



Synergy between Artificial Intelligence and Digital Transformation: A Systematic Review and Bibliometric Analysis

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Abstract

Artificial intelligence (AI) is progressively being embraced by institutions for digital transformation, a trend that is increasingly evident in scholarly endeavors. To better understand the research landscape at the intersection of AI and digital transformation, we conducted a systematic literature review (SLR) of 119 relevant articles indexed in the Clarivate Web of Science (WOS) and Elsevier Scopus databases. Our bibliometric analysis employed advanced techniques such as keyword co-occurrence and bibliographic coupling to map the dominant topics and their evolution over time in this emerging field. By leveraging these powerful analytical methods, we were able to generate valuable insights into the current state of research at the nexus of AI and digital transformation. The findings from our comprehensive SLR provide an updated synopsis of the existing scientific work in this area. Moreover, we developed an interpretive framework that sheds light on the key drivers and outcomes of AI adoption for digital transformation within organizations. This framework serves as a valuable tool for researchers and practitioners alike, helping to elucidate the complex interplay between AI, digitization, and innovation in the context of organizational transformation. Our study underscores the growing importance of AI as a transformative technology that enables firms to navigate the challenges and opportunities of the digital age. By systematically mapping the research landscape, we aim to inspire further scholarly inquiry and practical applications of AI in the service of digital transformation. As organizations continue to embrace AI-driven solutions, we must deepen our understanding of this powerful technology's strategic and operational implications.

Keywords: Artificial intelligence AI, Digital transformation, Firms, Digitization, Innovation

1. Introduction

The Digital transformation the integration of digital technology into all areas of a business (Westermann et al., 2011) is an unstoppable force that has set off a sequence of radical changes in the global economy. Fast evolution of digital business is driven by already wide spread combination of technologies that are radically changing company's operations and the way value is created. Such a transformation changes fundamentally the business model of how value is created and delivered and even how stakeholders perceive it (Brynjolfsson and McAfee, 2014). As such, most organizations undergoing this transformation report greater efficacy in operational processes, customer perception and active participation, and different ways of doing business. Even though it is so valuable, the process of digital transformation is not very easy. Organization faces difficult transitions, including change in mindset, change in strategy, and change of technologies. AI is being regarded as one of the powerful technologies that facilitate such change ranging from automating some tasks to making decisions (Huang and Rust, 2018). AI powered organizations armed with machine learning and natural language processing can review big amounts of data, recognize market patterns and automate processes (Davenport, 2018). Nevertheless, even though AI powered technology will assist in the rethinking of many processes within the organization, the role of digital transformation in this process seems to be an under researched topic.

This literature can be said to be aware of the centrality of AI, but can also be seen as stating where more research is needed. For example, how AI technology plays a role in constructing a business model or shaping the organization is dealt with in fewer studies despite many studies focusing on its operationalization (Brynjolfsson et al., 2018; Vial, 2019). Moreover, there are also unresolved issues regarding the level and the sphere of AI applications and scale of power of AI in different organizational Set-ups (Hallinan & Striphas, 2014). It is these shortcomings that emphasize the importance of studying AI and its effects in greater detail in the context of digital transformation in a way as to enhance the performance of organizations. Closing these gaps is not only important from a theoretical perspective, but also from the practical perspective. For organizations, the appreciation of AI and digital transformation interlinkages can help make purposeful technology investment decisions which can increase responsiveness and competitiveness in the hypercompetitive environment (Kane et al., 2017). Conceptually, this research adds to the literature dealing with change and innovation management by portraying the ways in which AI embeds processes in organizations such as planning, forecasting, and decision making (Frank et al., 2019). To this end, this study undertakes a systematic review and bibliometric analysis to synthesize existing research and provide actionable insights. Specifically, it addresses the following research question: *How does the interaction between Artificial Intelligence and digital transformation enhance organizational efficiency and reshape management practices?* By bridging theoretical gaps and offering practical guidance, this study aims to advance understanding of AI's role in driving digital transformation and to equip organizations with strategies to navigate the challenges and opportunities of an AI-driven future.

2- The Digital Integration of Organizations and Their Leadership

The digital transformation of an organization is by its nature a multidimensional venture that encompasses the integration of a greater extent of digital technology into business processes, activities and models (Demirkan, Spohrer and Welser 2016; Matt, Hess, 2017 and Benlian 2015). The digital transformation of an organization is primarily a multidimensional process of infusion of digital technologies into various business processes, activities and models (Demirkan, Spohrer, & Welser, 2016; Matt, Hess, & Benlian, 2015). This

