



Digital Transformation in Organizational Management: A Bibliometric Analysis

Nicolae Urs¹, Alexandru Roja², Ioana Nisioi³

Abstract:

This research article aims to provide an in-depth examination of the complex aspects of digital transformation, from an organizational management perspective. The study offers an overview of the prominent research interests and trends in this field, shedding light on organizational changes brought by digital transformation, and on the strategic shifts it requires. To achieve these objectives, the research utilizes bibliometric analysis techniques, specifically performance analysis and science mapping. The analysis is conducted using the VoSviewer software application, which efficiently integrates data from multiple databases, including Web of Science and Scopus. The findings reveal that digital transformation, within the context of organizational management, encompasses diverse research directions and themes that play a central role in its success. Key areas of focus include innovation, leadership, dynamic capabilities, digital innovation, and change management. These themes highlight the pressing need for organizations to navigate and thrive in the digital age. The research contributes to the understanding of digital transformation and its implications for organizational management, both in private and public organizations, highlighting the differences between the two.

Keywords:

bibliometric analysis, digital organizations, digital transformation, organizational management, public administration

¹ Babeş-Bolyai University, Cluj-Napoca, Romania

² Babeş-Bolyai University, Cluj-Napoca, Romania

³ Babeş-Bolyai University, Cluj-Napoca, Romania

1. Introduction

In recent years, digital technologies have brought about significant changes to economies and societies, resulting in what is known as digital transformation. The impact of digital transformation is significant, affecting multiple areas of public and private organizations (Andrews, 2018; Niehaves et al., 2019; Mergel et al., 2019; Gong et al., 2020; Farida & Lestari, 2021). From an organizational perspective, this process requires notable change and transformation. According to Vial (2019) the process of digital transformation is disruptive by nature, and it aims to improve an entity by changing its characteristics using a combination of technologies.

In the last couple of years, the topic of digital transformation has gained interest for researchers in social sciences, including research in the public administration field (Mergel et al., 2019; Jonathan, 2020; Criado & Gil-Garcia, 2019; Duhamel et al., 2023). In the scientific literature, some researchers have explored the topic of digital transformation with a focus on organizational management (Lanzolla et al., 2020; Li, 2020; Appio et al., 2021; Fernández-Vidal et al., 2022), but despite the interest in this topic, bibliometric studies are scarce. Therefore, this article aims to provide an overview of digital transformation research, through the lens of organizational management, using bibliometric analysis as a method of identifying the key trends and study directions in the literature.

This paper aims to provide a comprehensive analysis of digital transformation from an organizational management perspective. To achieve this goal, we begin with a literature review that sets the stage for our research and helps us better understand the topic. Following the literature review, we present the methodology used to conduct our study, which includes data collection and analysis methods. In the data analysis section, we provide an overview of the results, followed by a deeper examination into performance analysis and science mapping. We utilize co-citation analysis and co-word analysis to gain further insights into the data. Next, we move on to discussions, where we examine the practical implications of our findings and explore their potential impact on organizations and continue with the implications that our findings have for public administration. Finally, we conclude the paper with a discussion of the limitations of our study and suggest future research directions in this area. Overall, the structure of the paper is designed to emphasise the digital transformation impact on organizational management, highlighting the evolutionary trends of this matter, utilizing bibliometric analysis to provide a robust and nuanced understanding of the topic. The following research questions serve as the framework of our paper:

RQ1: What are the dominant themes and research areas in digital transformation research from an organizational management perspective, as identified through bibliometric analysis?

RQ2: What are the emergent research directions and gaps that need further exploration in the field of digital transformation, from an organizational

management perspective?

RQ3: What distinctions emerge when examining the digital transformation of public institutions as opposed to private organizations?

2. Understanding digital transformation in the organizational context

Digital transformation has gained significant recognition as a prominent area of research, coinciding with the widespread adoption of digital technologies in various sectors, industries, and organizational management practices (Shi et al., 2022; Appio et al., 2021; Lanzolla et al., 2020; Vial, 2019). Ever since its inception, digital transformation has been identified as a dynamic research field that undergoes constant evolution in connection to the ongoing changes in the area in which it is relevant (Shi et al., 2022). The rapid advancement in technology has caused significant disruption in organizations, leading to substantial changes in work processes and leadership approaches, as noted by Li (2020). Defining digital transformation is challenging due to its multifaceted (Vial, 2019) and multidimensional (Appio et al., 2021) nature, as it impacts organizations in various ways and at different levels.

At the organizational level, the concept of digital transformation has been examined from different perspectives. Thus, digital transformation represents a holistic and intricate process that goes beyond the simple adoption of technology (Fernández-Vidal et al., 2022). It encompasses profound shifts in how organizations function (Vial, 2019), innovate, and create value within a digitally-driven ecosystem (Wessel et al., 2021). This transformative journey involves multiple dimensions, such as organizational change (Kő et al., 2019) organizational culture transformation (Hartl, 2019), leadership capabilities (Peng, 2022; Sainger, 2018), and the strategic alignment of digital initiatives with broader organizational objectives (Matt et al., 2015).

Digital transformation at the organizational level is a complex and multifaceted process that necessitates effective management practices, particularly in the realm of change management (Panenkov et al., 2021). As digital transformation involves significant changes in technologies, processes, and organizational structures, it requires strategic planning, careful implementation, and continuous adaptation. Effective management plays a critical role in driving digital transformation processes by developing and executing appropriate strategies that leverage digital technologies to achieve organizational objectives and align them with broader goals (Appio et al., 2021; Fernández-Vidal et al., 2022). Regarding this idea, strategic management and adopting a digitalization strategy are essential elements of digital transformation in organizations. A digitalization strategy refers to the comprehensive plan and approach adopted by an organization to leverage digital technologies and capabilities for achieving its goals and objectives. It involves setting clear objectives, identifying necessary digital tools and

platforms, and outlining actions required for successful implementation of digital initiatives (Soto Setzke et al., 2021). On the other hand, strategic management encompasses the overall process of formulating, implementing, and evaluating an organization's long-term objectives and initiatives (Vial, 2019; Cillo & Verona, 2022; Rêgo et al. 2022). It involves analysing both internal and external environments, making strategic decisions, and effectively allocating resources to achieve organizational goals.

