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Navigating the digital frontier: a systematic review of digital governance's determinants in public administration

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Abstract: The aim of the study is to examine the determinants of digitalisation in public sector. This research is particularly relevant as digital transformation has become a crucial factor in modernising public sector and enhancing service delivery to citizens. The method of the systematic literature review (SLR) was implemented by searching documents on the Scopus database. The initial research reached the 7902 documents and after specifying the keywords the authors found 207 relevant documents. Finally; after the careful read of their abstracts and the use of inclusion and exclusion criteria; the most cited and relevant 32 papers constituted the final sample. Findings highlighted the focus of the literature on technological factors such as the sense of trust and safety as well as the ease of use in the adoption of digital governance; emphasising the need for effective; trustworthy and user-friendly digital services. The most discussed internal factors were leadership and organisational culture. The study offers a deeper understanding of the factors that shape the successful implementation of digital governance initiatives.

Keywords: digitalisation; digital governance; public administration; public sector; SLR; systematic literature review.

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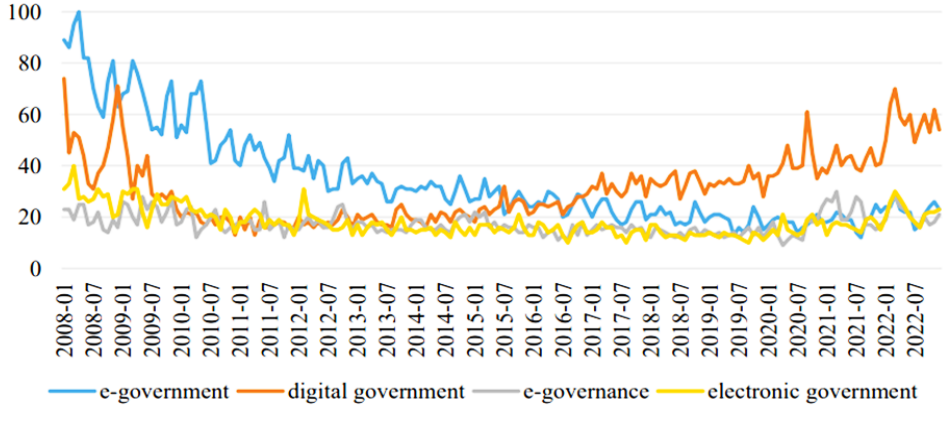
1 Introduction

The digital transformation of the public sector is a key priority for modern governance, aiming to improve efficiency, transparency, and accessibility of services provided to citizens (Latupeirissa et al., 2024). However, the terms 'public sector', 'public services', 'public administration', 'public authorities', and 'administrative services' are often used interchangeably, which may lead to confusion regarding the specific focus of this study. Therefore, it is essential to clearly define these terms to establish the research context. The public sector encompasses all government-owned entities, including central and local governments, as well as state-owned enterprises, responsible for providing various public services like healthcare, education, and transportation (Hjaltalin and Sigurdarson, 2024). Public administration refers to the execution of government policies and the management of public programs, while public authorities are the governmental bodies tasked with creating and enforcing these policies. Administrative services according to Ridley (2024) are a subset of public services, focusing on government-provided documentation, certification, registration, and compliance processes, such as passport applications, business registration, and licence issuance. This study, examines the literature on the digitalisation of administrative services provided by public sector entities. The research examines e-services such as e-governance platforms that facilitate governmental documentation, certification, and registration processes.

Establishing strategies and taking action to produce long-term, high-quality results is becoming a more pressing task for the public sector globally (Gębczyńska and Brajer-Marczak, 2020). Public organisations have a duty to ensure the quality of services they provide to the general public. In this sense, the task facing governments is to deliver services that are more useful, responsive, effective, and efficient (Kuziemski and Misuraca, 2020). A new generation of digitalised public services is emerging as a result of current social, economic, and technological advancements (Xanthopoulou, 2022; Kitsios and Kamariotou, 2023) and in this way, these advancements may contribute a more innovative public sector which will further benefit society. As part of the reform

initiative to raise the calibre of public sector operations, these services are also coupled with information and communication technologies (ICT) (Kalampokis et al., 2023). New technologies, like BlockChain (BC), serve as a conduit for information between public authorities and the general public as well as a way to increase transparency (Laukyte, 2023). The "Lisbon Strategy", aims to benefit citizens as well as private and public organisations through their digital access. The same view adopts US expressing that "*Better public administration through the better use of information, personnel, processes and technology*". In recent years, there are many studies which examine the relationships between digitalised public services and of open governance, transparency and citizens' participation (Hanisch et al., 2023). Through the identification of these factors through the systematic review of the literature, the current research can offer valuable perspectives on how public administrations can effectively introduce a digital culture in their services and operations. It is imperative to emphasise that the term "digital governance" should not be conflated with 'e-governance', but rather recognised as an evolution thereof. To better understand their differences, Figure 1 presents the Google's trend analysis regarding "e government", "digital government", "electronic government" and 'e-governance' from 2008 to 2022. During 2008 a new era of technological innovations was emerged due to the introduction and extended use of smartphones, artificial intelligence, block chain technologies, Big Data etc., including public administration. Google Trends normalises this data on a scale from 0 to 100 to represent search interest relative to the highest point on the chart for a given region and time. Google Trends does not explicitly offer the entire number of records studied; instead, it extrapolates this amount from the total number of searches made worldwide. Trend lines in the field of public governance point to areas of attention and objectives that are changing, pointing to a transition toward more digitally linked government services. The examination of Google Trends search queries reveals geographical variations in the prevalence of several e-government key terms. Specifically, USA, Canada, Great Britain, Australia, and New Zealand are among the countries where the phrase 'digital government' is frequently used. In most other nations, the phrase 'e-government' is more often used. As a result, the phrases 'e-government' and 'digital government' were selected for the present study.

