An Emerging Digital Transformational Perspective: A Bibliometric Analysis

Savita Rastogi[1], Priya Sharma[2]

Abstract

Purpose: *This research examines the main themes and current dynamics surrounding Digital Transformation (DT); in addition, it offers future-oriented research topics in the field of DT.*

Methodology: *We identified 697 studies by using bibliometric analysis to search the Scopus database which enabled us to identify the research activity on DT from 2019 to 2023. The study has examined current issues, identified obstacles to literature's advancement, and suggested directions for further study.*

Findings: *Although DT research is conducted globally, a major portion of such work is from developed nations while only a few studies address the realities of developing nations. Developing nations suffer from a dearth of cooperation between the authors of developing and developed nations. One of the important conclusions of the study is that Digital Leadership, Digital Innovation, Technology Adoption, and Digital Maturity are the four significant pillars leading DT to economic growth which must be regulated by Corporate Governance. Digital technologies play an influencing role in the era of digitalization facilitated by artificial intelligence in Industry 4.0 which further performs as an antecedent for DT. The study also suggests an intersection of Digitalization and Sustainability.*

INTRODUCTION

In recent times, the notion of "Digital Transformation (DT)" has gained a stable and prominent place in the discussion surrounding the key factors that impact the growth and endurance of modern organizations. DT is the adjustment/adaptation of business structures due to the rapid advancement and innovation in technology that leads to shifts in commercial and social behavior. The use of technology to develop new business models, procedures, softwares and systems is collectively referred to as "Digital Business Transformation". Companies manage business transformation through modernizing corporate procedures and models, fostering employee creativity and efficiency, and customizing interactions with consumers and citizens. To increase efficiency, a stronger competitive advantage and more advanced business structure is required.

Keywords:

Digital Transformation, Digital Technologies, Digitalization, Digital Leadership, Technology Adoption, Digital Maturity, Sustainability

[1]*Associate Professor, Jesus and Mary College, University of Delhi; Email: srastogi@jmc.du.ac.in Orcid ID: https://orcid.org/my-orcid?orcid=0000-0002-5055-8147*

[2]*Ex-Assistant Professor, Jesus and Mary College, University of Delhi; Email: priya4206@gmail.com Orcid ID: https://orcid.org/my-orcid?orcid=0000-0002-4170-1108*

There are various ways in which the DT has affected society. Like approaching, thinking, assessing, and managing situations. It has affected the digital economy and its sustainability. The field of research on the convergence of sustainability and digitalization is relatively new, and less research has been undertaken on the issue.

In the field of business, DT has played a significant aspect in achieving dynamic capabilities as well as ethical considerations (Merali & Nadkarni, 2012). In the era of advancement, businesses face a variety of challenges, such as integrating new technologies, inefficient data collection and utilization, insufficient experience employing digital leadership strategies, a deficiency of reliable inventive techniques enabled by digital platforms, an unfocused approach to innovation and exploration, a lack of team devotion to digital platforms, and many more.(Dana et al., 2022) Additionally, due to the technological sophistication, corporate culture confronted with many technological barriers, such as a lack of creative environment, sound digital enabled techniques and operations, technological expertise, digital leadership capabilities, digital immaturity and the absence of digital participation efforts, are among the variables of the corporation that frequently affect digital engagement. In addition to actively participating in digital transformational projects, digital involvement is crucial for engaging in discussions about digital transformation.

For businesses to remain competitive in the present digital revolution, they must modify their activities and strategies. According to a recent study, the majority of businesses still struggle with the transformative processes and are not digitally mature. Digital transformation is a key area of study in the corporate domain because it allows businesses to develop new business models (Weritz et.al., 2020). Organizations need to work on the factors leading them towards the achievements of the digital transformational journey (Kotarba, 2018).

Transformation primarily drives growth and has assumed massive importance in the face of global digital challenges. Despite several factors influencing the business growth, transformation is seen to be playing a vital role. Hence, researchers should be more focused on gaining insights into digital transformational antecedents. Finding the antecedents that facilitate digital transformation and then improving enhanced business performance is crucial. Significant research studies need to be conducted to identify business transformational behavior. Considering the importance of the emerging digital era, lack of studies has been found that highlighted the themes related to digital transformation.

Therefore, a bibliometric analysis is used to assess the state of DT to identify prominent researchers, countries and unexplored issues. Through bibliometric technique, it is possible to fully understand the studies and the emerging issues that are not yet fully explored, developed, or defined in transformational literature.

The present study will not only assist in comprehending the field's prevailing knowledge about the effects of digital transformation but will also offer useful recommendations for more effective implementation of the phenomenon.

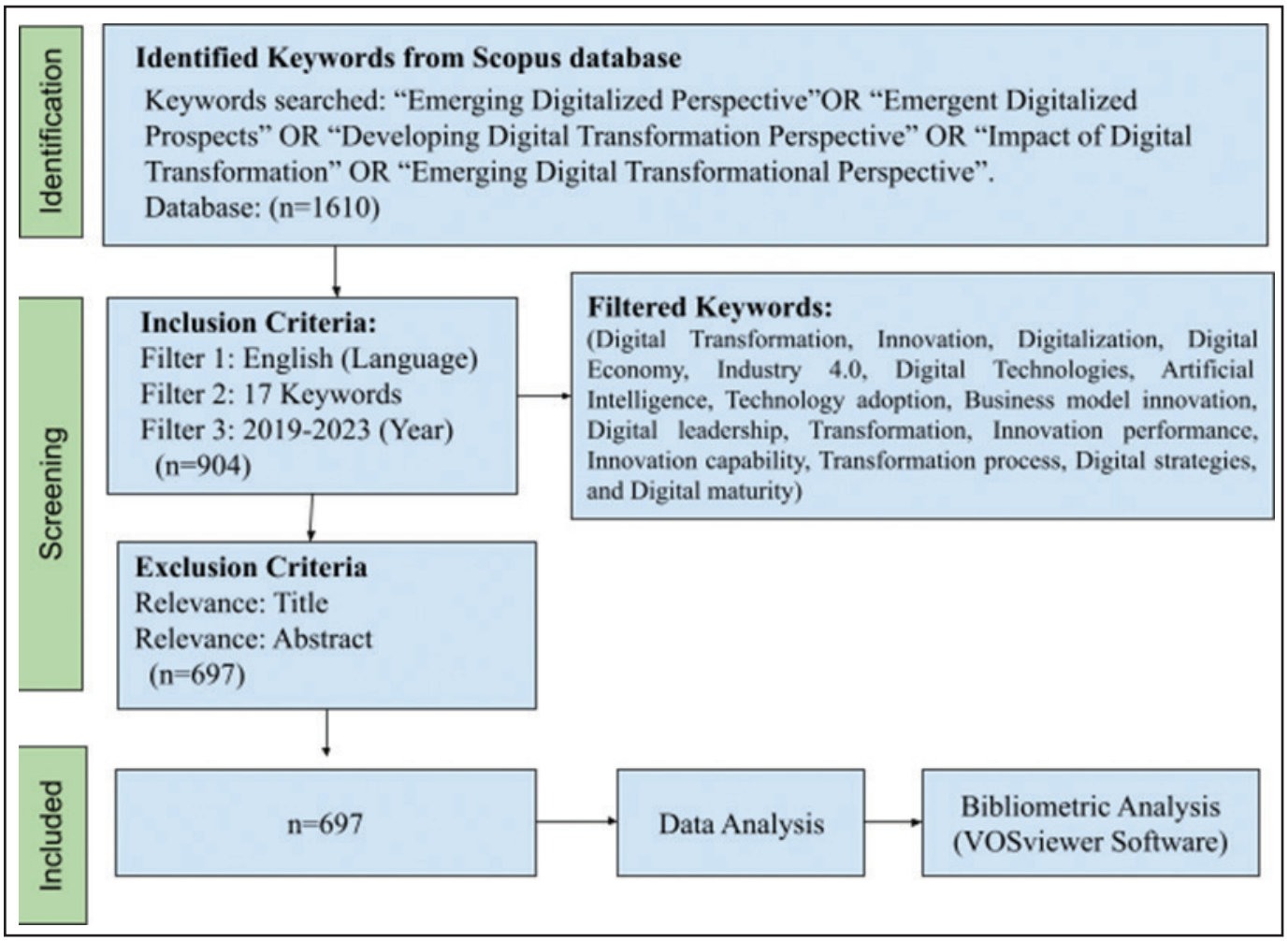
More precisely, the research concerns that the present study intends to address are:

a. What is the current scenario of research in the corporate field?
b. Who are the reputed authors in terms of publications and citations in this field?
c. Which nations, and their collaborative efforts are at the forefront of this field of study?
d. What possible avenues might this field go in the future?