The impact of strategic management on digital transformation is significant. A well-defined digitalization strategy, aligned with the organization's overall strategic direction, provides a roadmap for successful transformation. It enables organizations to identify areas where digital technologies can create the most value, prioritize initiatives, and allocate resources effectively. Strategic management ensures that digital transformation efforts are in line with the organization's vision, mission, and objectives. It involves making strategic decisions regarding investments in digital technologies, identifying potential risks and challenges, and establishing metrics to measure the success of digital initiatives. Therefore, strategic management is an important dimension in the digital transformation process.

Change management is another integral part of the digital transformation journey and it focuses on guiding individuals, teams, and the entire organization through the transition process. It involves managing resistance to change, facilitating effective communication, and providing necessary training and support to enable a smooth and successful transformation (Gfrerer et al., 2021; Giacomini & Muzzi, 2021; Pasmore et al., 2019). By employing change management principles, organizations can minimize disruptions, engage employees, and foster a positive attitude towards digital transformation.

Thus, change management and strategic management are two important aspects of organizational management and both contribute to the digital transformation process. While strategic management sets the direction for digital transformation, defining what the organization strives to achieve and how it plans to do it, change management is the element that drives the organization towards that direction, dealing with the implementation of change.

Leadership, closely intertwined with management, plays a pivotal role in successfully navigating the complex landscape of digital transformation. In the context of organizational change driven by digital technologies, effective leadership becomes even more crucial (Rosenbloom, 2000). Leaders set the direction, establish a compelling vision, and create a sense of urgency that motivates employees to embrace the transformation journey. Leadership in digital transformation goes beyond individual leadership traits; it requires a collective leadership approach, where leaders at all levels of the organization actively contribute to driving the transformation agenda. This distributed leadership enables the dissemination of knowledge, fosters cross-functional collaboration, and empowers employees to become agents of change, as digital transformation is all about change (Peng, 2022; Tigre et al., 2023). Through their actions

and behaviours, leaders shape the organizational culture, reinforcing the importance of digital transformation and instilling confidence and resilience in the face of challenges.

Furthermore, it is essential to emphasize the significant impact of organizational culture on the process of digital transformation. The prevailing culture within an organization significantly shapes the mindset, values, and behaviours of its employees, thereby impacting their receptiveness to change and their ability to adapt to new ways of working. In the context of digital transformation, a culture that embraces innovation, agility, and collaboration is essential (Hartl, 2019). Management, thus, plays a critical role in cultivating and nurturing such a culture.

In summary, digital transformation at the organizational level is closely tied to management. It requires effective change management practices, strategic decision-making, strong leadership, and a supportive organizational culture. By effectively managing the change process, both commercial organizations and public institutions can navigate the challenges of digital transformation and leverage its potential to drive growth, innovation, and competitive advantage.

The public sector is also undergoing a transformation determined by the pressures of technological change. These changes now go beyond simply delivering online the same public services offered in-person. However, the need for organizational changes and the rapid pace of technological development brings new challenges for the leadership and management of public organizations, as they can be unprepared for the upcoming transformations. New technological tools (AI; big data) present not only advantages but can also generate new forms of 'wicked problems' for public authorities, requiring innovative approaches to managing these changes (Andrews, 2018; Meričková & Muthová, 2021). For example, public institutions can face challenges in terms of data privacy and security, as they work with substantial amounts of data that can be exposed to cybersecurity risks when transferred online. Another challenge that they can face is the lack of digital literacy of public institutions' employees. Additionally, public institutions may not have the necessary capability to implement and consume technology, which can make public institutions fall behind in terms of development and evolution. The literature on the subject is still scarce, especially when it comes to governmental institutions, so these are just a few examples of the challenges that digital transformation might bring to public institutions.

Technological pressure is remodelling the organization, workflows, and strategies of public institutions. Multiple case studies show that internal transformations are necessary so that an organization can take advantage of the new technologies. They also shed light on the feasibility of transferring digital transformation experiences between public sector organizations (Di Giulio & Vechi, 2023; Dobrolyubova, 2021; Debeljak & Dečman, 2022). This is why it is important to have a deep understanding of how digital transformation differs in public institutions, compared to private organizations. In this regard, research has shown that digital transformation in the public sector is related to institutional changes by employing the use of digital technologies (Mergel et al., 2019),

especially in the administrative processes, as well as the creation of value (Abil & Bauyrzhankyzy, 2023; Scupola & Mergel, 2022; Criado & Gil-Garcia, 2019) by effectively changing public services using digital technologies, among others.

3. Methodology and Data collection

Bibliometrics represents a statistical method that is frequently used in academic literature reviews, which analyses the history of scientific works to measure impact. It entails using quantitative techniques, such as citation analysis on bibliometric data (which includes units of publication, citation, etc.) (Broadus, 1987), in order to understand the trends and evolutions of a particular field of study (Donthu et al., 2021). Following Shi et al. (2022), we use a five-step methodology (data retrieval, data cleaning and formatting, data analysis, visualization, and interpretation) to examine networks, evolutionary trends, and the most influential elements (researchers, keywords, publications, etc.) in the field of digital transformation, through an organizational management perspective. It is important to mention that our analysis focuses solely on bibliometric data and does not entail a systematic literature review, but rather provides an overall image of the current state of knowledge in digital transformation from an organizational management standpoint. Thus, this research highlights the connections between authors cited together, as well as the keywords used by multiple researchers, in order to provide an understanding of what has been studied so far, and of the gaps in research that need to be addressed.