transformation does not simply go beyond technological adoption but includes the shift of a firm's position, culture and processes (Fitzgerald et al., n.d.). It is a major shift in the, not only the sophistication of the features of the products but also the forms of innovation of the operational and economic processes. The effects of digital evolution extend across economies, industries, and societies making firms look for means to maintain their competitive advantage in the more dynamic industry: Vial (2019). However, for firms to exploit the fullest extent of the digital transformation, it is important for them also to incorporate the digital technologies into the business fundamental processes and accordingly their business strategies (ECISM 2016 Proceedings). For example, this transition has many benefits, including better control over customer relations, greater efficiency of business processes, and new business models (Fitzgerald et al., n.d.) While promising, digital transformation is not without significant difficulties. The organizations face problems such as the procuring of additional. Modify current practices, and solve organizational inertia. Ahmad et al. (2021) highlight that changing an organization is not only about putting money into technologies, but also about having a culture that advocates for creativity. Likewise, Saura, Palos-Sánchez, and Cerdá Suárez (2017) maintain that in order to achieve success in the digital transformation, employee issues and the objectives of the organization and its resources in the form of technology must be integrated. As Verhoef et al. (2021) point out, achieving digital maturity is not a simple end-state, but rather a growth path where there must be a degree of balance between the utilization of what existed and the development of new technologies. On the other hand, one important dimension neglected in the literature is the perspective of Artificial Intelligence (AI) as a catalyst of digital transformation. According to Huang & Rust (2018), the AI is of great importance for the complex reality of digital transformation and its specific offerings includes, inter alia, real time analysis of data, prediction and modelling, as well as optimization of processes. However, the application of AI technologies in the strategies of the digital transformation comes with new requirements such as the demand for the system made up of AI technologies and social technologies, supporting external environment, which maintains system equilibrium and trust, as well as the "black box" problem of algorithms (Hallinan & Striphas, 2014). It is crucial to be able to address these concerns to guarantee that digital transformation doesn't only promote operational efficiencies but also contributes to organizational resilience and innovation, but also promotes resilience and allows for greater innovation within the organization. Digital transformation is not simply a strategic consideration, but a fundamental requirement for organizations that seek to cope with ever-changing markets and advancing technologies. Companies can take advantage of the complementary relationship between AI and digital transformation in order to improve their potential for growth, strengthen their agility, and remain competitive in the digital age.

3. The Emergence of AI and its Capabilities

Organizations around the world are embracing AI technologies in record numbers, even if this particular wave of innovation comes with challenges. After all, the potential that this rapidly changing and advancing technology presents is significant for organizational development and disruptive innovation (Bostrom, 2014; Canhoto & Clear, 2020). Still, there are many firms which have not caught on and have yet to fully leverage these technologies. It has been consistently illustrated as per McKinsey's report that while firms are starting to see some return for AI investment, the reality is that a large section of organizations remain resistant to change (Boutetiere & Reish, 2018). The successful adoption of AI technologies within the organizational culture is important for the effective realization of their benefits. If authorities do not mobilize their resources effectively, AI as a cluster of complex technologies may be rendered less effective (Davenport, 2018) as it would not yield the maximum output due to a lack of effective resource and people mobilization. Moreover, a disjointed

understanding of internal structural dependencies surrounding AI systems and their inherent “black box” nature makes it infeasible to harness them adequately (Hallinan & Striphas, 2014; Lindren & Holmstrom, 2020). Such complexity further highlights the need for organizations to acquire the requisite capabilities to meet such demands when they arise and out the framework suggested above. "The sophistication is also not constrained just to automating mundane chores but operates at a sophisticated level of even higher order functions like contemplation and decision making (Huang & Rust, 2018). This proficiency allows Ai to take on responsibility that would otherwise be performed by humans, including problem-solving, prudent exercising of power, and good decision-making. The technological advancements in these enhanced provided features have contributed towards the growth of digital transformation and the change in managerial functions in organizations. These developments are contributing towards enabling wider cognitive access, so that many more people will be able to take advantage of it than is the case now (Toukhtab, 2011). Access to computer systems with high processing power becomes enabled by integration of sophisticated algorithms, thus allowing for connection between distinct algo modules. When these connections are expertly executed, they lead to improved performance. Such characteristics make ai-based automation more effective than conventional types of automation that rely on repetitive and easy tasks, for instance, filling in forms and processing simple data.

In the other hand AI integrates different intelligent capabilities in one automated system using big data and extensive analytics to provide quick, high quality and high level solutions. The combination of monotonous mechanical work with human intellect processes is the modernization of human.

4. Synergy between Artificial Intelligence and Digital Transformation

The way companies operate is profoundly altered by digital technologies (Henfridsson & Bygstad, 2013; Jonsson et al., 2018), it is arduous to organize without taking digital technology into account (Kallinikos et al., 2013). In other words, modern companies are so integrated with digital technologies that organization and digitization are two sides of the same coin. According to Lyytinen et al (2016), digital technologies are defined as "products or services that are either embedded in, or enabled by, information and communication technologies". Digitalization can be achieved without digitization. Digitization refers to the internal optimization of processes, which often leads to cost reductions. Digitization, on the other hand, goes beyond the implementation of technology to involve a more profound change in the business model and the evolution of work. In the end, very few companies have successfully completed digital transformation. Kane et al (2017) found in a global study that only 25% of organizations had transformed into digital businesses, 41% were in the process of transformation, and 34% spent more time talking about the digital transformation trend than acting on it. However, what is remarkable about the study is that 85% of executives said that achieving digital maturity is crucial to organizational success.