RESEARCH METHODOLOGY

The present study utilizes a bibliometric analysis approach using VOSviewer Software to assess the impact of Digital Transformation in an economy. These days, a plethora of databases, like IEEE Explore, Springer, Google Scholar, Web of Science, and others offer insights into the literature. For a reasonably thorough and reliable search of the literature, the scientific research community mostly uses the Scopus database. Furthermore, the Scopus database for literature searches offers the ability to categorize the literature it stores and provides reliable and extensive information. Therefore, this study has chosen Scopus for data collection. The study started with the search using the keywords and utilized the following steps given in Fig. I to conduct topic specific search for documents using the Scopus database. A total of 697 articles were found in the search after this method was used and the duplicate articles were eliminated.

Fig. I: Prism Approach (Authors Own Source)



DOCUMENTS' ANALYSES

Tables and figures below provide the most significant and noteworthy insights regarding the 697 documents finally chosen for the study.

A. TYPE OF DOCUMENTS

Table I. Document Type

DOCUMENT TYPE	OUTCOME (Number)
Article	570
Conference Paper	70
Book Chapter	35
Review	19
Book	2
Editorial	1

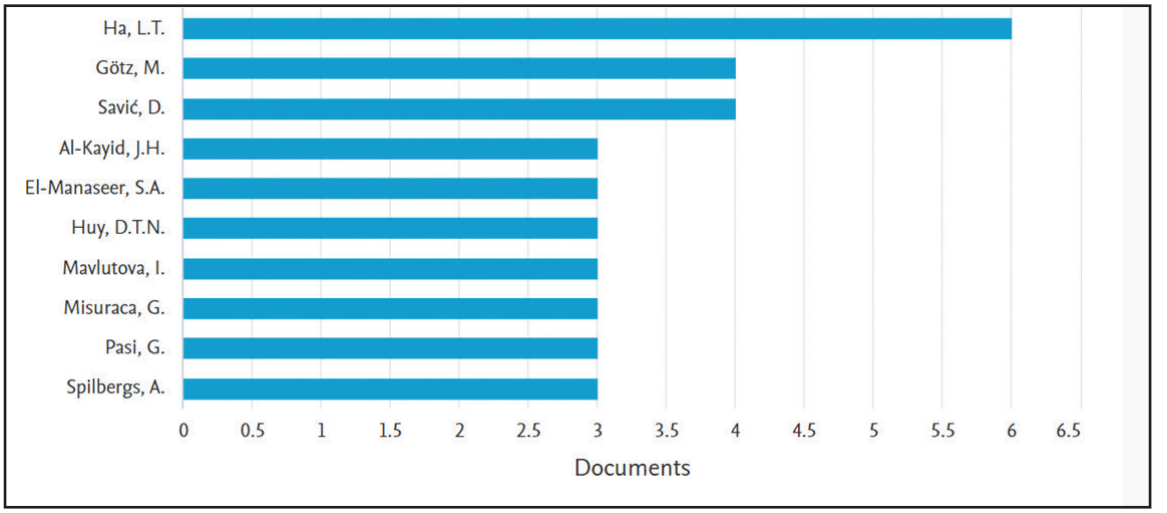
Source: Scopus

Table I shows 697 documents in terms of type of publication. 697 documents categorized as 570 Articles, 70 Conference Papers, 35 Book Chapters, 19 Reviews, 2 Books, and 1 Editorial.

B. REPUTED AUTHORS

Fig II sheds light on the aforementioned objective of finding the reputed authors in the field. The study lists the top 10 authors who have immensely contributed to the technological field.

Fig. II: Top 10 Authors

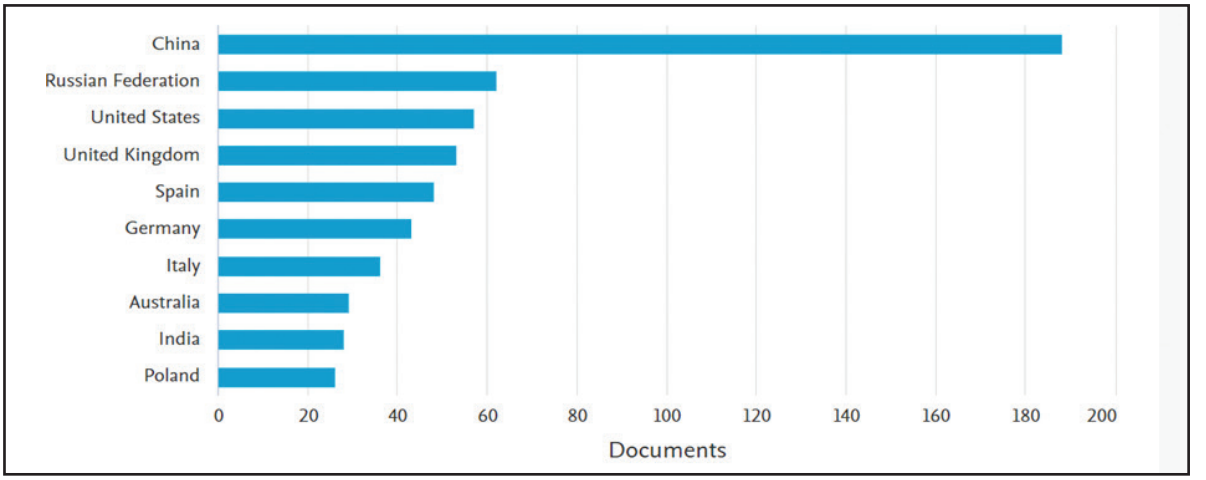


Source: Scopus

Data study revealed that a total of 159 Researchers have rigorously and consistently contributed to 697 Documents. figure II represents the top 10 Authors in terms of several publications concerning the articles on the topic DT. One Author Ha, L.T. from China is at the top of the list and published six articles on DT. Other two famous Authors (Gotz, M and Savic, D) play a renowned role in publishing articles in the context of DT by publishing four articles each. The remaining seven authors contributed three articles each.

C. COUNTRY-WISE STUDY OF DOCUMENTS

Fig III: Top 10 Countries

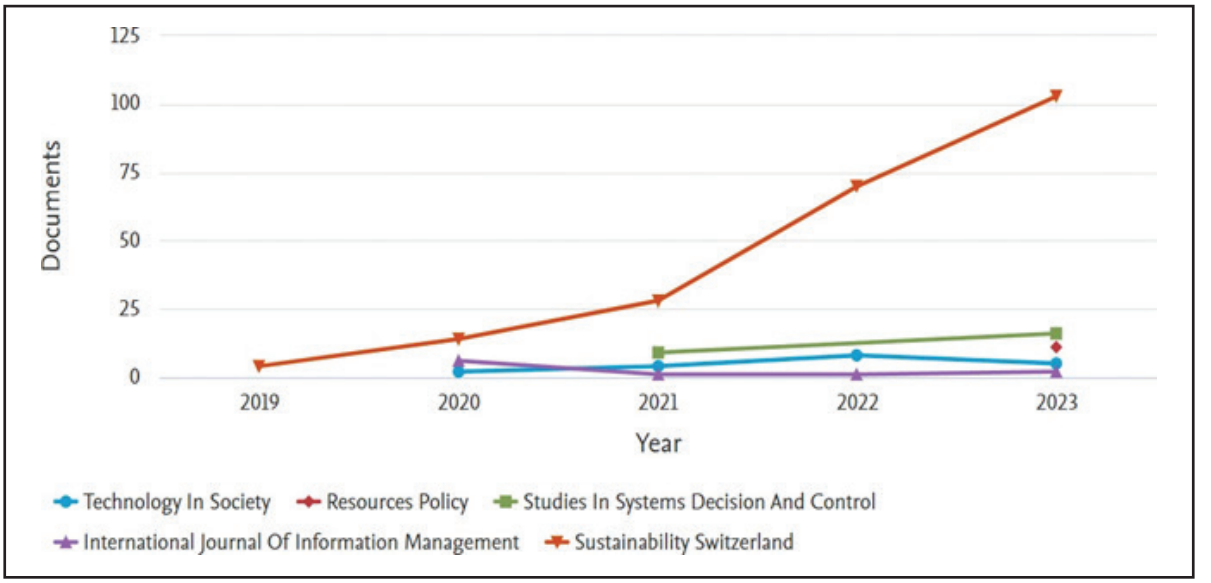


Source: Scopus

Figure III represents the top ten Countries related to this field. The best three representative countries are China (188), the Russian Federation (62), and the United States (57). India has become a least contributory country, which is a matter of concern.