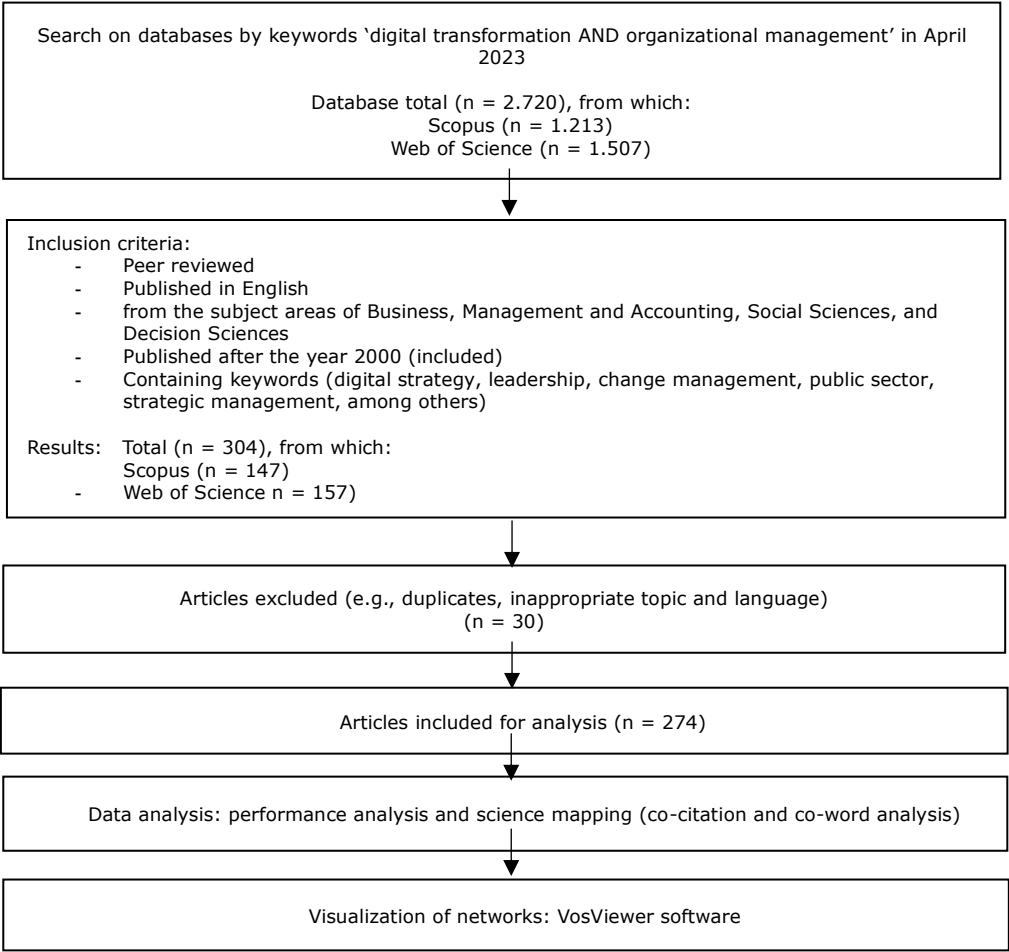
Articles relevant for this study (data) were gathered and organized from two popular databases, namely *Scopus* and *Web of Science*. This choice is motivated by the fact that both (*Scopus* and *Web of Science*) are considered the largest databases (Zhu & Liu, 2020), thus providing more data for our study; by using both we can ensure a more comprehensive and diverse coverage of the literature relevant for our study. In addition, by employing both databases we can cross-check our results and reduce the risk of missing important studies, which can occur if we were to rely solely on one database (Mongeon & Paul-Hus, 2016).

In this study, a systematic search was conducted on the two databases described above, during April 2023. We first used the *Scopus* database, where we performed a search using specific keywords: *digital transformation* and *organizational management*, by the article title, abstract, and keywords. We did the same search on the *Web of Science* database. Upon performing the search, the *Scopus* database returned 1,213 documents, while the *Web of Science* database returned 1,507 documents. To increase the relevance of the retrieved articles, we applied a number of inclusion criteria, including the requirement that articles be peer-reviewed, given that these works constitute a body of verified knowledge and generally propose trustworthy findings (Tigre et al., 2023), published in English, and related to digital transformation and organizational

management. Additionally, only articles from the subject areas of Business, Management and Accounting, Social Sciences, and Decision Sciences were included in the study, as they focus on organizations and management and not on the technical aspects of digital transformation. The search was further refined by limiting the articles to those published after the year 2000 (included), and by selecting keywords related to organizational management, digital transformation, digital strategy, leadership, change management, public sector, strategic management, among others. The purpose of our selection was to align with the subject matter of our research study, as well as with the dimensions of digital transformation in organizations that have been described in the literature review, namely strategic management, change management, leadership, and organizational culture. The rationale behind our choice of keywords for refining the search relies on relevance: in order to have a relevant dataset of papers related to digital transformation in organizational management, we need to consider all the dimensions discussed before, and include them in our data retrieval step, otherwise we will have articles that are outside the scope of this study and are, therefore, not relevant to the analysis. Indeed, it is important to acknowledge that the use of those specific keywords for refining our search may inherently pose limitations, potentially leading to the oversight of pertinent articles that do not align with the predetermined keyword selection. Therefore, this limitation should be taken into consideration when interpreting the results.

After applying the inclusion criteria and refining the search, the *Scopus* database returned 147 articles, while the *Web of Science* database returned 157 articles. Due to the use of two databases, there were some instances of publication duplicates, which were manually removed from the *Web of Science* database, because their citation format is less comprehensive than that of *Scopus* (Zhao & Strotmann, 2015), resulting in the extraction of 26 duplicate articles. In addition, four articles were excluded from the *Scopus* database as they did not meet the criteria of organizational management, were not in English, or were a duplicate in the database. Ultimately, 274 articles were included in our bibliometric analysis, comprising 143 articles from *Scopus* and 131 articles from *Web of Science*.

Figure 1:
Methodology of the article



Source: Authors' own, 2024.

The data obtained from bibliographic databases can include errors, such as missing elements, among others. Therefore, it is important to analyse the data retrieved (Ahlgren & Colliander, 2009; Cobo et al., 2011), thus we reviewed all the bibliometric information and manually added the years to the articles that did not include information regarding the year.

4. Results

Data analysis was performed in two parts. First, we conducted a performance analysis, and second, a science mapping. Performance analysis evaluates the contributions of various research entities, such as authors, institutions, journals, and countries to a specific area of study (Donthu et al., 2021). In our bibliometric analysis, we chose performance analysis to identify the most influential publishing journals in the field, the articles that were highly cited, the authors who were bringing a significant contribution to the field and the countries that are actively contributing to the body of research in digital transformation and management.