Figure 1 Google trends analysis for "e government", "digital government", "electronic government", and "e-governance" (2008–2022) (see online version for colours)



As it can be observed, e-government and digital government are the most popular terms analysed. Then, from 2016 there is an increased searched for "digital government", while the search for the previously mentioned term of e-government is decreasing demonstrating thus the transition from electronic to digital world.

E-government refers to the internal use of ICT (particularly the internet) and places that focus on organisational administration and management in both the public and private sectors. Digital government can be considered an advanced, mature stage of e-government. Digital government is strongly connected with Digital Transformation and represents a more citizen-focused administrative and governmental paradigm (Attour and Chaupain-Guillot, 2019). The change in the public sector's terminology from 'e-government' to 'digital government' around 2016 represents a paradigm change as well as an update to current trends. This shift was more than simply a change in language; it was a more comprehensive and integrated approach to governance, with blockchain, big data, and artificial intelligence playing key roles in the reimagining and redesign of public services. The term 'digital government' captures this development, highlighting how governance models and citizen involvement have evolved beyond the previous emphasis on merely providing services online. This represents a substantial leap in the reach and capacity of technology in the public sector.

This study aims to analyse and debate the key factors influencing the digital transformation of the public sector. The main purpose was to identify the characteristics that influence the digital reform of public organisations through a systematic review of the literature. This is an area of great interest since digital reform is one of the most recent and radical changes. "RQ: Which factors influence the digitalisation of public sector" is the primary research question (RQ) of this study and is a topic that has been discussed by many academics and policymakers. To determine these parameters, this study uses a systematic literature review (SLR) technique to provide a comprehensive overview of the current state of knowledge. A part of the study's originality can be contributed to the involvement of bibliometric procedures and presentations along with a focus on identifying the major factors that will influence public sector's digital transformation from the SLR. Dolhey (2019) writes that the combination of bibliometric analysis and systematic review of the literature improves the identification of significant advancements and gaps in the field and enables quantitative mapping of the structural elements of the research environment. Additionally, this combined research strategy guarantees a comprehensive and well-informed understanding of digital change in the public sector and its drivers. Linnenluecke et al. (2020) note that there is a dearth of systematic literature analyses because academics in the management area and allied disciplines still mostly use narrative literature reviews. Research has also shown that despite the abundance of published works on the topic of government digitalisation, theoretical and empirical advancements have been hampered by contradictions and gaps in conceptual and practical meanings (Helbig et al., 2007, 2009).

Taking these arguments into account, the present study can advance the area by providing a clearer picture and identifying the elements (or themes) using thematic analysis with NVivo12 software. The determination of these themes will offer valuable perspectives on how public sector may effectively manoeuvre through the intricacies of digital governance, capitalising on technological progress to foster an environment of efficacy, openness, and responsibility in its operations.

The remainder of this paper is organised as follows. An outline of the methods and instruments used for the research is provided in Section 2 that follows. Section 3 presents

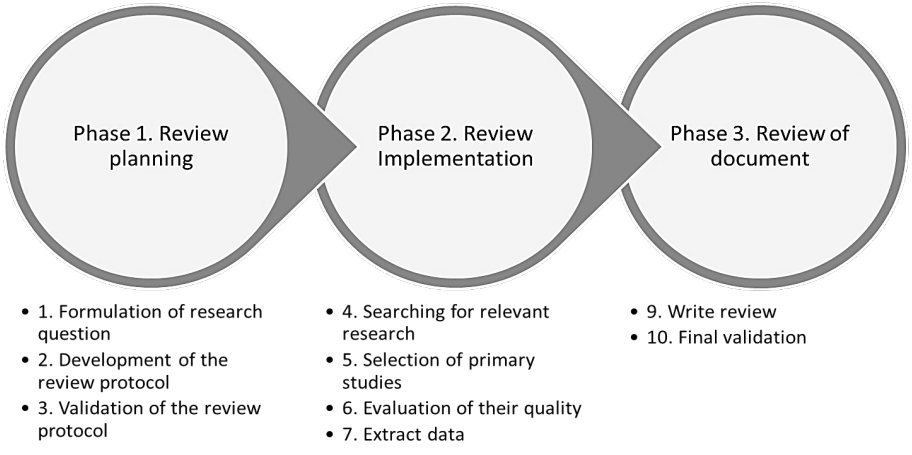
the analysis, together with the tables and figures that support the conclusions. The results and a critical discussion are presented in the concluding section. The authors also provided suggestions for future research in the field and mentioned the limitations of the current study.

2 Methods

2.1 Materials and methods used

The present study conducted the method of the SLR. The literature review was guided by a single research question on "*Which factors affect the adoption of digital governance in public sector*". The authors' second choice, was the narrative literature review, however according to Baumeister and Leary (1997), this approach has drawn a lot of criticism as there are not many resources or established protocols. Furthermore, as mentioned already, narrative literature reviews are commonly used in management scientific field, thus this selection could negatively impact on the study's originality. The method of the SLR was also preferred to ensure open and comprehensible assessment of the research (Thorpe et al., 2005). SLR is frequently conducted at several stages, which vary from study to study based on the goal of each research. This study was based on Kitchenham and Brereton's (2013) SLR steps, which are described in Figure 2.