D. JOURNAL WISE CATEGORISATION OF DOCUMENTS

Fig IV: Top Journals contribution in the field



Source: Scopus

All the 697 documents were from 120 Sources, Sustainability Switzerland is the top Journal, publishing the highest number of documents on DT from the year 2019 to 2023. In 2019, a total of 4 articles were published and it reached 103 in 2023, considered as an expert publication production journal in recent developments. This was followed by 'Studies in Systems Decision And Control' which published a total of 25 articles and discussed the theory, applications, and thoughts on the most recent advancements as well as those that are still to come in the domains of science and technology, physics, economics, social and biological sciences, and related fields that are pertinent to networks, decision-making processes, oversight, and complex processes. Others are 'Technology in Society' (19) and 'International Journal of Information and Management' (11) also contribute in promoting research that is grounded in practice and disseminating knowledge related to technologies and advancements.

E. YEAR WISE CATEGORISATION OF DOCUMENTS

The above table and graph represent the year-wise publication profile of the documents to assess the impact of DT between the year of 2019 to 2023, covering Business, Management and Accounting as a Subject area, produced 697 documents from the last five years. The rising trends of documents from the year 2019 (39) to 2023 (281) indicate that there has been a major rise in interest in this area shortly, driven by the convergence of commercial advantages and technological advancements expedited by COVID-19.

Table II. Year Wise Profile of Publications

PUBLICATION YEAR	OUTCOME(Number)
2019	39
2020	80
2021	115
2022	182
2023	281

Source: Scopus

BIBLIOMETRIC ANALYSIS

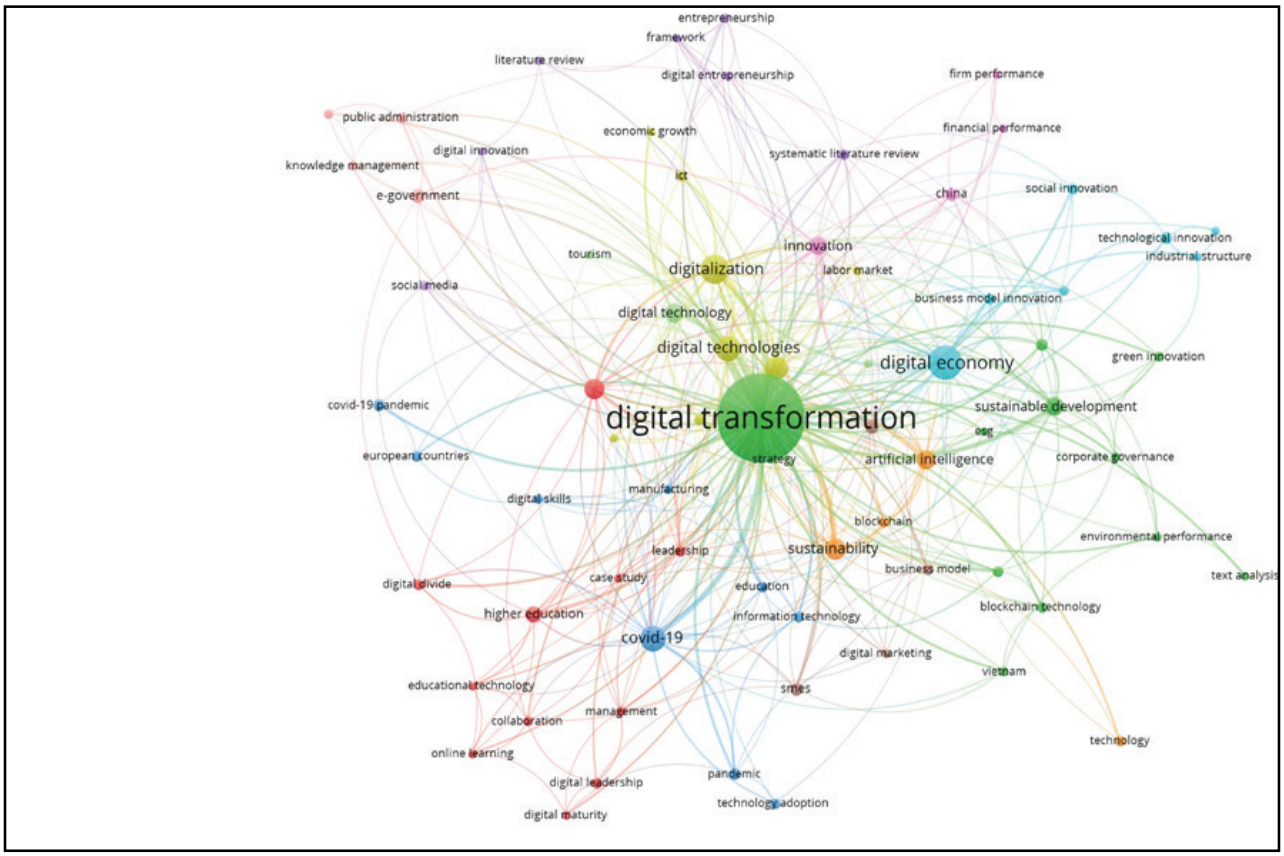
This section analyzes the selected documents from the standpoints of:

A. Keyword profiles as per authors' keywords;
B. Authorship;
C. Citations; and
D. Co-occurrence of all Keywords

A. KEYWORD PROFILES ANALYSIS BY AUTHORS' KEYWORDS

The network shown in Figure V depicts the keywords and their co-occurrence. The network representation also highlights several well-known topics that appear throughout transformational literature.

Fig. V: Co-Occurrence of Authors' Keywords



Clusters' Discussion of Fig. V

Cluster 1 (Red,11 Keywords): Case Study, Collaboration, Digital Divide, **Digital Leadership, Digital Maturity,** Educational technology, higher education, leadership, **DT**, Management, Online Learning.

Cluster 2 (Green, 11 Keywords): Blockchain Technology, **Corporate Governance**, Environmental Performance, ESG, Green Innovation, Green Technology Innovation, Information system, sustainable development, text analysis, Vietnam.

Cluster 3 (Blue, 7 Keywords): Covid-19, Digital Skills, Education, European Countries, Information Technology, Manufacturing, Technology adoption.

Cluster 4 (Yellow, 7 Keywords): Digital Technology, **Digitalization**, Economic Growth, Education, ICT, Industry 4.0, Labour Market.

Cluster 5 (Purple, 6 Keywords): **Digital Entrepreneurship**, **Digital Innovation**, Entrepreneurship, Framework, Social Media, Systematic Literature Review.

Cluster 6 (Sky Blue, 7 Keywords): **Business Model Innovation**, **Digital Economy**, Digital Finance, Fourth Industrial Revolution, Industrial Structure, Social Innovation, Technological Innovation.

Cluster 7 (Pink, 4 Keywords): Financial Performance, Firm Performance, China, Innovation.

The analysis of Fig V information majorly revealed Digital Leadership, Digital Maturity, DT, Corporate Governance, Technology Adoption, Digital Innovation, and Digital Economy as the prominent keywords. Further, an in-depth study of the documents shown in Fig V revealed that out of all the above keywords, one theme has been extracted from the above seven clusters with Digital Leadership, Digital Innovation, Technology Adoption, and Digital Maturity are the four significant pillars leading DT to economic growth which must be regulated by Corporate Governance.