Science mapping involves categorizing and visually representing the structure of a research area by grouping elements such as documents, authors, journals, and words (Boyack & Klavans, 2010). This process combines classification and visualization techniques to create a graphical representation of the area's organization and structure. The techniques used for science mapping include citation analysis, co-citation analysis, bibliographic coupling, co-word analysis and co-authorship analysis, and by using these methods, researchers can gain valuable insights into the interconnections between documents, authors, and concepts, amongst others, in a certain field of study (Donthu et al., 2021). We opted for science mapping, using co-citation analysis and co-word analysis to understand the research field by examining the interconnections between the citation numbers, authors, institutions, journals and so on, and to find the key contributors in the field, as well as prominent themes and emerging trends regarding digital transformation and organizational management.

Visualization of the science mapping techniques are needed in order to represent the classifications and networks that emerge (Župič & Čater, 2015). Thus, using a software specially created for network representation is necessary. For this, we used the *VoSviewer* software application to perform the network analysis, as it works efficiently with different databases, in our case *Web of Science* and *Scopus*. Also, *VoSviewer* uses a clustering methodology that is useful in presenting the similarities between objects (like co-citation), and also provides accurate visual representations about the relations and the distance between any pair of objects (Waltman et al., 2010). It is also one of the most popular software tools for creating maps based on network data and it is widely used amongst researchers (see Tigre et al., 2023; Shi et al., 2022; Chawla & Goyal, 2021).

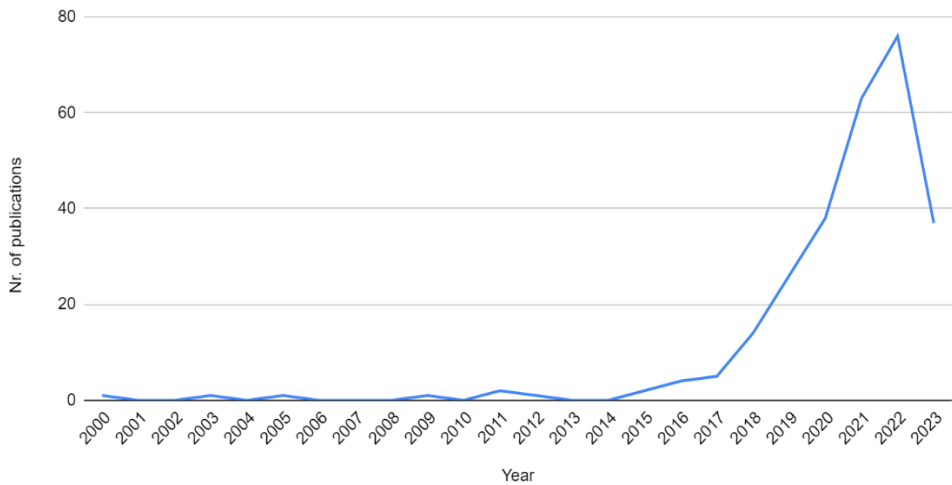
4.1 Overview

Our research dataset comprised 274 articles published across 170 diverse sources (journals), primarily focused on the domains of management, business, organizations, strategy, public administration, and innovation. The articles were authored by 536 individuals associated with 512 organizations from 41 countries, and featured 9,195 cited references.

While the topic of digital transformation is not new, we noticed a recent surge in

attention towards it, with the majority of the research articles published after 2020, as seen in the graph below. Many scholars have acknowledged the noticeable increase in interest regarding research on the topic of digital transformation after 2020 (see Mikalef & Parmiggiani, 2022; Soto Setzke et al., 2021; Dobrolyubova, 2021). The wide range of literature on digital transformation from different perspectives emphasizes the need for structured discussions and a clear understanding of future research paths.

Figure 2:
The increase in number of source documents per year



Source: Authors' own, 2024.

4.2 Performance analysis

In our research on digital transformation from an organizational management perspective, we observed that the primary journal repositories in the field featured a range of publications. Among the most encountered journals were the Journal of Business Research, Management Decision, Journal of Organizational Change Management, European Journal of Innovation Management, Industrial Marketing Management, and International Journal of Innovation Management. These journals are well-aligned with our focus on organizational management, change management, innovation management, and digital transformation. Based on our dataset, we gathered interesting findings regarding the most cited articles, the countries with the highest number of articles published on this topic, and common affiliations.

Table 1:
Articles with more than 90 citations, in order from the most cited

Authors	Title	Journal	Year	Citations
Roosenbloom R.S.	Leadership, capabilities, and technological change: The transformation of NCR in the electronic era	Strategic Management Journal	2000	258
Bienhaus F.; Haddud A.	Procurement 4.0: factors influencing the digitisation of procurement and supply chains	Business Process Management Journal	2018	192
Khin, S; Ho, T.C.F.	Digital technology, digital capability and organizational performance: A mediating role of digital innovation	International Journal of Innovation Science	2019	141
Nadkarni S., Prügl R.	Digital transformation: a review, synthesis and opportunities for future research	Management Review Quarterly	2021	140
Schwarzmüller T., Brosi P., Duman D., Welpel I.M.	How does the digital transformation affect organizations? Key themes of change in work design and leadership	Management Revue	2018	138
Cortez, RM; Johnston, WJ	The Coronavirus crisis in B2B settings: Crisis uniqueness and managerial implications based on social exchange theory	Industrial Marketing Management	2020	138
Liu, DY; Chen, SW; Chou, TC	Resource fit in digital transformation Lessons learned from the CBC Bank global e-banking project	Management Decision	2011	107
Kotarba M.	Digital transformation of business models	Foundations of Management	2018	99
Urbinati, A; Chiaroni, D; Chiesa, V; Frattini, F	The role of digital technologies in open innovation processes: an exploratory multiple case study analysis	R & D Management	2020	97
Cichosz M., Wallenburg C.M., Knemeyer A.M.	Digital transformation at logistics service providers: barriers, success factors and leading practices	International Journal of Logistics Management	2020	93
Saarikko T., Westergren U.H., Blomquist T.	Digital transformation: Five recommendations for the digitally conscious firm	Business Horizons	2020	90

Source: Authors’ own, 2024.