Despite various conceptualizations of digital transformation (Vial, 2019; Wessel et al. 2020), it is widely accepted that digital technologies particularly in the form of AI can massively transform organizations (Constantinides et al. 2018; Davenport, 2018). Thus, over the past decade, increasing attention has been paid to the process and tensions associated with implementing AI in organizational operations (Agarwal et al. 2010; Hinings et al. 2019). Among other things, managers have to decide whether to focus on exploiting existing technologies or investing in new AI technologies for the future (Gibson & Birkinshaw, 2010; Raish et al., 2011). They also face pressure to change quickly to keep up with competitors and investor demands. The growing use of digital technologies linked to various types of datasets

has enabled the emergence of diverse AI capabilities designed to augment organizational capabilities (Khrais & Shidwan, 2020). Giving concrete examples such as the provision of online conversations by chatbots as well as advanced digital services such as fraud detection. But despite growing recognition of AI's potential to increase organizational capabilities, there has been little conceptual and empirical investigation into the effects of AI on organizations' digital transformation processes. This is related to the debate on narrow versus broad AI applications, where narrow AI applications are linked to a specific context with a specific and limited dataset (Brynjolfsson et al., 2018). The notion of AI readiness is particularly important for broad AI applications due to their greater complexity. Digital transformation is considered a broader concept than IT-enabled organizational change, although most conceptualizations place digital transformation within the boundaries of a single organization (Vial, 2019) as it is deeply intertwined with several layers of organizational reality. Consequently, recent academic interest in digital transformation focuses on the mechanisms and processes that harness the power of digital technology to transform business activities, boundaries and goals (Wessel et al., 2020; Wimelius et al., 2021).

4-1- Digital Transformation Timeline over AI Timeline Visualisation 2020 to 2024

This chronology illustrates the most important events and achievements in the field of artificial intelligence and digital transformation during the important period under study which is four years. Thus, the timeline encapsulates the evolution of these ideas and their relations, thus providing an understanding of the dynamics between technology and organization. This starts with expansion of remote-work technologies during COVID-19 outburst and then the emergence and increase of reliance on generative AI tools and sustainable AI applications, these reiterate the above trend of universal importance of developing in AI and DT era as factors of developing industries and new opportunities expanding and enlarging them.

2020: COVID-19 pandemic boosted the integration of AI tools for remote work and online collaboration. Research done by Davenport (2020) mentions this period and the volume of virtual assistants, among others, work automation that were AI supported being implemented as well.

2021: Advancements in NLP technologies allow for more complex CS applications such as AI based chatbots (Huang & Rust, 2018).

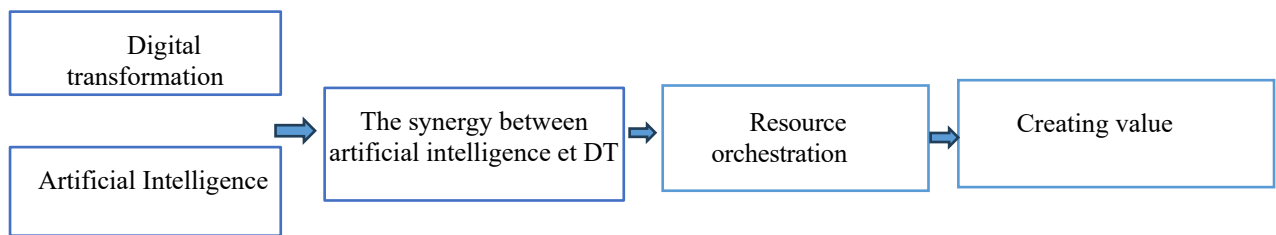
2022: Began development of AI-driven IT capabilities for predictive analytics on optimizing and mitigating supply chain loss (Frank et al., 2019).

2023: Application of generative AI in the creative sectors alongside growing rate of innovation in product design and marketing (Brynjolfsson et al., 2018).

2024: Growth of AI driven efforts in supporting green initiatives such as energy improvements and carbon lessening (Di Vaio et al., 2020).

The above timeline highlights the constant relationship that exists between AI and digital transformation, the two approaching changes are co-evolutionary and will affect organizational practices in a growing manner. Such developments also highlight the need of using AI capabilities to match the strategic intention so that maximum transformative effect is felt (Verhoef et al., 2021).

Figure 1: Literature review model: Synergy between artificial intelligence and digital transformation