Figure 2 The SLR process

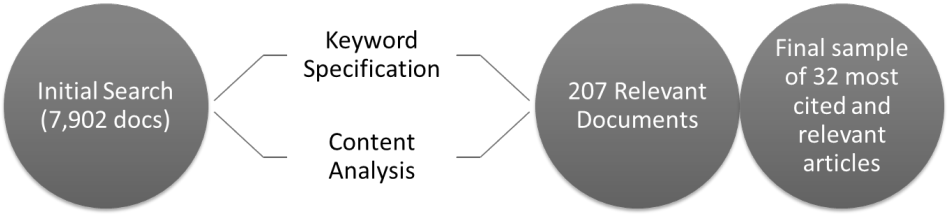


Source: Adapted from Kitchenham and Brereton (2013)

Through web search engines, the search was limited to digital governance in public sector and its surrounding factors of success and failure. The search result was produced by searching publications in which the title, abstract, and keywords reference digital governance topic. The authors in this study used Scopus database because of its coverage wider range of journals (Dolhey, 2019). The work of Van Eck and Waltman (2017) on the coverage and overlap of 21 systematic reviews (SRs) between Scopus and WoS Scopus captured more of the literature than WoS and Scopus overlapped on average 86% with WoS. Mongeon and Paul-Hus (2016) found that WoS provides very comprehensive

coverage in the area of natural sciences and engineering while Scopus offers more extensive coverage in the social sciences (Kumpulainen and Seppänen, 2022). Figure 3 depicts the refinement process, starting from initial search all the way through to the eventual inclusion of 32 most cited and relevant papers for content analysis. This progression results from more targeted sampling at each stage of the process for analysis.

Figure 3 Document selection process



Source: Authors' own contribution

As shown in Figure 3, the first results for research documents reached the 7902. At this point, inclusion and exclusion criteria were developed to decide which search results should be included. The abstract, keywords, introduction, and conclusion of each database were examined in order to narrow down the results that were found. Specifically, the following inclusion criteria were developed:

- the paper is peer-reviewed publication
- English language of the study
- relevance of the study regarding the given search criteria
- the implementation of an empirical study and not of a literature review (narrative or systematic)
- the publication year which should be from 2003 to 2024.

When determining the relevancy of each paper screened, the authors additionally incorporated four exclusion criteria to reinforce the evidence search procedure.

- studies that do not address Digital Governance in public sector and its factors as a main focus of the research (relevance issues).
- papers that do not define or describe the Digital Governance or the Digital Reform or the Digital Transformation in public administration (relevance issues)
- studies that do not refer to public sector organisations (relevance issues)
- studies that conducted literature reviews (methodology issues)
- studies that were written languages other than English (language issues).

Following a more focused keyword search (see Table 1), the authors found 207 pertinent studies that discussed the elements (or determinants) of digital governance in public administration. Figure 2 shows that throughout the recent time, there was a large growth in the quantity of documents on this issue. The authors may supply the whole list upon

request, but space constraints prevent them from providing it here. The researchers then followed Cornelius et al. (2006)'s recommendation and employed particular keywords and key phrases (see Table 2) for their search. To identify relevant documents that explain the material of interest, a systematic and repeatable procedure was employed. Carefully picked terms and phrases were also used to guarantee a more complete search of the database's contents. The main terms, keywords, and Boolean expressions utilised in the literature search are shown in Table 1. 207 documents total with 130 papers, 38 conference papers, 16 book chapters, 13 reviews, 6 books, 3 conference reviews, and 1 note. The search was further limited to 192 English-language papers published between 2003 and 2024.

Table 1 Key terms, keywords and Boolean expressions

TITLE-ABS-KEY("digitalisation*" OR 'digitalisation*' AND public*) AND TITLE-ABS-KEY (determinants* OR factors*) AND ALL (method OR research OR study OR analysis) AND ALL (public administration* OR public sector* OR public organisations* OR public organisations) AND LIMIT-TO (LANGUAGE, English)

To identify the key factors that drive successful digital governance in public sector bodies, we analysed the most frequently cited and relevant papers on the subject, as listed in Table 2. The protocol for the systematic review was written using the PRISMA 2020 statement (Page et al., 2021). The PRISMA flow diagram, shown in Figure 4, provides a clear visual representation of the steps involved in conducting a systematic review and meta-analysis. This flow diagram serves as a valuable tool for researchers to ensure transparency and accountability in their methods throughout each phase of the research process. By utilising this diagram, researchers can effectively illustrate the progression of study participants from the initial search for relevant studies to the final inclusion or exclusion of those studies in their analysis. The PRISMA flow diagram illustrates the results of the present search. The authors looked in Scopus and found 7902 documents to start with. The set of documents was first narrowed down based on certain criteria, and then the papers were checked individually to make sure they actually fit with the overall concept. This means the researchers looked at the background of each paper, its purpose, and its findings to ensure they made sense in terms of how we wanted to use them in our review. In this case, we specifically targeted systematic reviews published over a 15-year span across multiple databases because we wanted to look at an overarching narrative that those reviews told. In all, 15 papers were rejected because of language problems. After carrying out more in-depth research, 130 papers were selected for this analysis that concentrated on those two subjects. Two reasons for selecting these papers are that they focused on the public sector, and because they illuminated several determinants of digital governance in that domain. Understanding how digitalisation affects public services can help illuminate many of the challenges citizens face when interacting with government and thereby inform improvements to public service delivery systems. To maintain a high level of rigour and concentrate on the main subject, we avoided looking at certain types of documents. For content analysis, the final sample consisted of the 32 most cited and relevant papers.