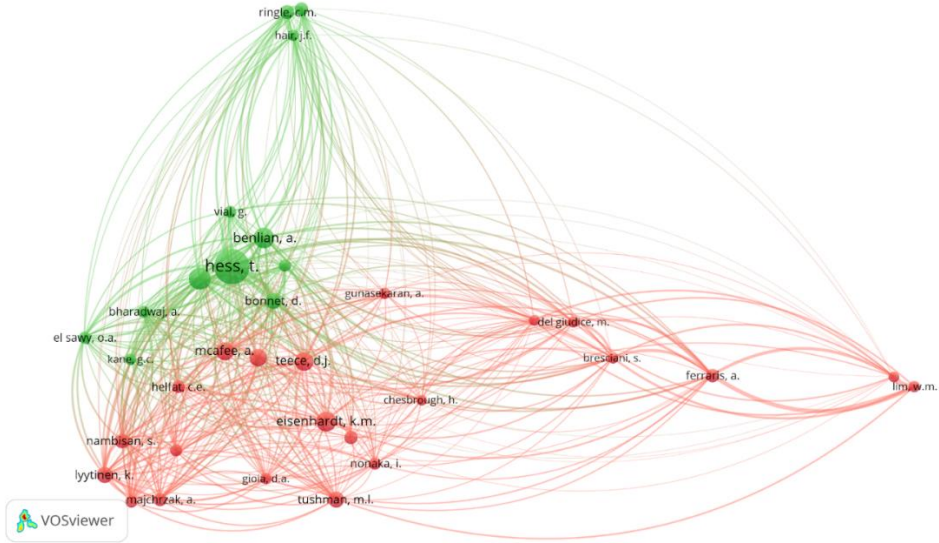
When it comes to the most cited articles, “Leadership, capabilities, and technological change: The transformation of NCR in the electronic era” by Roosenbloom R.S., published in the *Strategic Management Journal* in 2000, garnered 258 citations. Another highly cited article is “Procurement 4.0: factors influencing the digitisation of procurement and supply chains” by Bienhaus F. and Haddud A., published in the *Business Process Management Journal* in 2018, with 192 citations. Table 1 presents a classification of the most cited articles, with at least 90 citations, from the dataset analysed. Table 1 shows that the most cited articles are about digital transformation and some elements of organizational management and leadership. While it is important to note that the most cited papers in our study are at least two years old, it is worth acknowledging that highly cited papers typically require quite some time to accumulate citations, as citations are often considered a measure of impact (Župič & Čater, 2015). It is also important to mention that these papers focus on technology adoption and digital transformation in the private sector.

In terms of countries with the most published articles, Germany, the United States, Italy, the United Kingdom, and China were among the leading contributors. Regarding affiliations, the most common organizations found in our database were *RLUK – Research Libraries UK*, *N8 Research Partnership*, and *Polytechnic University of Milan*.

4.3 Co-citation analysis

Co-citation analysis is a science-mapping technique that operates on the assumption that publications frequently cited together share thematic similarity (Cobo et al., 2011). This type of analysis can be used to understand the intellectual structure of a research field by identifying common themes and concepts that underlie the citations (Donthu et al., 2021). Figure 2 shows, in a graphical representation, the networks of co-citation relationships for authors, produced with VoSviewer. For this, we set the minimum number of citations of an author to 20, in order to consider only the most relevant and popular authors in the field. We then restricted our analysis to a minimum cluster size of 10 elements and a resolution of 1. It resulted in two clusters being formed: cluster 1, in red, containing 22 items, and cluster 2, in green, with 12 items. Each of the two clusters has a probability of sharing the same theme or knowledge base.

Figure 3:
Visualization of authors' co-citation relationship



Source: Authors' own, 2024.

Both clusters approach digital transformation, but in slightly different perspectives. Cluster 1 adopts an organizational-oriented approach, emphasizing areas such as strategy, leadership, organizational culture, organizational change, and management. This cluster explores the impact of digital transformation on organizations, examining how strategies can be developed, leadership can be enhanced, and organizational culture can be transformed in the digital era.

On the other hand, Cluster 2 has a more technology-focused perspective, with an emphasis on digital transformation (Vial, 2019; Matt et al., 2015), digitalization strategy, artificial intelligence, and innovation (Matt et al., 2015). This cluster focuses mostly on the technological aspects of digital transformation, exploring the role of emerging technologies like artificial intelligence, and their impact on innovation and business models.

While both clusters address the broader topic of digital transformation, they provide different lenses through which to examine and understand this phenomenon. The organizational-oriented perspective of Cluster 1 highlights the importance of internal dynamics and management practices, while the technology-focused perspective of Cluster 2 emphasizes the role of technological advancements, and their implications for business models and innovation. The differences between the two clusters are not

Figure 4 showcases the network of co-occurring author’s keywords, enabling a deeper understanding of the keywords used in research regarding digital transformation through the perspective of organizational management. The network is constructed based on the frequency of keywords used by authors in the articles included in our dataset. A total of 922 author keywords were identified across the 274 articles. To ensure relevance and a meaningful analysis, we set a minimum threshold of five occurrences for keyword inclusion. This resulted in a final selection of 24 keywords after removing duplicates and keywords that did not align with the research theme (e.g., case study, covid-19). The network map presented in Figure 4 illustrates the clustering of keywords and highlights three distinct clusters, generated with a resolution of 1 and a minimum cluster size of 5 items. This approach combines the unified clustering and mapping technique in bibliometric networks, as described by Waltman et al. (2010), and has been effectively employed in recent studies for graphical exploration of literature trends (see Prashar & Sunder, 2020). The *VOSviewer* software was utilized to analyse the *Scopus* and *Web of Science* datasets, utilizing bibliographic information without modifications. The density-based clustering technique, employing the full counting method and association-based normalization algorithm (Kriegel et al., 2011; Prashar & Sunder, 2020), was employed for the analysis of the co-occurrence of the author’s keywords network.

Table 2:
Co-occurrence of author keywords – Clusters

Cluster 1 – Red, 10 items	change management , collaboration, digital innovation, digital technology, innovation, knowledge management, leadership, organizational change , transformation.
Cluster 2 – Green, 7 items	artificial intelligence, big data, digital strategy , digital transformation, human capital, industry 4.0, organizational transformation .
Cluster 3 – Blue, 7 items	business model innovation , design thinking, digital technologies, digitalization, digitization, dynamic capabilities , SMEs.