Literature Review of the Highlighted Pillars

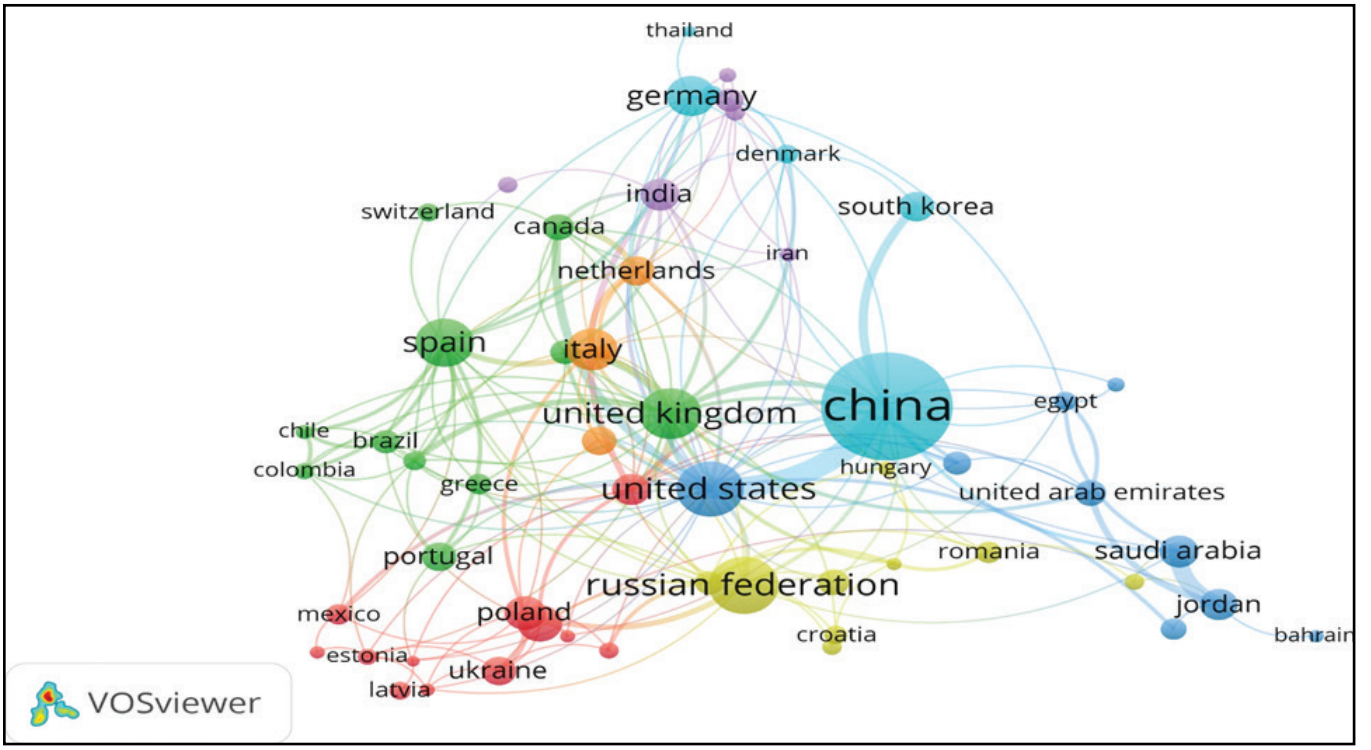
In the modern era of emerging economies, the use of technology has grown since the year 2000. Digitalization is not the only concept included in the notion of DT. The phrase "DT" is often understood to refer to "the development and subsequent shift in corporate business processes and offerings that result from the incorporation of the web age." The emergence of various advanced and modern technologies has led to the growth of the phenomena of digital progression and maturity. To achieve **digital maturity**, which is seen as the foundation and ultimate aim of DT, businesses must utilize varied approaches to digital corporate structure. Corporations strive to reach digital maturity as it is a significant as well as an influential yardstick for growth and development inside the organization. The organization's regulations, people and other resources need to be progressively incorporated and applied into digital procedures to reach digital maturity (Awad, 2022). The DT of business organizations in various industrial sectors is a developing phenomenon, enabled by revolutionary **digital innovations** such as cloud computing, big data analytics, technological advancements and artificial intelligence (Di Vaio et al., 2021). The literature in this area is still in its infancy, despite the concept of digital innovation's growing prominence. According to Correa et al. (2020), most research on innovations in the digital realm examines innovation primarily from a technical, engineering or information systems viewpoint rather than from a strategic one.

But as the digital era advances at an exponential rate, businesses are becoming more and more vulnerable to digital disruption. Businesses face a growing number of obstacles as they work to transform their organizational environments digitally, which prevents their staff from developing into personnel with a high level of digital maturity. According to the literature, due to an absence of advanced technological capabilities, companies will be either devastated by their competitors who are successfully adopting DTs, or instead they will be enabled to achieve huge commercial gains such as increasing consumer contacts and involvement, optimizing operations, and building innovative company models (Hamidi et al., 2018). Challenges include insufficient experience applying **digital leadership** strategies, a deficiency of sound innovative methodologies allowed by digital technology, an unfocused approach to innovation and experimentation, an apparent absence of staff engagement to **digital technology**, and many more (Dana et al., 2022). The theme depicts that through key pillars that are Digital leadership, Digital Innovation, Technology Adoption, and Digital Maturity, Corporate culture attains the goal of DT. However, due to major challenges encountered by the workplace environment, the organization environment fails to adopt such multidimensional practices. Additionally, the theme also evidenced the importance of **corporate governance** (Cluster 2) plays an influential role in attaining the transformation, Through Governance, corporate authorities oversee the working progress of such practices. Jewer et. al. (2022) stressed the fact that DT is not a one-step process but involvement and engagement from all corners enable a holistic contribution to the corporate world. In the advanced modern opportunistic era, personnel can transition from a resistance to an embracing mentality through governance (Grover et al., 2020). The most prevalent keywords used by several authors are listed in the network visualization figure V.

B. AUTHORSHIP

Research collaborations have significant appeal considering that they make it more accessible to share information, ideas, skills, and perspectives (Martins et al., 2012). They can also improve the caliber and productivity of research. According to Baker et al. (2020), increased cross-national cooperation serves as essential for the development of any field that requires collaboration among diverse experts.

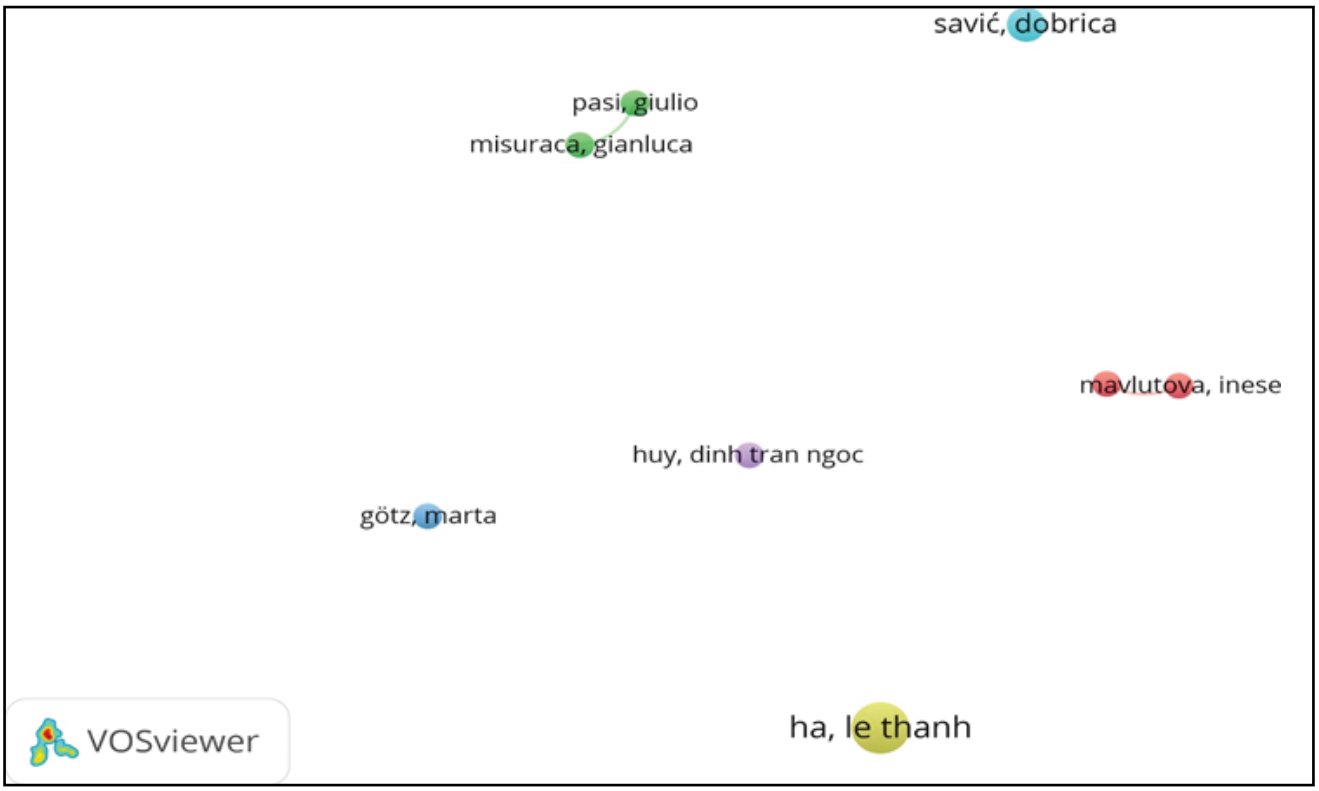
Fig. VI: Network Visualization Map (Co-authorship by Countries)