Table 2 Determinants of digital governance in public sector

		Determinants												
		Technological factors			*Contextual factors-external environment*			*Organisational factors*				*Employees' background and characteristics*		
Citations (in Scopus)	*Studies (Year)*	*Ease of use (perceived)*	*Trust/safety*	*Transparency*	*Political leadership and legal factors (regulations)*	*Economic factors*	*Citizens/social and demographic factors*	*Leadership*	*Internal environment/ resources*	*Internal Strategy*	*Organisational Culture*	*Skills (existed)*	*Training*	*Personal characteristics*
1	Xanthopoulou et al. (2023)	✓	✓					✓	✓	✓	✓	✓		
22	Kuhlmann and Heuberger (2023)	✓			✓		✓		✓			✓		
2	Duygan et al. (2023)								✓		✓			
11	Natalini and Stolfi (2012)				✓									
2	Müller et al. (2023)			✓			✓							
7	Androniceanu et al. (2022)				✓									
3	Nugraha et al. (2022)				✓									
14	Aristovnik et al. (2021)						✓							
4	Dobrolyubova (2022)						✓							
28	Roth et al. (2023)		✓		✓		✓		✓		✓			
11	Sohag et al. (2021)				✓									
1	Alomar (2023)	✓	✓	✓			✓				✓	✓	✓	
20	Safarov (2021)	✓					✓							✓
4	Al-Alawi et al. (2023)							✓	✓	✓	✓	✓	✓	
74	Yuan et al. (2021)				✓									
17	Hüsers et al. (2017)										✓			
6	Sembekov et al. (2021)								✓			✓	✓	
3	Schmitt (2023)	✓	✓				✓							
4	Glinkina et al. (2020)						✓		✓		✓			✓

Table 2 Determinants of digital governance in public sector (continued)

		Determinants												
		Technological factors			*Contextual factors-external environment*			*Organisational factors*				*Employees' background and characteristics*		
Citations (in Scopus)	*Studies (Year)*	*Ease of use (perceived)*	*Trust/safety*	*Transparency*	*Political leadership and legal factors (regulations)*	*Economic factors*	*Citizens/social and demographic factors*	*Leadership*	*Internal environment/ resources*	*Internal Strategy*	*Organisational Culture*	*Skills (existed)*	*Training*	*Personal characteristics*
5	Brodny and Tutak (2022)				✓									
1	Nguyen et al. (2022)				✓		✓							
1	Marikyan et al. (2023)	✓	✓	✓			✓							
7	Gladkova and Ragnedda (2020)				✓									
23	Vasyltsiv et al. (2022)				✓	✓	✓							
58	Williamson (2014)								✓					
17	Collington (2022)						✓							
58	Greve (2015)		✓				✓							
223	Margetts and Dunleavy (2013)				✓		✓							
7	Şandor (2012)						✓		✓		✓			
1	Al-Mansour (2021)									✓				
4	Shao et al. (2023)						✓							
3	Xanthopoulou et al. (2022)		✓								✓	✓	✓	✓

Source: Authors' own contribution

The inclusion criteria for this study focused on peer-reviewed publications in English that were directly relevant to the determinants of digital governance in the public sector, specifically empirical research published between 2003 and 2024. Exclusion criteria involved discarding non-peer-reviewed studies, non-English publications, studies that were irrelevant to digital governance, and narrative or SLRs. These criteria ensured that only high-quality, pertinent, and recent research was analysed, providing a robust foundation for understanding the factors influencing digital governance in the public sector. Specifically, a number of studies were excluded for a variety of reasons, including language barriers, and relevance and methods, which resulted in the elimination of 15

studies for reason 1, 31 for reason 2, 16 for reason 3. More precisely, because the 31 publications in question did not directly answer the research issue of the current study – which was centred on the variables influencing the adoption of digital governance in public sector – they were first disqualified from consideration. To ensure uniformity and readability, the study only contained English-language publications by excluding 15 papers because of linguistic issues. Because all of the included research was published between 2003 and 2024, the authors did not have to exclude any publications based on publication date. Next, 6 studies were excluded as they used the method of literature review and the authors preferred to examine only quantitative and qualitative studies as they provide more generalised results. Finally, 130 papers were selected as the exclusion of other types of documents (such as conference proceedings, books, note etc.) is consistent with the methodology employed in several comprehensive literature reviews, which prioritise peer-reviewed papers to enhance the reliability and depth of the analysis (Alvarenga et al., 2020; Palumbo et al., 2023).

Figure 4 Flowchart indicating identification and selection of studies used in the present analysis following PRISMA statement guidelines (see online version for colours)