Source: Authors’ own, 2024.

Apart from the prominent keyword “digital transformation”, which has 90 occurrences and a strong total link strength of 84, several other keywords demonstrate substantial link strength in the author’s keyword co-occurrence network. These influential keywords include “digitalization” (37), “innovation” (25), “leadership” (18), “dynamic capabilities” (16), “digital technologies” (16), “SMEs” (small and medium-sized enterprises) (15), “digital innovation” (14), “Industry 4.0” (14), “change management” (12), and “knowledge management” (12). Considering the emergence of clusters in the co-occurrence network, we can notice distinct themes represented by the

keywords “innovation” (cluster 1, red), “Industry 4.0” (cluster 2, green), and “digitalization” (cluster 3, blue). These clusters signify areas of research focus and highlight the evolving landscape of digital transformation within an organizational management perspective.

The first cluster, depicted in red, revolves around the keyword “innovation” and highlights the crucial role of innovation in digital transformation from an organizational management perspective. The keywords associated with this cluster, such as change management, collaboration, digital innovation, digital technology, innovation, knowledge management, leadership, organizational change, and transformation, further emphasize the significance of fostering an innovative culture within organizations. Recent studies (Lim, 2023; Schildt et al., 2023; Cillo & Verona, 2022; Giacomini & Muzzi, 2021; Marion & Fixson, 2020; Batko & Baliga-Nicholson, 2019) emphasize the importance of prioritizing digital innovation as a means of effectively adapting to the digital era. These studies argue that organizations should integrate innovation into their culture and processes, to capitalize on emerging technological opportunities, and to provide more value to their target group. From a managerial standpoint, fostering an environment that encourages experimentation, risk-taking, and collaboration, is crucial for organizations to successfully navigate the complexities of digital transformation. This holds true both for private organizations, where there are fewer restrictions in this sense, as well as for public organizations, where the process of experimentation and risk-taking is harder to put into practice, due to the limitations that public organizations face, such as legislative barriers, insufficient allocation of resources, lack of digital literacy among civil servants, and reluctance to change (Andrews, 2018; Farida & Lestari, 2021; Giacomini & Muzzi, 2021).

By embracing a culture of innovation, and leveraging digital technologies, organizations from both private and public sectors can drive meaningful change, enhance their competitive advantage, and seize new opportunities. This cluster highlights the need for organizations to prioritize innovation as a core element of their digital transformation strategy, aligning their leadership and management practices to foster digital innovation and create value.

The second cluster, depicted in green and focused on “Industry 4.0”, highlights the influence of technology in driving digital transformation. Keywords such as “digital technologies” and “big data” underscore the impact of technological advancements on organizational processes and capabilities. Numerous researchers (De Andrade & Tumelero, 2022; Arnaboldi et al., 2022; Malik et al., 2022; Ram & Zhang, 2022; Burström et al., 2021; Ferrás-Hernández, 2020; Agostini & Nosella, 2019) emphasize the transformative potential of digital technologies such as artificial intelligence, cloud computing, and Big Data analytics. They advocate leveraging these technologies to enhance operational efficiency, decision-making, and overall performance. Within this cluster, the presence of keywords such as “digital strategy” and “organizational transformation” stresses the importance of integrating transformative digital technologies, specifically artificial intelligence (AI) and big data, into the organizational

framework. By strategically incorporating transformative digital technologies like AI and Big Data, organizations can optimize their processes, automate routine tasks, extract valuable insights from vast datasets, and deliver personalized customer experiences. Ultimately, this integration empowers organizations of any kind to become more competitive, improve overall performance, and sustain long-term growth (De Andrade & Tumelero, 2022; Arnaboldi et al., 2022).

The third cluster, depicted in blue and centred around “digitalization,” encompasses keywords such as business model innovation, design thinking, digital technologies, digitalization, digitization, dynamic capabilities, and SMEs. These keywords signify the various aspects related to digital transformation. Recent research (Di Giulio & Vecchi, 2023; Shaba et al., 2023; Faraj & Leonardi, 2022; Li, 2020) sheds light on the digitalization process and its impact on organizational transformation, both in public (Di Giulio & Vecchi, 2023) and private organizations. The researchers highlight the importance of adapting business models to leverage digital technologies effectively, the role of design thinking in fostering creative problem-solving, and the influence of digital technologies on organizational processes and capabilities to deliver innovative value to the users and customers. Furthermore, they explore concepts such as digitalization and digitization, focusing on integrating digital technologies and transforming analogue processes into digital formats. The studies also emphasize the need for organizations to develop dynamic capabilities to adapt and innovate in the digital landscape. Overall, the third cluster provides comprehensive insights into the multifaceted nature of digitalization and its implications for organizational transformation.

By considering these recent studies, we can have a more comprehensive understanding of the evolving trends and implications of the identified keywords in the co-occurrence network. It becomes evident that innovation, organizational flexibility for technological adoption, and strategic planning, are critical factors in driving digital transformation from an organizational management perspective. These findings provide valuable insights for researchers, practitioners, and organizations navigating the complexities of digital transformation to achieve sustainable success in the digital era.

5. Discussions and implications for public administration

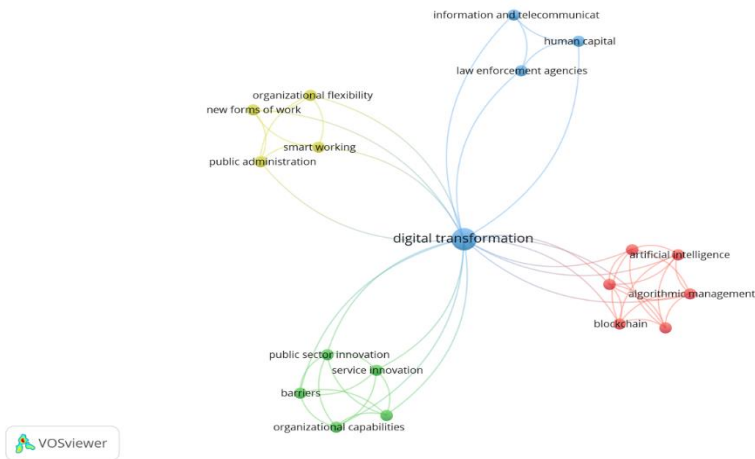
In our database, which encompasses a substantial collection of 274 articles, only 11 of them are dedicated to the topic of digital transformation within public administration. These 11 articles covered a range of topics, including the digitalization of public services, value co-creation between public and private sectors, the implementation of e-services, the impact of COVID-19 pandemic on public employees' perceptions of smart working, smart cities, digital governance and others. Although a fair amount of topics regarding

digital transformation in public administration were covered in those 11 articles, only one of them addressed to an extent the topic of management in organizations.