The level of collaboration between researchers across several countries is shown in the above figure, and highlights which countries have the most prestigious publishing histories within the aforementioned network of collaboration. Figure VI illustrates the leading nations involved in cooperative endeavors: China, the United Kingdom, the United States, the Russian Federation, Italy, Saudi Arabia, South Korea, Denmark, Germany, Malaysia, Japan, and Denmark. Consequently, in this network visualization map, India has been represented by the thinner node and depicts the lowest collaboration as compared to other developing nations. India has collaborated with a smaller number of countries such as Cyprus, Iran, Morocco, Singapore & Sweden. Language, geography and cultural ties are the elements that influence and define co-authorship preferences.

According to Cisneros et al. (2018), the most effective formal strategy for fostering intellectual interaction about scientific research is collaboration among scholars. Through international collaboration networks, developing countries can participate in the process of creating knowledge, which is typically spearheaded by wealthy countries (Palacios-Callender & Roberts, 2018). The blending of any two viewpoints leads to the growth and development of ideas. In addition to discussing countries' collaboration, this section also discusses the authors' collaboration network in the scientific field of scholarly collaboration. Language, language interactions, and geopolitical location are the variables that define and shape co-authorship preferences.

Fig. VII: Network Visualization Map (Co-Authorship by Author)



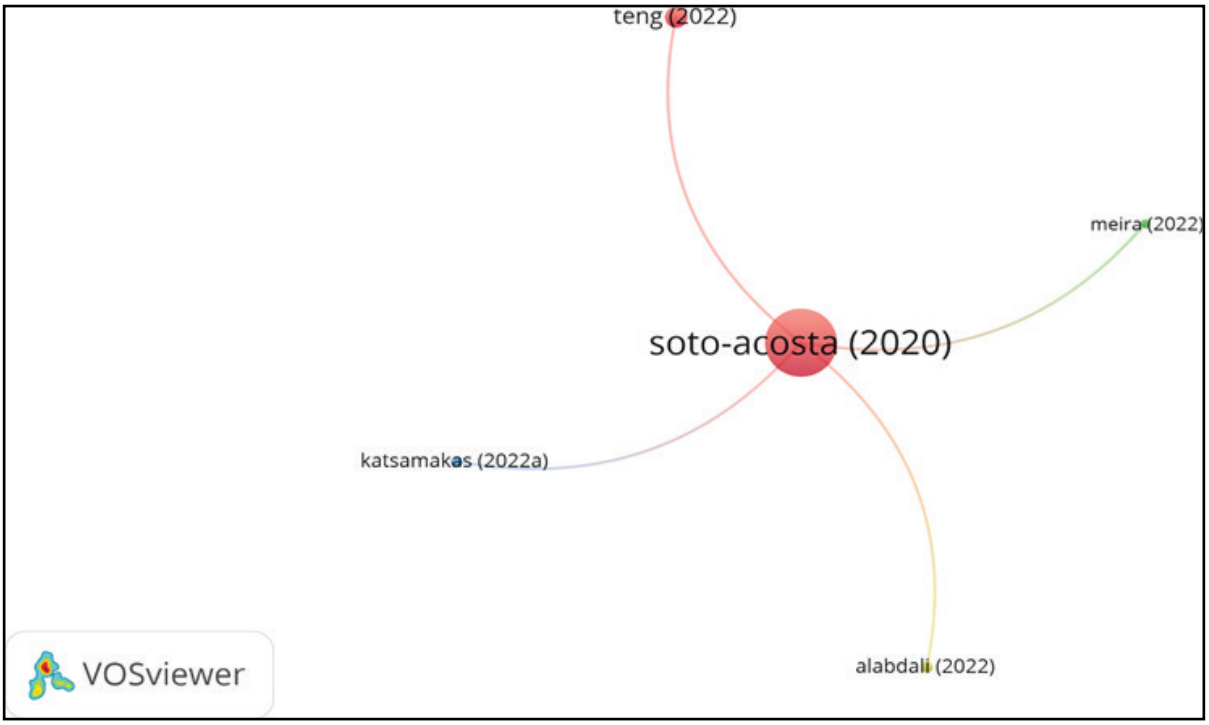
As depicted in figure VII, in terms of collaborative efforts the most prominent authors are (figures in bracket indicate no of publications): Ha, le Thanh (6), Gotz, mar ta (3), Misuraca, Gianluca (3), Pasi, Giulio, Savic, Dobrica (4), Mavlutova, Inese (3), Huy, Dinh Tran Ngoc (3). These authors form a homogeneous structure in which initiatives at collaboration are primarily limited to authors in their countries. The network demonstrates the focus of the study on an insignificant number of authors, with the majority of nodes forming a network with one author only and two nodes with two authors. This emphasizes the necessity of increased cross-national authorship in the field of DT research.

C. CITATION ANALYSIS

Citations serve as evidence that a work of literature incorporates the contents of multiple other sources (in the form of suggestions from other individuals, research findings, etc.); as a result, the quantity of citations used in research evaluation determines the research's impact (Bornmann et al., 2008). "A research study's impact is determined by how helpful it proved to other researchers" (Shadbolt et al., 2006; Bornmann & Daniel, 2007). The average citation count of 12.76 per paper is considered good because academic research is among 24% of the world's most frequently cited works when it has 10 or more citations (Beaulieu, 2015).

Fig. VIII demonstrates the most prominent contributors based on the number of citations they have cited. The most often cited author is Pedro Soto-Acosta, recognized for his article "COVID-19 Pandemic: Shifting DT to a High Speed Gear" from the Journal "Information System Management" (Acosta, et.al., 2020). According to the author, an unparalleled worldwide health emergency brought on by the COVID-19 epidemic is having dire socio-economic repercussions. The paper examined how the COVID-19 epidemic affects DT and how it affects transformational initiatives. More specifically, the literature offers specific insights into whether and how the COVID-19 pandemic is hastening the DT of businesses. The primary findings of this study may be helpful to both new and established businesses looking to investigate or take advantage of forthcoming possibilities in DT. Additionally, numerous sectors have been touched by digital technologies in terms of output and innovation.

Fig. VIII: Network Visualization Map (Citation by Authors)



In any circumstance, digitization is affecting or changing every aspect of the economy, including at least a significant portion of the processes involved in production and possibly consumption.