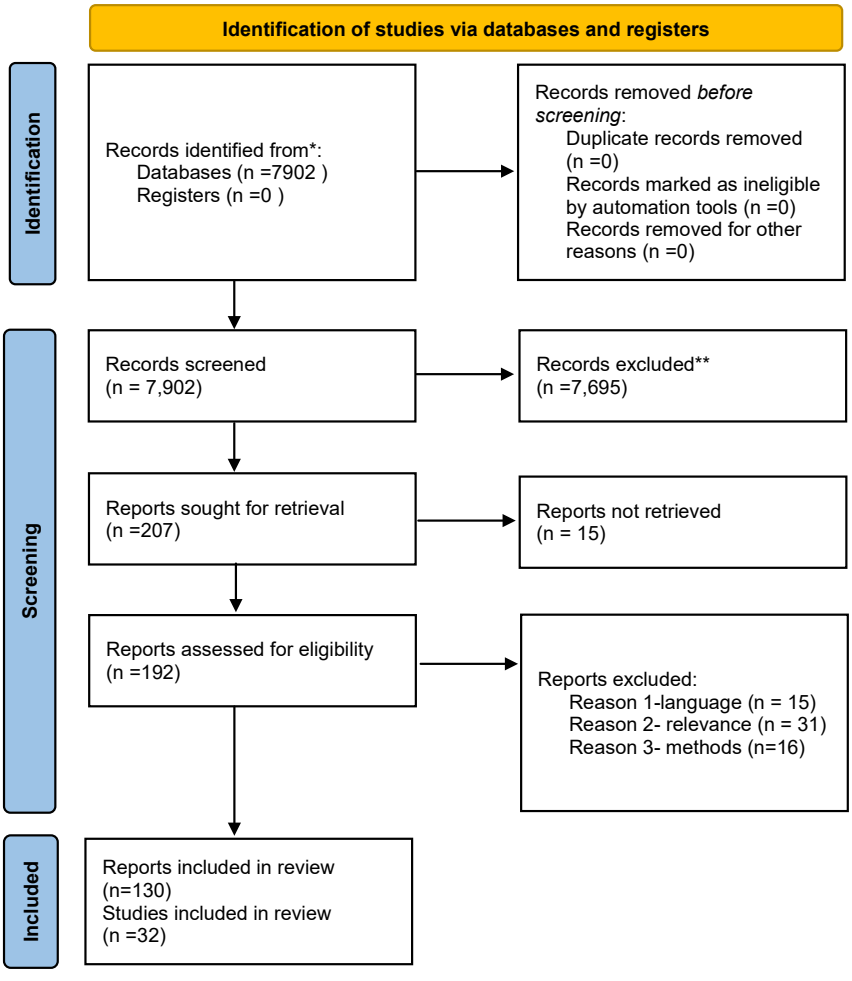
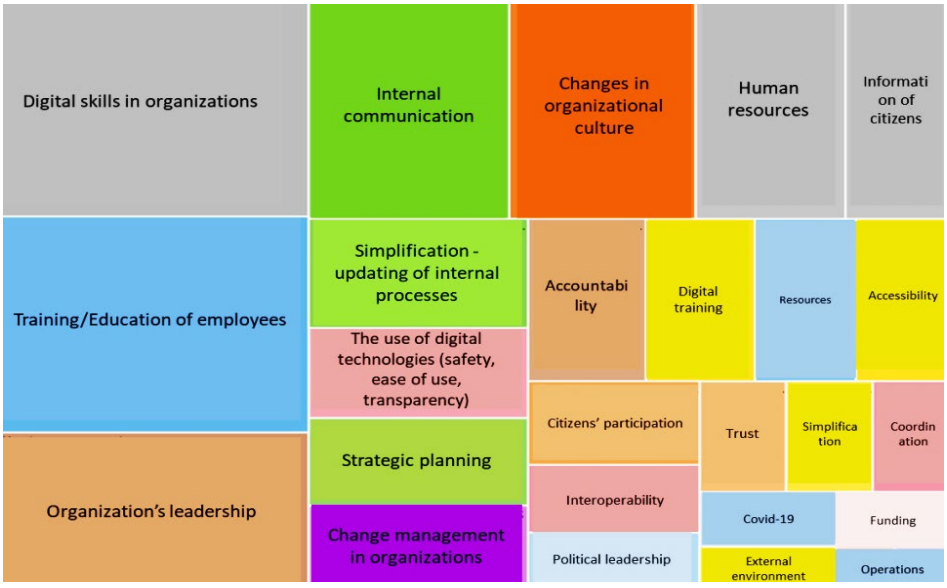


Figure 5 displays the categories and subcategories of determinants/factors, which are also referred to as "codes". Greater area in the figure indicates more references to that code.

Figure 5 Codes of digital governance determinants in public sector (see online version for colours)



2.2 Methodology overview

This study combined bibliometrics and a SLR. Using the Scopus database and accurate iteration of search terms, we conducted a thorough literature search for evaluating the factors that could lead to a public sector conducive to digital transformation. After performing the analysis on methods and relevance, the authors used thematic analysis in NVIVO12 software to identify concepts and patterns common among these studies that point toward an understanding of what might lead public sector systems towards digital transformation. Performing a preliminary literature scan enables one to identify the kinds of keywords and key phrases that structure document collections relevant to a research question. This process then forms the basis for executing database searches that yield the needed documents. In this case, we employed Scopus as our database and used citation analysis – a basic bibliometric technique – to highlight the most important papers in studies on digital reform of public sector and its determinants VosViewer was our visualisation tool in performing this analysis.

