SLR took a deep dive into the literature and reviewed the papers to find the most promising areas for future studies. Expansion of the studies to other countries and developments for a more international organizational environment [14], [16-17]. Monitoring and assessment of the applicability of the model/framework is a crucial area to look into, due to the novel nature of these models/frameworks [9-10]. More

corporate studies including extending the research to different phases of DT models/frameworks as well as establishing tools, procedures, and methodologies, also trying for linking different understandings of different perspectives of the DT [13], [20]. [10], [12], [21] found another area to conduct research for future studies is an expansion of scope through more interviews and expanding the research through quantitative surveys or consolidation of prior quantitative studies, and trying to catch up with technology as AI is increasingly advancing.

V. DISCUSSION

The results of the SLR found that there are some challenges that affect the success of digital transformation success in businesses. For example, digital technologies [10], the digital skills of employees, the digital transformation strategy [32], and leadership. The business and its employees should have the necessary innovative devices, and digital technologies for the digital transformation process, and of course, the digital skills of the employees should be sufficient to use new technologies effectively. In addition, the business must prepare an effective digital transformation strategy and leadership for digital transformation so that digital transformation processes can be carried out successfully.

The digital world globally needs to achieve smart sustainable development while creating value and wealth for society [24]. Therefore, this SLR took a deep dive into the literature and presented a clear picture of what has been done in terms of DT model/framework development searched for by the researchers. This shortage was one of the reasons why this SLR was carried out so as to fill this gap in the literature, it helps the researchers understand the status quo of DT and enabled them to visualize a clear vision of previous studies in this area. This study was able to identify an uptick in the trend of research papers published in the field of Digital Transformation over the past five years (from 2017 to 2021). The papers steadily increase in number, with the total number peaking at 11 papers published in 2021, which is more than the prior four years combined, which adds up to 5 papers. This growth may be attributed to an increased awareness of the extent to which DT impacts the organization [4]. Put forward the argument that DT is not just a passing trend, but may prove to be key to the continued operation of companies, with several companies acknowledging the new DT status quo, it stands to reason those organizations and researchers alike would take an increased interest in the area, resulting in a rise in the number of published articles over time.

Papers originated from a spread of 11 countries. As 62% (n=11) of studies came from Europe, which is remarkable, as the term Digital Transformation itself was coined in North America, one would deduce that the bulk of research would stem from their [3]. However, this peculiarity is better framed when looked at through an economic lens. Germany alone counts for 25% of Europe's Gross Domestic Product and constitutes the largest market in Europe [25], also, it is the third-largest exporter globally, after the United States and China. These factors may contribute to its organizations swiftly taking up DT so as to survive and thrive in the global marketplace. Researchers may also have been drawn to

publish from the country as it is a hub of small and medium-sized enterprises, forming an ideal study and testing ground for proposed DT frameworks [25-26]. It is worth mentioning that the two terms may be used interchangeably when it comes to Digital Transformation [4]. This interchangeability of these terms caused this SLR target search broader than expected which made it harder to find needed results in the literature, but this SLR put both terms in the research agenda to maximize the efficiency of the study and make the road smoother for further studies around the DT area.

Therefore, one limitation, the researchers faced was to conduct this SLR from 4 databases (Scopus, IEEE, Science Direct, Web of Science) meaning that there are other databases that are not covered yet. Another limitation in this SLR was the time boundary, despite the concentration of the studies in recent years we suggest further research on a wider time boundary to collect more relevant studies from before the year 2017. This study focuses on finding the advantages of DT models and frameworks to businesses while gathering proposed models and frameworks that are developed for DT, this can be beneficial to the businesses that are not sure which DT strategy is more suitable to take and also the researchers will have a more clear vision of the road ahead to conduct future studies about DT. We suggest to other researchers who will study this topic, to focus on the negative effects of DT models /frameworks on SMEs and businesses and to utilize this SLR and take additional actions for the development of the DT models and frameworks.

VI. CONCLUSION

Previous studies in this area mainly focused on the development of DT models and provided guidelines and procedures for the adoption of their presented model. The aim of this SLR was to review and analyze existing DT models and frameworks to point out their advantages for businesses to help them to approach the most suitable DT model or framework for their organization based on their strategy. Moreover, the results of this SLR provide a clearer vision for future studies in this area. This SLR found 16 studies in a period of five years from 2017 to 2021 in four databases of IEEE, Web of Science, Scopus, and Science Direct. The results showed an incremental trend in the time distribution of discovered studies, interestingly only from 2020 to 2021 number of related studies raised by 275% percent. Also this study indicated that 10 out of 16 discovered studies were conducted in Europe. However, the DT area is still seeing novel models and frameworks that are not deeply tested and refined. We hope that the results of this SLR will help researchers and practitioners in this field in their future work and studies.

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