Fig. IX: Network Visualization Map (Citation by Countries)

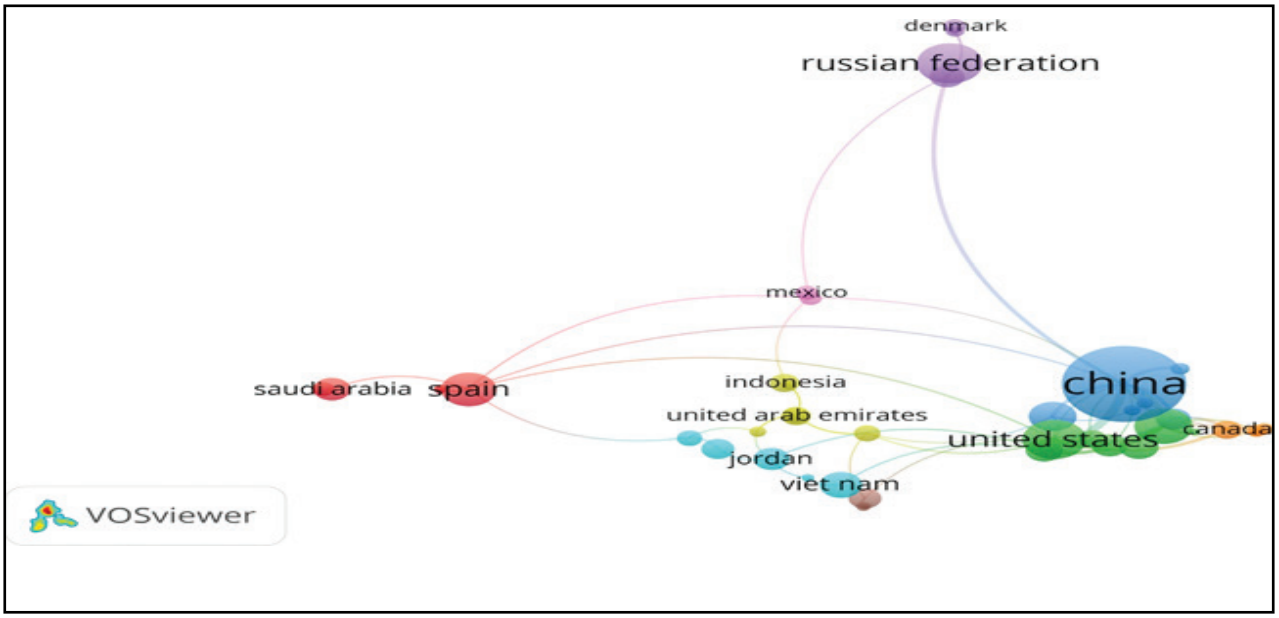


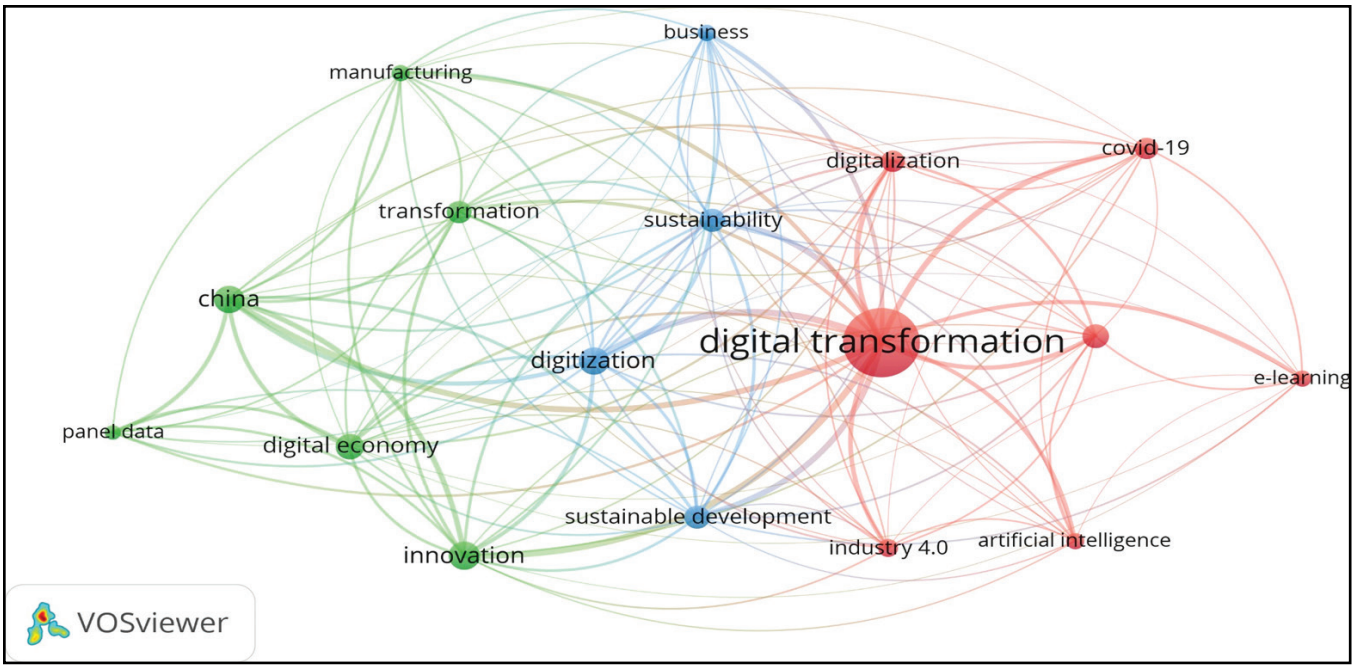
Figure IX shows the profile of publications with reference to citation by countries. Out of 697 papers that were reviewed for this study, the most significant quantity of publications is from China (152), a vibrant economy, and the others on the list are the United States (48), United Kingdom (42) , Italy (30), South Korea (17), and Spain (38). As compared to other nations, India, which is represented by the tiniest and most embedded circle, has the lowest and weakest share of articles (19) published in the transformational field.

D. CO-OCCURRENCE NETWORK BASED ON ALL KEYWORDS

Author Keywords, discussed under A above, consist of a selection of terms chosen by the authors to best describe the content of their paper, while Keywords Plus (all keywords) are words or phrases that are extracted from the titles of the references cited in the article using an automated computer algorithm developed by Thomson Reuters, even if they are not present in the title of paper or listed as Author Keywords. Analyzing both Keywords Plus and Author Keywords when examining the knowledge structure of a scientific field can provide a more comprehensive understanding.

Using the advanced software "VOSviewer", keywords were found, scrutinized, and arranged logically. It resulted in three distinct clusters identified by their colors shown in Fig X.

Fig. X: Co-occurrence network based on all keyword fields



The visual representation of the co-occurrence of co-words or keywords is shown in figure X. Circles in a range of sizes and colors represent the keywords' exploration. The size of the circle demonstrates how frequently a certain term appears; the bigger the circle, the more frequently the term appears in the titles and abstracts of the studies that were examined (Van Nunen et al., 2018). The circles' colors correspond to the various clusters identified during the search. The distance between the circles depicts their relationship with each other the closer the circles are to one another, the stronger the relationship. The frequency with which keywords appear together in document titles and abstracts determines this connection. The VOSviewer identified three distinct clusters based on the theme area. The three clusters have been identified by three colors, red, green, and blue, which are as follows:

Red Cluster- The Prominent Keywords are DT, Digital Technologies, Digitalization, Artificial Intelligence, Industry 4.0, COVID-19, and E-learning. Therefore, the network comprises 7 keywords associated with the direct and close relation of DT with Digital technologies and digitalization. Therefore, the cluster depicts that digital technologies play an influencing role in the era of digitalization facilitated by artificial intelligence in Industry 4.0 which further performs as an antecedent for DT.

Backhouse and Manda (2017) stressed the fact that adopting cutting-edge technological advances has emerged as one of the primary strategic ways for the steady expansion of enterprises in the corporate sector. To encourage digitalization for the inclusive development of a digital society, the researchers looked at the regulatory structure,

its execution process, and a case study concerning business models. The analysis found that society is still distant from the route of DT because of the inadequate cooperation of authoritative organizations, the ineffective accomplishment or implementation of legislation reforms, the absence of coordinating efforts, and the lack of a segmented strategy. Kowalkiewiez & Shahiduzzaman (2018) concluded that the business environment is changing rapidly, and technology is changing the way businesses run. Digital technologies open up new avenues for work production, offering, and execution. However, whether it's updating antiquated systems, optimizing workflows, or launching new services or goods, enterprises face significant obstacles during the digital evolution process. The study identified three areas and made a distinction between the "digital effects" and "digital competencies''. Weritz et.al. (2020) explored that organizations need to adapt their strategic approaches in response to the constant shifts in the technological landscape and the need for innovation. Several organizations have not yet attained maturity in digital technologies, according to an earlier study. Using a multi-industrial case study assessment of eight successful organizations, the report constructed six dynamic skills. Certain dynamic qualities should be mentioned as pertinent to the DT: a) Absorbent capability; b) Adaptability; c) Cooperation role; d) Ingenuity potential; e) Focus on marketing; and f) Relationship potentials. In addition, new digital management as a component of digital culture, continual learning and development, ethics, and data stewardship are prerequisites for reaching DT.