Source: By the authors

5. Research Methodology

In this study, we opted for a systematic literature review (SLR). This approach is deemed appropriate for our subject, as it enables us to gather collective evidence from the literature, synthesize the state of knowledge, and propose avenues for future research (Snyder, 2019, p.334). Greenhalgh et al. (2004) point out that RSL is characterized by an explicit, rigorous and transparent methodology. Furthermore, this method enables us to identify articles by meeting predefined inclusion and exclusion criteria in order to achieve our research objective and synthesize the results of the transparent and reproducible way from which conclusions and decisions can be drawn (Moher et al., 2010; Snyder, 2019). Following the SLR methodology proposed by Transfield et al. (2003) and Williams Jr. et al. (2020), data were gathered by collecting documents from two key databases: Scopus and Web of Science (WOS) (Christoffi et al., 2021). These databases were choosing because they assemble a collection of the most important sources of academic research and scientific articles in the field of social sciences (Vieira and Gomes, 2009). The Scopus database, owned and managed by Elsevier, is considered one of the most comprehensive scientific databases indexing research output across a myriad of academic disciplines. Both databases enable data retrieved from different sources to be organized and integrated in any bibliographic format for each cited reference. Moreover, this integration functionality guarantees scientific rigor, making this attribute valuable for bibliometric analysis (Mustak et al., 2021), establishing the reliability, validity and relevance of documents retrieved from both databases (Mariani et al., 2018). To support our choice to produce a robust, accurate and efficient search, we used the same set of terms/keywords to perform an initial advanced search in the Scopus and WOS databases, as presented in Figure 1.

5.1 Methodological Strengths

Rigorous and systematic approach: The methodology clearly defines the inclusion and exclusion criteria for articles, enabling a rigorous and reproducible selection of relevant studies.

Use of bibliographic and reference databases: The choice of Scopus and Web of Science guarantees broad and exhaustive coverage of the scientific literature on our subject.

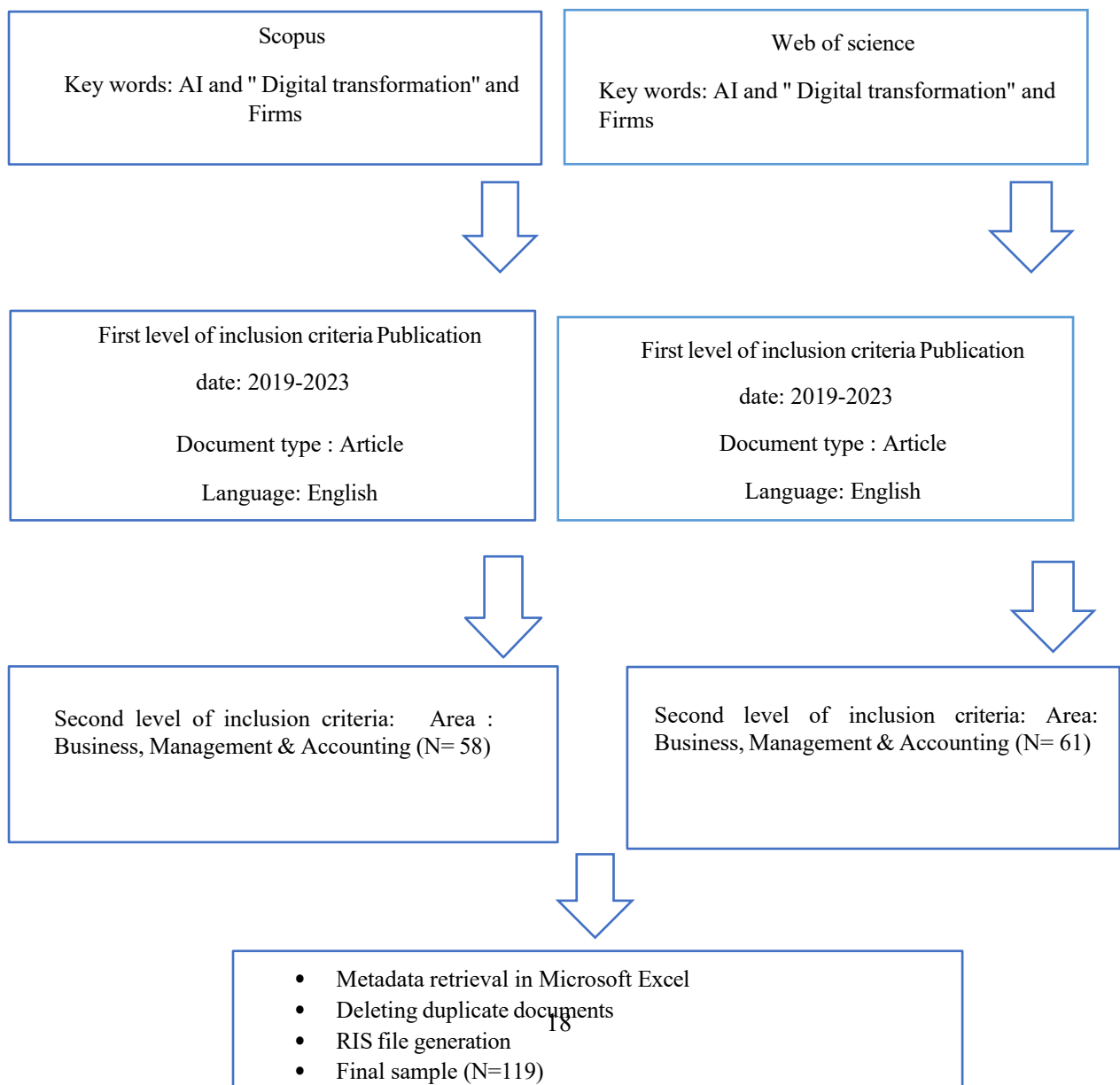
Integration of two levels of inclusion criteria: The application of two levels of criteria enables us to refine the selection and target the articles we're looking for.