This low number of articles suggests that there is a gap in the scientific literature or even a lack of interest regarding digital transformation in public administration, especially concerning management in public institutions. This is a surprising remark, given the high interest in the topic of digital transformation in the last couple of years. This lack of literature can be caused by various factors, such as the possible limitation that our study has in terms of the use of keywords in the search phase of our study. We only used the keywords ‘digital transformation’ and ‘organizational management’ in order to have an understanding of the research regarding this perspective. Future studies can look into a more specific search, using keywords such as ‘public institutions’ in their search query. Another reason for this may be related to the focus of public administration literature on other dimensions of digital transformation, such as changes in public service delivery (see Tham, 2018; Hong et al., 2022) or creating public value (see Panagiotopoulos et al., 2019; Duhamel et al., 2023; Van Noordt & Tangi, 2023).

In our analysis, we chose to explore the content of the 11 articles on digital transformation in public administration, from our database, using the co-word analysis method, more specifically the author’s keywords’ co-occurrence network, with the VOSviewer software. Out of 51 author’s keywords from the 11 articles, 19 of them showed associations, forming a network of interconnected concepts. These interlinked keywords were grouped into four distinct clusters, centred around the keyword “digital transformation” as represented in the Figure below.

Figure 5:
Author’s keywords co-occurrence network for the articles on public administration



Source: Authors’ own, 2024.

The first cluster, represented in yellow, highlights the synergy between public administration and the keywords: “smart working”, “new forms of work” and “organizational flexibility”. This underscored the adaptability of public administration to the digital era, with an emphasis on the integration of flexible work arrangements for public sector employees.

The second cluster, represented in blue, anchored in keywords such as “information and telecommunication”, “human capital”, and “law enforcement agencies”. This cluster points to the transformative impact of digitalization on information management, human resource dynamics and its specialized application within law enforcement.

The third cluster, represented in red, delves into advanced technological aspects, featuring keywords like “artificial intelligence”, “algorithmic management”, “blockchain”, “digital governance”. This cluster highlights the infusion of cutting-edge technology in public administration and its consequent implications on governance structure. For example, this integration of technology has led to increased efficiency in administrative tasks through automation, advanced data management and improved communication. It has also enhanced accountability in government operations through open data initiatives and digital financial management. Furthermore, transparency has been boosted through open data portals and improved information dissemination, which has helped to build public trust in government operations. The digital transformation of public administration has also strengthened budgeting, improved operational performance, and enhanced public engagement (Gong et al., 2020; Andrews, 2018; Criado & Gil-Garcia, 2019; Abil & Bauyrzhankyzy, 2023; Di Giulio & Vecchi, 2023; Duhamel et al., 2023). Thus, with the right approach, technology can transform public administration, making it more efficient, accountable, and transparent.

Lastly, the fourth cluster, represented in green, shifts the focus towards challenges and opportunities associated with digital transformation in public administration. Here, keywords such as “barriers”, “organizational capabilities”, “public sector innovation”, “service innovation”, and “value co-creation” are the focus. This cluster emphasizes the necessity of overcoming barriers and using the organizational potential to drive innovation and create value in public administration. Research has shown that digital transformation in the public sector usually involves innovating in contexts that are typically resistant to change. Thus, in order to create value by employing digital technologies, public institutions have to overcome the challenges that arise, mostly in terms of limitations due to increased bureaucracy.

Digital transformation, from an organizational management perspective, encompasses a variety of research directions and themes that are central to its success, such as innovation, leadership, dynamic capabilities, digital innovation, and change management. These themes testify to the transformative nature of digital transformation and the need for organizations to navigate and thrive in the digital age.

Thus, the answer to the first research questions finds its place in the analysis of the co-word occurrences and it reveals that most research directions and themes in this context focus on organizational change management, digital organizational strategy and fostering an innovative culture within the organization. Additionally, there is a focus on exploring the transformative potential of digital technologies such as artificial intelligence, cloud computing, and big data analytics, on organizations. Lastly, the multifaceted nature of digitalization and its implications for organizational transformation, particularly in relation to dynamic capabilities, are also considered.

The concept of 'digital transformation' has evolved into a cross-functional phenomenon that necessitates a comprehensive consideration of specific management areas. To achieve organizational development through digitalization, it is crucial to recognize and leverage the various interrelationships and connections among the analysed concepts. One notable outcome directly associated with digital transformation is organizational innovation. By embracing digitalization, commercial organizations and public institutions can create value for citizens, beneficiaries, and users and foster innovation and growth.

Moreover, it is important to look into the differences between private and public organizations in relation to our findings, and to provide adequate recommendations for public institutions. For instance, the digitization of organizations leads to the decentralization of organizational digital structures and architectures, which also increases organizational agility, especially if the institutional capacities and capabilities for the adoption and integration of digital technologies are also developed. Another effect of digital transformation, especially if it is correlated with the innovation potential of an organization, is the development of the organization's product and service portfolio. If we consider commercial organizations, the adoption of new technologies increases competitiveness. In the case of public institutions, the diversification and innovation of the portfolio of public services, especially the digital one, generates new value for citizens, stakeholders and implicitly for cities.

Access to information contributes to the decentralization of organizations, all of which leads to an increase in the quality of management decisions. A significant limitation that public institutions have is institutional bureaucracy. This is determined by both the legislative framework and the way the institutions are organized and their degree of digitization. In recent decades, private organizations have adopted data-centric strategies that have led to reduced bureaucracy, more efficient control of resources and reduced costs. These practices can also be adopted by public institutions by redefining digital architectures and by cultivating a greater focus on their end-customer, this process being facilitated by data-centric approach.