It is beyond the purview of the present work to portray an in-depth analysis of every study. However, the following sections attempt to highlight a few noteworthy studies that fall under this cluster.

Green Cluster- "Transformation and Innovation". The important keywords in the green cluster are Digital Economy, Manufacturing, Panel data, and China. The cluster comprises six keywords stating that Transformative and Innovative Capabilities play an influencing role in the progress of the Digital Economy. The papers about transformation and the expansion of an economy and business are gathered in this cluster.

Nambisan et al. (2019) proclaimed that the advent of cutting-edge and potent digital platforms, facilities, and technologies has fundamentally changed the innovation and entrepreneurship landscape. Digital advancements affect value creation and capture in ways beyond just creating new avenues for inventors and entrepreneurs. Comprehending the DT of the economy requires research that embraces ideas and concepts from various fields and disciplines, integrates numerous and cross-levels of assessment, and explicitly acknowledges digital technologies' role in changing social relationships and organizations. Three major themes connected to digitization—openness, affordances, and generativity—are identified, together with broad research challenges associated with each, to aid in the realization of this research agenda. This application is that themes inherent in digital technologies could act as a shared conceptual framework, facilitating the integration of concepts from many disciplines and areas as well as links between concerns at different levels.

Dou, et.al. (2022) concluded that the recent development of information technology has led to the gradual emergence of the digital economy, whereby manufacturing enterprises must now deal with when performing green innovation operations. They examined the unpredictable effect of the digital economy on company innovation in the environment, further identifying the moderation mechanism of government effectiveness and the varied nature of its effects. It provides this by using corresponding panel data at the region and manufacturing business levels in China throughout the period 2011–2019 to be the sample. The mutual fixed-effects model shows that contrary to what is typically believed, there is a U-shaped inversion of the effect that first promotes and then hinders firm innovation. This relationship is robust when endogenous and robustness measurements are run. Further analysis reveals that the association between business innovation and the rise of the digital economy is favorably moderated by government quality, statistically indicating a change in the pivotal moment to the right under higher-quality governance.

Liu et al. (2023) aimed to investigate the effects of DT on corporate innovation from both theoretical as well as empirical perspectives. Against the backdrop of the rapidly developing digital economy, the influence of DT on organization innovation is empirically analyzed in this paper, which uses panel data from China's Shanghai and

Shenzhen from 2013 to 2021. First, we discover—a finding supported by robustness testing—that DT quickens enterprise innovation. Second, by increasing efficiency and facilitating transparency, DT has an impact on corporate creativity. Third, there are different regulatory functions that financial redundancy and funding limits play in this procedure. Fourth, heterogeneity analysis reveals that different enterprises—state-owned and non-state-owned, technologically advanced and non-high-tech, in addition to varying life cycles—benefit differently from the significance that DT plays in fostering enterprise innovation. Ultimately, the functional analysis acknowledges that such a role could possess a lag impact and recommends more research to ascertain whether DT can significantly foster the sustainable development of businesses through innovation. All things considered, this research advances our knowledge of innovation-driven strategies and DT while promoting a deeper merging of the physical and digital economies.

Thus, Publications in the green cluster, focus on transformation as a predictor of business performance and economic expansion.

Blue Cluster- Important keywords comprising the blue cluster of the network visualization map are Business, Digitalization, Sustainability, and Sustainable Development. Thus, the blue cluster describes the intersection of Digitalization and Sustainability.

Bohnsack et al. (2022) suggested that due to the widespread use of digital technologies, researchers need to learn more about how these technologies affect sustainable development. This special issue demonstrates the potential and limitations of several digital technologies, such as social media, industry 4.0 technology, digital and sharing platforms as well as citizen science. The organization approach places a strong emphasis on the necessity of considering both first- and second-order implications, which have the potential to either exacerbate or derail early beneficial effects. The field of research on the convergence of sustainability and digitalization is relatively new, and the articles included in this special issue add significantly to the conversation about the potential positive effects of digital technology. The digital economy as a whole is involved in sustainability in the digital age, even though the researcher's main focus was on using digital technologies for sustainable development. The emergence of the Metaverse[1] (networks of shared knowledge) demonstrates how society is fast changing due to the digital revolution, with many implications for sustainability that require further study to be thoroughly explored.

Scholars studying sustainability will find special value in three research areas: person dynamics, business dynamics, and society dynamics. Similar to corporate sustainability it is important to comprehend the effects of digital technology on several levels (Whiteman et al., 2013). The advantages of digitalization for businesses will not always benefit people or society as a whole. It's critical to comprehend both first- and second-order effects at various levels. Disentangling impacts at each level is a beginning step, even though generativity allows for the impossible to fully foresee new paths and second-order repercussions. While researching how digital technologies might improve the sustainability of wealth generation and capture is crucial, a thorough review must additionally recognize possible consequences, such as artificial intelligence concerns regarding privacy or rebound impacts in energy use. Understanding the effects that digital technologies impact on people and organizations is necessary to address concerns about the governance of digital technologies and their application in addressing societal issues. Future studies should examine the effects of digital technologies at different levels and look for analytical techniques that make it possible to connect the macro, meso, and micro levels to understand how they can assist sustainable development.

Bhutani et al. (2015) concluded that in the current era of technological progress, where everything is centered around the "e" world, DT has permeated every aspect of existence. The widespread usage of digital devices and the increasing dependence on them demonstrate that digitalization is essential and has the power to completely transform the parameters of social and economic progress, creating a mutually beneficial partnership with sustainable development and all-inclusive growth. It has developed into a significant tool that, by improving living quality, has streamlined operations and procedures in several areas, including planning, regulation, administration, and the socioeconomic domain. Since technologically empowered societies are more Cognizant Connected, Conforming,

Cooperative, and Content towards their advancement, and because they work together as responsible assets to enhance the nation's prospects, this very aspect of the digital age leads to sustainable development. However, lack of research studies have been found that explored the relation between Digital transformation and Sustainability. Therefore, the purpose of the article was to demonstrate the extent of digitalization in the present era and its role in assisting countries worldwide in achieving inclusive growth through sustainable development. Using this all-encompassing strategy, countries would be able to provide their citizens with efficient, sustainable, and digital lives in addition to inclusive growth. Improved living conditions, engaged citizens, a dynamic urban framework, transparent public welfare policies and procedures, and environmentally conscious governance would all follow, leading to the creation of self-aware, digitally literate, self-enabled individuals who are capable of learning and acting as change agents and growth agents. This will progress society towards sustainable development.

CONCLUSION

The study significantly contributes to the comprehension of the current situation and the concept of DT's expansion in the transformational literature. With a majority of these insights, the reader is provided with a description of the authors, numerous publications, journals, and nations, along with data on publications and the number of citations based on a review of 697 papers in total. Conclusions of the study are as under:

- The analysis of the documents identified seven clusters at the time of the author's keyword analysis which found Digital Leadership, Digital Innovation, Technology Adoption, and Digital Maturity as the four significant pillars leading DT to economic growth which must be regulated by Corporate Governance. It indicates that transformation can only be possible with proper corporate governance or regulatory efforts as transcribed by the network visualization map used in the study.
- Despite the increasing popularity of the notion of digital transformation, there is still a lack of literature in this field. On the other hand, as the digital world develops at an accelerating pace, companies are finding themselves more and more exposed to digital disruption.
- Companies are facing more and more challenges as they attempt to digitally alter their organizational environments, which keeps their employees from becoming highly digitally immature employees.
- Through a co-occurrence network (based on all keywords analysis), the study has identified three clusters which showed:
  i) Digital technologies play an influencing role in the era of digitalization facilitated by artificial intelligence in Industry 4.0 which further performs as an antecedent for DT;
  ii) Transformative and Innovative Capabilities play an influencing role for the progress of Digital Economy; and
  iii) There is an intersection of Digitalization and Sustainability.
- It is imperative for managers to recognize that providing an individual with the necessary skills, knowledge related to digital technology, and necessary digital innovative skills along with the mindset of being an adaptable employee in the digitally transforming field, can enhance the organization's overall resilience.