Metadata exploitation: Retrieving and analyzing article metadata to extract valuable information for bibliometric analysis.

Eliminating duplicates: Eliminating duplicate documents ensures consistency and final quality.

RIS file generation: Creating a RIS file makes it easier to organize and manage bibliographic references

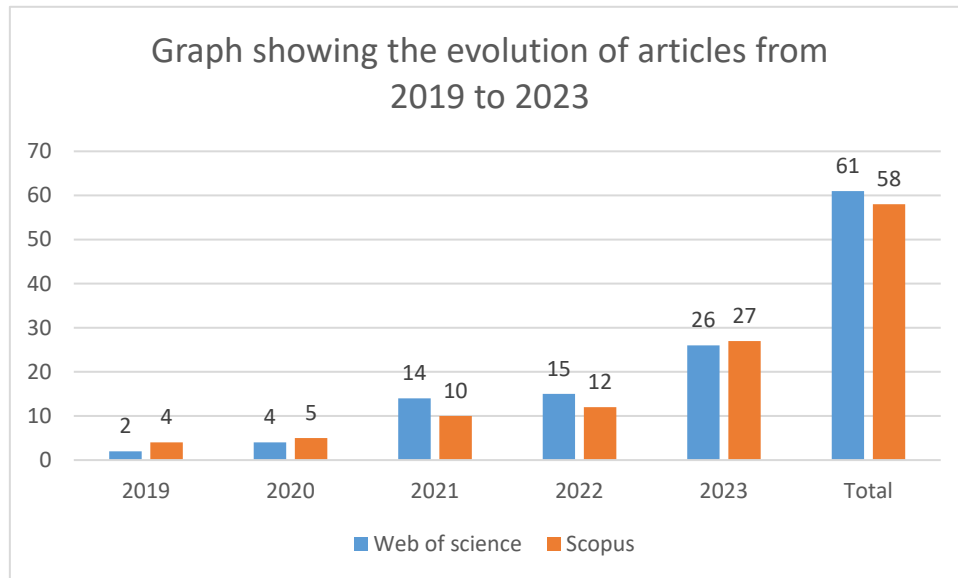
Figure 2: prisma flow diagram



5-2 Data Analysis and Retrieval

We first identified (n=80) articles in Scopus and (n=170) articles in WOS between 2019 and 2023, giving us a total of (n=250) articles. After removing duplicates, and applying rigorous exclusion criteria, such as specific keywords, publication date, language and full article access, this led to the exclusion of (n=119) articles for further and relevant analysis see Figure 2.

Figure 2: Chart showing the evolution of items between 2019 and 2023



Source: By the authors

Table 1: Table showing the evolution of items between 2019 and 2023

	2019	2020	2021	2022	2023	Total
Web of science	2	4	14	15	26	61
Scopus	4	5	10	12	27	58

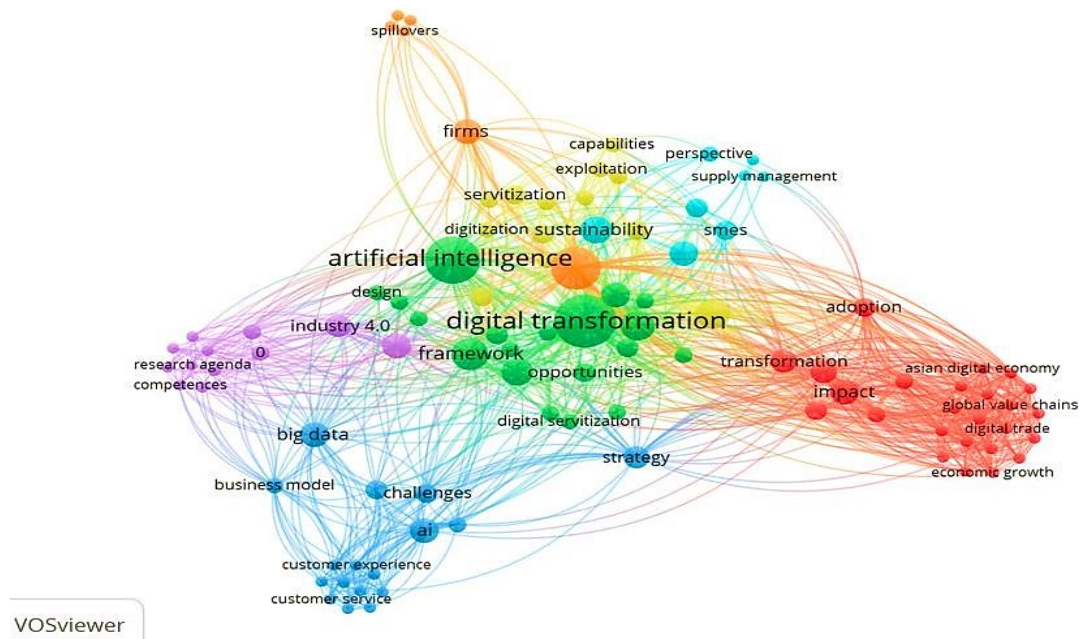
Source: By the authors

5.3 Bibliometric Analysis

The importance of digital technologies is that companies that ignore them risk finding themselves in a weak position in highly competitive markets. Studies show that companies that fail to integrate these technologies can lose their competitive edge, resulting in lower performance and profitability. Keyword research using VOSviewer was undertaken on the 119 relevant articles and then processed by the software to visualize and analyze trends in the form of bibliometric maps. Thanks to this tool, we were able to draw up a map of the keywords used in selected studies based on the shared network. Keywords represent the main content of publications as defined by the authors.