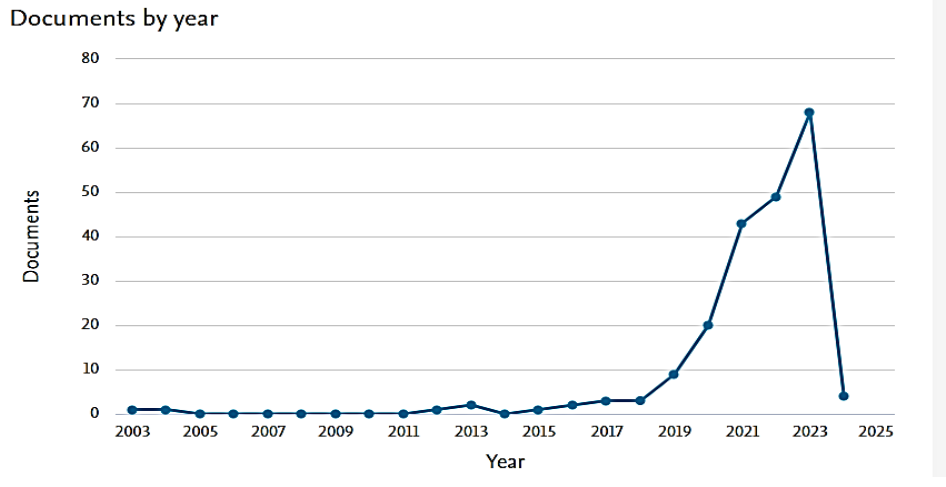
Finally, it should be mentioned that all ethical considerations, particularly regarding data integrity, were met. This research was designed to avoid any bias by implementing rigorous, transparent, and reproducible systematic review methodologies. Throughout the study, the authors ensured that all findings and discussions were presented honestly and without manipulation of the data or interpretation. This commitment to ethical research practice not only strengthens the validity of the findings but also aligns with the ethical guidelines recommended by the academic community for systematic reviews.

3 Results

It can be seen from Figure 6 that the research on digital governance has been growing over the years.

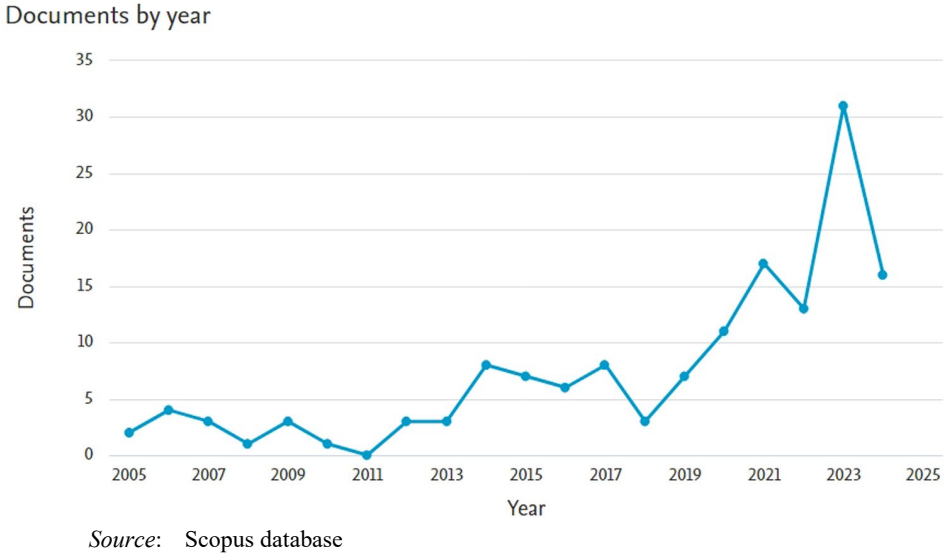
Specifically, it can be observed a great increase from the year 2019 to 2023, as the number of documents rose from 9 to 68. Further, it can be seen that maximum papers (68) have been published in 2023, while the number of papers for 2024 is not completed yet until the end of the year. Regarding the number of papers, which constitute the sample of the present research, Figure 7 confirms that 2020 (9), 2022 (11) and 2023 (13) were the years with the highest numbers of publications (papers).

Figure 6 No of documents (207) published from 2003 to 2024 (see online version for colours)



Source: Scopus database

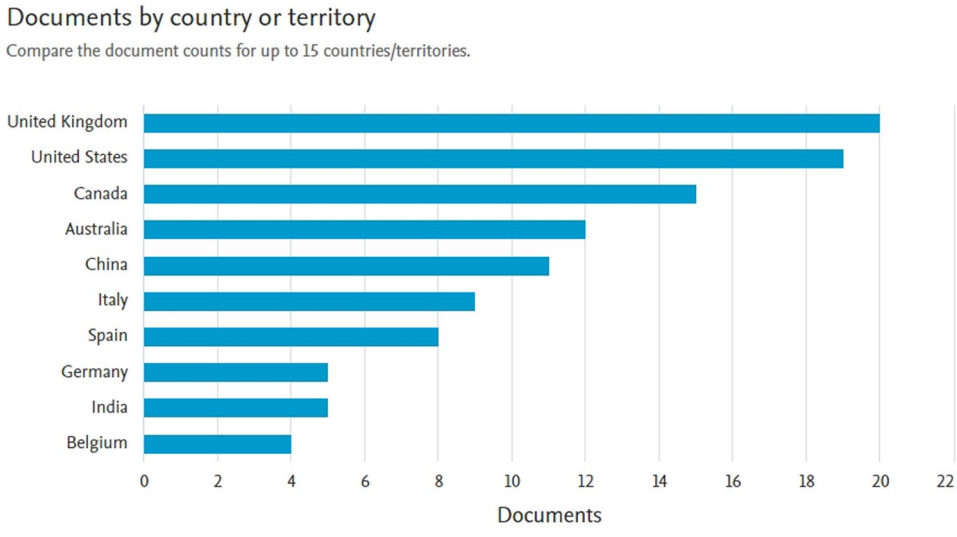
Figure 7 No of papers (148) published from 2003 to 2024 (see online version for colours)



Source: Scopus database

Influence of the COVID-19 pandemic on research about the public sector comes in two ways. One is by boosting academic interest in digital governance, which is critical to how government works, and the other is by increasing the governments' dependence on digital means to carry out their functions. Furthermore, Figure 8 shows that US, UK, and Australia have the highest concentration of research on digital governance in the public sector and its determinants.