MANAGERIAL IMPLICATION OF THE STUDY

The DT research area utilizes such a wide range of contexts, this study aims to provide a thorough overview of the topic. The conceptual framework for the research field has been determined by this study. The primary topics found in the thematic landscape of the DT literature are "Digitalization, Digital Maturity, DT, Governance and Sustainability". This study provides a thorough summary of the DT literature. It is crucial to identify the key pillars through which one can achieve the goal of digital transformation. The present study provides four clusters that collectively and significantly influence digital transformation and assist the corporate sector to accomplish DT. To quickly adapt to the transformational goals, organizations need to design coordinated digital strategies that generate digital capabilities involving systems, personnel, culture, and

operations that are consistent with desired outcomes. In order to stay competitive and relevant in the current and future digital era, organizations need to keep putting a high priority on the intersection between digital creative strategies and sustainable behavior because the advantages of digitalization for businesses will always benefit people or society as a whole.

LIMITATION OF THE STUDY

Network profiling and science mapping are quantitative approaches. These techniques evaluate a wide range of publications and offer a thorough and all-encompassing view of the research field. But they might not "deep dive" into the subject of the research's areas. The limits of the co-word analysis approach are to be taken into account: some publications may not have keywords; various kinds of publications may be underestimated in bibliometric documents; and the quality of co-word analysis is dependent on the indexing methods on which the authors have no control. The complete study field was evaluated when determining prevalent and emerging subjects using keyword co-occurrence analysis. It does not give information as to which papers contain those keywords. The study is based on the selection of keywords. Future research may use other keywords leading to different identification of documents. The use of the SCOPUS database as the only source for the study might have left out those publications that were not listed on it but on other databases. The inclusion of English language literature only must have resulted in the exclusion of some good works in other languages.

FUTURE RESEARCH AND RECOMMENDATIONS

Although DT seems to be a less explored area, additional research must be undertaken in developing nations, especially in India. This idea would achieve its major objectives if an extensive range of research is supported and continued development in various institutional contexts. Future research can unveil the unexplored area of the intersection of Digitalization and Sustainability systematically and scientifically. The present study was restricted to Bibliometric analysis using VOSviewer only. Future research can utilize more advanced software for bibliometric analysis such as BibExcel, PoP (Publish or Perish), etc. The present study restricted the Scopus database to extract the data. So, future research can be conducted by using a combination of all the databases such as Scopus, Web of Science, and Google Scholar.

REFERENCES

- Acosta S., Garza, T., Hsu, H.-Y., & Goodson, P. (2020). Assessing quality in systematic literature reviews: A study of novice rater training. *SAGE Open*, *10*(3), 1-11. https://doi.org/10.1177/2158244020939530
- Awad, M. J. (2022). The impact of digital maturity in organizational culture: exploratory research at Fallujah University. *International Journal of Transformations in Business Management*, *12*(01). 231-260. https://doi.org/10.37648/ijtbm.v12i01.013
- Backhouse, J., & Manda, I. (2017). Digital transformation for inclusive growth in South Africa: challenges and opportunities in the 4th industrial revolution at 3rd African Conference on Information Systems and Technology, Department of Information Systems. https://www.researchgate.net/publication/318395119
- Baker, H. K., Pandey, N., Kumar, S., & Haldar, A. (2020). A bibliometric analysis of board diversity: Current status, development, and future research directions. *Journal of Business Research*, 108, 232–246. https://doi.org/10.1016/j.jbusres.2019.11.025
- Beaulieu, L. (2015, November 19). How many citations are actually a lot of citations? Retrieved 26 July 2020,
- https://lucbeaulieu.com/2015/11/19/how-many-citations-are-actually-a-lot-of-citations/#:
- Bhutani, S., & Paliwal, Y. (2015). Digitalization: a step towards sustainable development. OIDA International Journal of Sustainable Development, 8(12), 11-24.
- Bohnsack, R., Bidmon, C. M., & Pinkse, J. (Eds.). (2022). *Sustainability in the digital age: Intended and unintended consequences of digital technologies for sustainable development* (pp. 599-602). Wiley.
- Bornmann, L., & Daniel, H. D. (2007). What do we know about the h index? *Journal of the American Society for Information Science and Technology, 58*(9), 1381–1385. https://doi.org/10.1002/asi.20609
- Bornmann, L., Mutz, R., Neuhaus, C., & Daniel, H. D. (2008). Citation counts for research evaluation: Standards

of good practice for analyzing bibliometric data and presenting and interpreting results. *Ethics in Science and Environmental Politics*, *8*(1), 93–102. https://doi.org/10.1002/asi.20609.

- Cisneros, L., Ibanescu, M., Keen, C., Lobato-Calleros, O., & Niebla-Zatarain, J. (2018). Bibliometric study of family business succession between 1939 and 2017: Mapping and analyzing authors' networks. *Scientometrics, 117*(2), 919–951. https://doi.org/10.1007/s11192-018-2889-1
- Correa, T., Pavez, I., & Contreras, J. (2020). Digital inclusion through mobile phones?: A comparison between mobile-only and computer users in internet access, skills and use. *Information Communication and Society*, *23*(7), 1074–1091. https://doi.org/10.1080/1369118X.2018.1555270
- Di Vaio, A., Palladino, R., Pezzi, A., & Kalisz, D. E. (2021). The role of digital innovation in knowledge management systems: A systematic literature review. *Journal of Business Research*, *123*, 220–231. https://doi.org/10.1016/j.jbusres.2020.09.042
- Dou, Q., & Gao, X. (2022). The double-edged role of the digital economy in firm green innovation: Micro-evidence from Chinese manufacturing industry. *Environmental Science and Pollution Research*, *29*(45), 67856-67874.
- Ebert, C., & Duarte, C. H. C. (2018). Digital Transformation. *IEEE Software, 35*(4), 16–21. doi:10.1109/ms.2018.2801537
- https://doi.org/10.1007/978-981-10-8612-0_75
- Jewer, J., & Van Der Meulen, N. (2022, January). Governance of Digital Transformation: A Review of the Literature. In The Hawaii International Conference on System Sciences (HICSS) 1-10 URI: https://hdl.handle.net/10125/80144
- Kotarba, M. (2018). Digital transformation of business models. *Foundations of Management*, *10*(1), 123–142. https://doi.org/10.2478/fman-2018-0011
- Le Thanh, H. (2022). Accelerating digital transformation implementation in the fight against corruption?: evidence from European countries before and during the COVID-19 pandemic. *International Journal of Electronic Government Research (IJEGR)*, *18*(2), 1-27.DOI: 10.4018/IJEGR.29818
- Martins, R. M., Andery, G. F., Heberle, H., Paulovich, F. V., de Andrade Lopes, A., Pedrini, H., & Minghim, R. (2012). Multidimensional projections for visual analysis of social networks. *Journal of Computer Science and Technology, 27*(4), 791–810. https://doi.org/10.1007/s11390-012-1265-5.Merali, Y., Papadopoulos, T., & Nadkarni, T. (2012). Information systems strategy: Past, present, future?. *The Journal of Strategic Information Systems, 21*(2), 125-153. https://doi.org/10.1016/j.jsis.2012.04.002
- Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research policy*, *48*(8), 103773, 1-9. https://doi.org/10.1016/j.respol.2019.03.018
- Palacios-Callender, M., & Roberts, S. A. (2018). Scientific collaboration of Cuban researchers working in Europe: Understanding relations between origin and destination countries. Scientometrics, *117*(2), 745–769. https://doi.org/10.1007/s11192-018-2888-2.
- Shahiduzzaman, Md & Marek Kowalkiewicz (2018) Digital organisation: A value centric model for digital transformation, *Academy of Management Global Proceedings, Vol*. Surrey, No.
- 2018, 1-11. Available at: https://journals.aom.org/doi/10.5465/amgblproc.surrey.2018.0047.abs
- Shadbolt, N., Berners-Lee, T., & Hall, W. (2006). The semantic web revisited. *IEEE Intelligent Systems, 21* (3), 96–101. https://doi.org/10.1109/MIS.2006.62
- Van Nunen, K., Li, J., Reniers, G., & Ponnet, K. (2018). Bibliometric analysis of safety culture research. *Safety Science*, *108*, 248–258. https://doi.org/10.1016/j.ssci.2017.08.011
- Weritz, P., Braojos, J., & Matute, J. (2020). Exploring the antecedents of digital transformation: Dynamic capabilities and digital culture aspects to achieve digital maturity. *Organizational Transformation & Information Systems, 22,* 1-10.
- https://aisel.aisnet.org/amcis2020/org_transformation_is/org_transformation_is/22