5-3-1- Keyword Co-occurrence Analysis

Figure 3: Keyword co-occurrence in the literature on AI in digital transformation



This map (**Figure 3**) represents the relationships between the most frequently used keywords in a set of 119 articles dealing with the digital transformation of companies. Keywords are represented by circles whose size is proportional to their frequency of occurrence, and links between keywords indicate that they are used together in the same articles. The color of the links indicates the strength of the association between the keywords.

Analysis of the bibliometric map identifies several key themes and concepts related to the digital transformation of businesses. The main themes identified are digital transformation and sustainability, sustainable performance and development, and digitization and performance. The first theme concerns the use of digital technologies to improve corporate sustainability, including initiatives such as reducing energy consumption, using sustainable materials and promoting ethical business practices. The second theme focuses on the use of digital technologies to The third theme examines the impact of digital transformation on business performance, showing that companies that successfully adopt digital technologies can improve their profitability, productivity and market share. The third theme examines the impact of digital transformation on business performance, showing that companies that successfully adopt digital technologies can improve profitability, productivity and market share. Key concepts identified from the bibliometric map include artificial intelligence, firms, capabilities, opportunities. Artificial intelligence is one of the most promising digital technologies for business transformation, used to automate tasks, improve decision-making and create new products and services. Firms, as key players in digital transformation, need to invest in digital technologies and develop the skills required to use them effectively. The bibliometric analysis provides valuable information on current research trends in the field of digital business transformation. The results of this analysis can be used to guide future research in this field, focusing on the impact of digital transformation and AI on corporate sustainability.

5-3-2- Mapping Keywords Over Time

To explore the evolution of central keywords over time, we conducted a co-occurrence analysis. Figure 4 illustrates the evolution of concepts in the focused research area (digital transformation and artificial intelligence).The development of central keywords over time

suggests that studies on artificial intelligence, digital transformation, artificial intelligence, innovation, digitalization became more frequent around 2016. Table 2 illustrates the frequency of keywords in the literature. From 2019 onwards, publications on corporate strategy and innovation emerge. Around 2020, studies on artificial intelligence and its impact on business and the adoption of digital technologies in organizations, digitalization in business organizational processes become more frequent, and in 2021, keywords begin to highlight the concept of AI and digital transformation, in 2022- 2023, concepts such as circular business models, digital servitization, technology policy, AI become increasingly frequent in focused literature, with studies published between 2019 and 2023 tending to focus on digital technologies and artificial intelligence. The growing relevance of related concepts to sustainability such as the circular economy shows that environmental and social dimensions are becoming more important. Interestingly, the growing use of keywords related to AI and digital transformation reflects the technological advances of AI in the world today (see Figure 4).