Public organizations and institutions can enhance their adaptability and capability to incorporate evolving digital technologies by leveraging dynamic capabilities. Dynamic capabilities refer to an organization's ability to integrate, build, and reconfigure its internal resources and competencies to adapt to changing environments

and seize new opportunities (Vuchkovski et al., 2023; Pradeep et al., 2021). In the context of digital transformation, organizations with strong dynamic capabilities may exhibit greater agility, flexibility, and responsiveness, in navigating the complex and rapidly evolving digital landscape.

One of the advantages of digital transformation is that it enables organizations – by focusing on data, to deliver customized experiences centred on the unique needs of citizens or users. From this perspective, organizations are currently undergoing an extensive process of transformation, and entire organizational processes are becoming data-centric. A data-centric focus in public institutions leads to a citizen-centric approach, creating a unique potential for the institution to adapt to the dynamics of change. From a strategic point of view, this advantage is significant, as it creates the context for developing unique dynamic capabilities.

The transfer of these practices from private to public organizations must take into account several key elements. First, public-purpose organizations need to change their management practices and become more flexible and agile. Increasing the degree of digital maturity implies preparing the organization for the complex changes that characterize the economic and social environment, and the dynamics of technological progress. Institutions that are better connected to the ecosystem they belong to can transfer know-how through open innovation practices in which key competences and capabilities are shared for the good of society. Secondly, change at the institutional level involves adapting digital and information architectures to the needs of digitalization, to technical and technological progress, as well as to the requirements of the ever-changing society.

Another key element in the process of digital transformation of public institutions, which can be adopted from the practices of commercial organizations, is the development of new managerial skills and practices. They are part of new management practices that feed into a new strategic vision of the organization. A significant enabler of digitization processes, in addition to the adoption of digital technologies are managerial practices. From the development stage of digital transformation strategies, managerial vision must be aligned with the capacities and capabilities of the organization. In the process of implementing their strategy, organizations go through a deep process of change and transformation, accompanied by resistance to change, especially in public institutions. Therefore, public organizations must adopt management and leadership practices and promote a change-oriented organizational culture to facilitate the transformation process.

6. Conclusions, Limitations and Future research directions

This study aims to examine the intricate aspects of digital transformation from an organizational management standpoint, and to provide an overview of the prominent

research interests and trends in this field. It becomes evident that digital transformation, when viewed through an organizational management lens, encompasses a diverse array of research directions and trends. The interaction between innovation, leadership, dynamic capabilities, digital strategy, strategic management, and change management underscores the profound and impactful nature of digital transformation, emphasizing the critical need for organizations to navigate and thrive in the digital era.

As implied by its name, digital transformation encompasses an organizational change process. It goes far beyond an organization's digital technologies and their use, it challenges its very existence and therefore it requires fundamental, strategic shifts. This transformative process is both shaped by and facilitated through the intersection and interplay of the key elements identified in this research. Consequently, organizations that recognize the significance of these elements and effectively integrate them into their digital transformation endeavours are likely to reap substantial benefits and achieve success in the rapidly evolving digital landscape.

Despite existing literature reviews on digital transformation and organizational management, a bibliometric study coupled with network analysis in this field has been lacking. Through bibliometric and network analyses, this research provides a systematic and comprehensive examination of the current research landscape. The incorporation of two databases, namely *Scopus* and *Web of Science*, expands the scope of analysis, incorporating insights from various disciplines and enhancing the study's relevance. The inclusion of a substantial number of peer-reviewed articles, 274, strengthens the credibility of the findings. Peer-reviewed literature undergoes rigorous evaluation, ensuring the quality and reliability of the research (Tigre, et al., 2023). Therefore, researchers can rely on this study as a dependable source of information in their investigations of the complex relationship between digital transformation and organizational management.

By conducting bibliometric and network analyses, this study not only sheds light on the current state of research, but also identifies key themes and connections within the field. These insights can guide future research directions by highlighting gaps and emerging trends. As such, this study serves as a valuable resource for scholars looking to deepen their understanding of the implications of digital transformation on organizational management, as well as the key differences between private and public organizations in terms of digital transformation, and to explore new avenues for further research.

Future research directions could explore the distinctive characteristics of digital transformation in terms of its connection to elements within the internal organizational environment. For instance, the dynamics and pace of digital transformation processes may be influenced by the dynamic capabilities that organizations develop. Researchers could investigate how organizations develop and nurture dynamic capabilities that enable them to successfully undertake digital transformation initiatives. This may involve examining the organizational processes, practices, and strategies that facilitate

the acquisition, integration, and utilization of digital technologies and capabilities.

While digitalization and digital technologies play a ubiquitous and comparable role in driving organizational digital transformation, the research approach for examining digital transformation in public-purpose organizations diverges from that of commercial entities. Notably, the value generated for citizens contrasts with the value created by private organizations for shareholders and the market. The current body of literature lacks comprehensive insights into the process of digital transformation and its unique dynamics within public institutions. Consequently, there is a pressing need for future research to fill these gaps by conducting in-depth analyses of digital transformation in the public sector. By addressing these research gaps, scholars can provide valuable knowledge and recommendations to guide public institutions in their digital transformation journeys, ultimately enabling them to effectively leverage digital technologies to better serve citizens and achieve their organizational goals.

Although our bibliometric analysis is comprehensive and includes the most recent and niched publications, it is important to acknowledge its limitations. First of all, we focused solely on peer-reviewed articles, which are considered a reliable source of certified knowledge (Tigre et al., 2023). However, future research could expand the scope by including conference proceedings and even non-peer-reviewed manuscripts to gain further insights into the broad and evolving phenomenon of ‘digital transformation’. Additionally, it is worth noting that our sample size of 274 articles, while using two databases for broader coverage, may have missed some relevant publications when we refined our search by a number of strict criteria (only articles in English, focusing on three subject areas and limiting our search with keywords that fit our scope). Moreover, the small number of articles related to public administration represents a limitation and can be a result of the choice of keywords in the search phase of our research, among other reasons. These limitations should be taken into consideration when interpreting the findings.

Future research should focus on filling the gaps in the literature, particularly regarding the specificities of digital transformation in public institutions. By understanding and effectively integrating these research directions, organizations can harness the potential of digitalization, adapt to changing technologies and customer expectations, and position themselves for sustainable growth and a significant competitive advantage.

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