Figure 8 Documents by country or territory (see online version for colours)



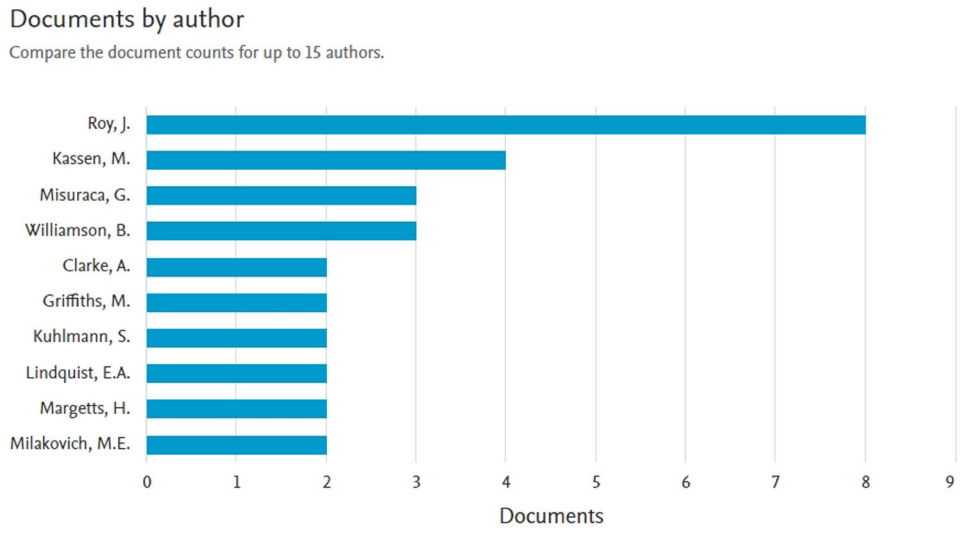
Source: Scopus database

A number of different considerations could explain why US, UK, and the Australia are leaders in public sector research on digital governance. First and foremost, these nations have shown strong government initiatives and policies meant to promote modernisation and digitalisation within their public sectors, providing a strong basis for scholarly research. Finally, Figure 9 shows that with two documents, B. Williamson is the author in this dataset with the most documents; the other writers listed each have one document connected with their names.

Table 2 presents the key studies with at least one citation that have discussed a variety factors influencing the digital governance in public organisations. Table 2 focuses only on Scopus content and lists the most relevant 32 publications with at least one citation. The most cited paper is the study of Margetts and Dunleavy (2013) titled "*The second wave of digital-era governance: a quasi-paradigm for government on the Web?*".

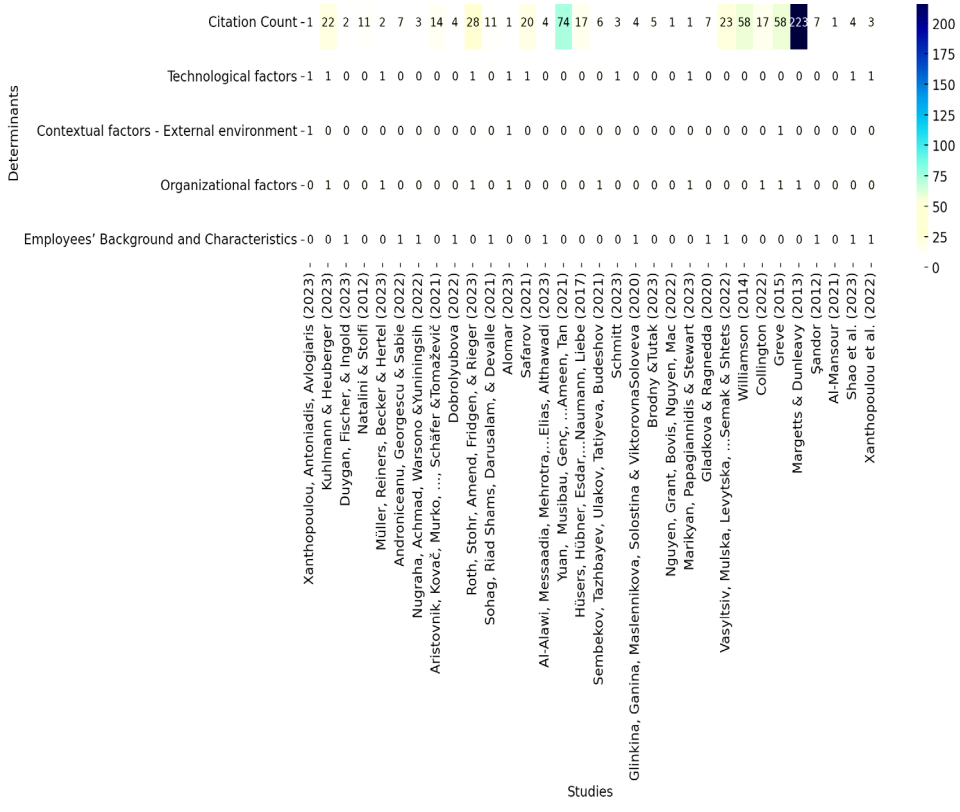
Figure 10 will present the visualisation of the bibliometrics used in Table 2. Each cell indicates the presence of a determinant (marked by a value) across different studies, with the citation count listed alongside. The colour intensity represents the presence or absence of these factors, making it easier to spot trends and patterns across the studies.