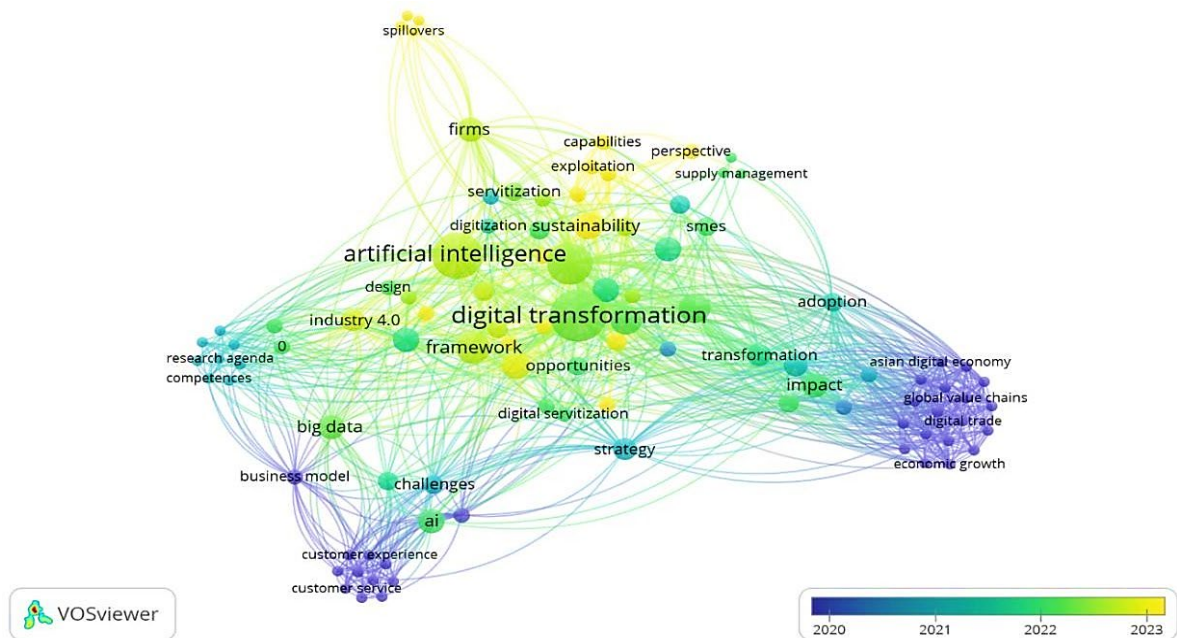


Figure 4: Keyword mapping over time

Table 2: Keyword frequency

Keywords	Occurrence	Total link strenght
Digital transformation	40	159
Innovation	20	123
Artificial intelligence	38	110
Digitalization	10	79
Strategy	12	61
Transformation	10	53
Impact	8	50

5-3-3- Table of Theories Used U Framework Encompassing the Results of the Articles Studied

The table of mobilized theories offers a synthesis of the conceptual frameworks and theoretical perspectives that guide research in the field of digital transformation and artificial

intelligence. This table will highlight the dominant theoretical frameworks, and emerging perspectives

Theories	Article authors	Authors of the original theory	Theoretical foundations
Technological innovation theory	Björn Johansson, Christina Gustafsson, Thomas Lennerfors, and Chris Reim	Joseph Schumpeter 1934	Explains how technological innovations emerge and spread across industries, influencing technology life cycles.
Dynamic capability theory	David Sjödin, Vinit Parida, and Christian Wincent	David Teece, Gary Pisano, Amy Shuen 1997	Examines how companies develop and readjust their capabilities in response to rapid changes in the environment technology.
Organizational readiness theory	John Holmström	Kurt Lewin 1947	Provides a framework for assessing and improving companies' ability to adopt and integrate AI technologies for digital transformation.
Theory of socio-technical change	John Holmström	Geels, Schot 2007	Analyzes the interactions between technological innovations and social structures, and how they influence digital transformation
Theory of digital transformation	Wei Li, Qiang Wang, and Jianmin Sun	Westermann, Bonnet, McAfee 2014	Investigate the impact of digitization on business models and performance innovation in manufacturing companies.
Game theory	Wei Li, Qiang Wang, and Jianmin Sun	John von Neumann, Oskar Morgenstern	Uses game-theoretic models to analyze strategic interactions between companies in digital investment.
Diffusion of innovation theory	Alexandra Tiron-Tudor, Ana-Nicoleta Deliu, Vlad-Petre Bradu, Andrei Farcane	Everett Rogers 1962	Describes how new technologies are adopted and disseminated throughout organizations focusing on the following factors influencing this adoption.
Technology adoption theory	Alexandra Tiron-Tudor, Ana-Nicoleta Deliu	Fred D. Davis 1989	Examines the processes and determinants of the adoption of emerging technologies by accounting and auditing professionals.

5-3-4- Summary of the Most Relevant Articles

Article title	Authors	Sources	Research objective	Methodology	Results and conclusions
Mapping the Role and Impact of Artificial Intelligence Digital Transformation	(Rana& Daultani, 2023)	Web of Science (Journal of Business Research)	The aim of this article is to examine the role and impact of artificial intelligence and machine learning in the digital transformation of the supply chain.	Bibliometric and network analysis	The results of this study show an increase in publications on artificial intelligence, with a rising trend in 2021. In conclusion, the study highlights the growing importance of integrating digital technologies into the supply chain. supply chain.
Innovation in SMEs, AI dynamism, and sustainability: the current situation and way forward	(Chaudhuri et al., 2022)	Web of Science (Sustainability 2022,14,12760.)	The aim of this study was to explore the role of artificial intelligence in stimulating innovation within SMEs, and to examine how these AI dynamics can help strengthen the sustainability of business practices.	Magazine from literature	The results of this study showed that integrating AI into SMEs' business processes can foster innovation and improve their sustainability. In conclusion, SMEs that adopt AI technologies strategically are better positioned to thrive in an ever-changing business
Implementation of Artificial Intelligence (AI): A Roadmap for Business Model Innovation	(Reim et al., 2020)	Web of Science (AI 2020 BY MDPI)	The aim of the research is to provide an in-depth understanding of AI and its use as a catalyst for business model innovation, this study aims to implement practical advice to managers on the implementation of AI in their operations in order to minimize the and optimize results	Systematic review	The results show that for a successful implementation of AI 4 steps are essential namely analyzing organizational capabilities, analyzing the current business model, developing the required skills and finally gaining acceptance. In conclusion, if AI is integrated in a structured way, it can transform industries while minimizing failures and optimizing business benefits.

How AI capabilities enable business model innovation	(Sjödín et al., 2021)	Web of science (<i>Journal of Business Research.</i>)	The aim of the research is to explore how artificial intelligence enables business model innovation in industrial ecosystems, based on digital servitization in companies manufacturing	Qualitative study	The results of this study indicate that artificial intelligence capabilities are crucial for business model innovation and digital servitization in manufacturing companies, with the top three capabilities being data pipelines, algorithm development, and the democratization of AI.
From AI to digital transformation: The AI readiness Framework	(Holmström , 2022)	Web of science (<i>Business Horizons</i> , 65(3)), 329-339.)	This study presents a framework for assessing AI readiness to enable digital transformation, the research objective is to analyze the current state of AI in an organization and facilitate a thorough theorization of the different roles artificial intelligence can play in digital transformation	Qualitative study	The results show that organizations need to improve their AI readiness in order to succeed in their digital transformation. The framework helps to identify risks and challenges, minimize failures and, above all, increase the success rate of digital transformation. In conclusion, AI capabilities can profoundly transform business and organizational objectives, but this requires mutual adoption of the technology.
Emerging technologies' contribution to the digital transformation in accountancy firms.	Tiron-Tudor,A., Donțu,A. N., & Bresfelean, V. P. (2022).	Web of science (<i>Electronics</i> , 11 (22), 3818.	The aim of this article is to explore how emerging technologies such as artificial intelligence, cloud and big data are contributing to the digital transformation of accounting firms	Qualitative study	The results show that new technologies (AI) are profoundly transforming accounting firms e automating processes and improving data analysis, professionals must acquire new technological skills to adapt to these changes in a constantly evolving environment in order to take advantage of the opportunities offered by the digital transformation

5 Discussion

As per the conclusions of this study, there are very concerning patterns about the functions of Artificial Intelligence (AI) and its usefulness in the digital transformation of organizations. Firstly, AI-based automation greatly improves business performance by minimizing the costs associated with performing business functions and utilizing existing resources. AI applications in management of supply chains, for instance, allow for real-time adjustment of production levels to comply with demand shifts, making businesses to be more flexible. This functionality epitomizes one of the key facts about AI that it assists not only in automation but also in optimization of many processes in the business and hence the vision of AI in business operations.

Secondly, the analysis of AI applications has enabled organizations to satisfy their customers in the best possible manner for increased loyalty towards the company. For instance, e-commerce marketplaces such as Amazon leverage the use of advanced AI to analyze patterns of customer behaviors with the platform which helps generate recommendations that motivate customers to make further purchases. AI's impact on business growth has also been seen in personalizing services through the use of big data analytics which has become vital for any firm that aims at gaining an edge in the market. AI also boosts the resilience of the organization, especially in uncertain and volatile markets. With the help of AI tools for risk prediction and agile response mechanisms, organizations can better cope with disruptions. This picture of the future of decision-making improvement through AI-enhanced predictive analytics assists the firm to anticipate competition and be able to respond to change quickly, thereby reinforcing their sustainability in the long term. The above findings point out the relevance of practical issues for managers in relation to the inclusion of AI in the overall business strategy. As to the most effective AI solutions, the companies should not only acquire the latest tools but also invest resources to upskill employees on how to use these devices properly. Furthermore, a well-elaborated organizational culture and technological ways to ensure that change is not opposed and complete synergies between AI and the digital transformation are achieved is required. This way, businesses will be able to address the concerns of adopting AI while at the same time focused on opportunities to innovate in their operational and strategic placement.

6. Conclusion

This research provides a great overview of the existing relationships between AI and the concept of the digital transformation whilst highlighting three particular such contributions that add to this complex area of research. First, the bibliography study indicates the prominent themes of research such as sustainable innovation, service personalization, and circular business models and points to an increased importance of AI with regards to pursuing these areas. These conclusions correlate with the dimensions of AI mentioned in the framework of the article, added, where we stated that AI helps not only to enhance the efficiency of processes but also to create sustainable and innovative business models.

Secondly, we help to fill in the gaps that exist regarding AI and digital transformation synergies. Integrating AI with digital transformation models, it decomposes the interrelated organizational complexity. The authors of our article also reinforce this by demonstrating how AI's cognitive functions including machine learning and natural language processing allow the organizations to redefine their business processes, improve service delivery and achieve sustainable competitive advantages. This view is consistent with the view that the introduction

of AI into the domain of organizational practices is crucial for efforts towards a holistic and flexible transformation to be successful.

Future Research Directions: Going forward, future research should focus on the sector-specific impacts of AI, especially within different contexts like SMEs or manufacturing industries. These are quite different industries that come with their own challenges and opportunities, thus offering very interesting lessons for the role of AI across diverse business environments. Finally, it is relevant to conduct a study on the ethical and social implications of large-scale AI adoption. Understanding the social impact of AI, including concerns on data privacy, workforce displacement, and algorithmic biases, will be crucial in order to make sure that AI contributes to sustainable and inclusive growth in the digital era.

The article concludes with practical advice on adopting AI in business. It recommends investing in advanced AI tools while creating a culture that supports technological change. We expand on this by highlighting the need for a clear integration strategy to ease adoption, reduce resistance, and help organizations benefit fully from the synergy between AI and digital transformation

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