Figure 9 Documents by author (see online version for colours)



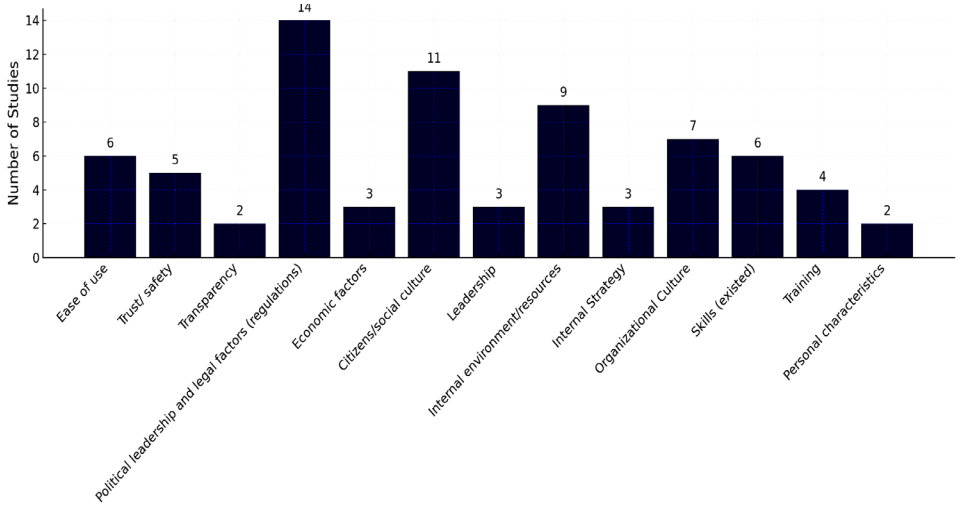
Source: Scopus database

Figure 10 Visualisation of bibliometrics regarding the most studied determinants on digital reforms in public sector (see online version for colours)



The most discussed determinants refer to external (contextual) factors mainly to the political environment (political initiatives, political support, investments in research and development or on other aspects related to digital reforms), while the next most common studied ones are those of the social culture of each country (the citizens' acceptance of new technologies in public services, their reediness, the country's structure of public sector) and the significance of resources within the organisations (such as internet, or operational platforms and software etc.). Figure 11 summarises the most studied determinants of public sector's digitalisation from the Scopus database.

Figure 11 Most studied determinants of public sector's digitalisation (see online version for colours)



Source: Authors' own contribution

3.1 Technological factors

Many empirical studies have examined the relationship between the successful adoption and integration of digital governance with a sense of trust, security, and transparency (Marikyan et al., 2023; Alomar, 2023; Freire and Casarin, 2021), while important reference is made to the effect of the quality of information (Xanthopoulou et al., 2023). Parasuraman et al. (2005) write that digital service quality is considered as one of the most relevant beliefs held by the user to evaluate digital services and is usually reflected in elements such as efficiency, fulfilment privacy, and availability of the system. The term of digital service quality is commonly used in the literature as an indicator of digital service reliability, but it has also been suggested to positively influence trust to the provider (McKnight et al., 2002; Alomar, 2023), in this case the public sector. Quality of service (or service quality) is perhaps the most important factor considered by users when evaluating digital services. Quality of service includes elements such as efficiency, privacy, fulfilment, and availability of the system (Nguyen et al., 2023). Sabani et al. (2023) pointed that factors such as performance expectations, system quality, and perceived transparency significantly influence e-government adoption, while social influence, facilitating conditions, perceived security, information quality, and government encouragement are also important determinants. User-friendly and high-quality digital

services lead to a seamless experience with a sense of trust and confidence in the users. Similarly, the dependability and efficiency of these services, including data security, responsiveness, and uptime, are essential for building confidence and openness.

Alomar Müller et al. (2023) mentioned the issue of digitalised working, and they findings confirm the association between digitalisation and transparency and simplification, standardisation, and structuring of work routines. Users are more likely to feel comfortable and trust service providers when they believe that the digital service will operate as planned and safeguard their data. It is commonly accepted that, establishing confidence and trust requires guaranteeing data confidentiality and privacy (Müller et al., 2023). Users' perception of security and trust may be increased by implementing robust security measures, clear data management procedures, and compliance with privacy legislation (Robinson, 2020; Roth et al., 2023). Researchers have highlighted the importance of organisational flexibility and internal cooperation. The same view shares Marikyan et al. (2023), Alomar (2023), and Schmitt (2023) underlined the positive impact of perceived usefulness, perceived ease of use, training, resources, position of the hierarchy, and citizens' attitudes toward digitalisation and its acceptance by civil servants.

3.2 Contextual factors

Lorentz et al. (2021) refer to a distinction between internal and external elements or determinants that impact on each reform. Internal issues include difficulties with time management, corporate culture, leadership, and resource management systems in addition to difficulties with human factors. Supply and demand as well as external environmental elements including social, political, and economic considerations is examples of external factors (Savoldelli et al., 2014). According to Effah and Nuhu (2017), antiquated legislation and an organisational culture that prioritises norms are important institutional impediments to digitisation.

There are numerous empirical studies on the barriers to the adoption of digital governance, which refer to the lack of trust in the external conditions such as political, social or economic that occur in each society (Margetts and Dunleavy, 2013; Kuhlmann and Heuberger, 2023; Natalini and Stolfi, 2012; Androniceanu et al., 2022; Nugraha et al., 2022). The political, social, and economic context in which digital governance is implemented is referred to as the socio-political circumstances (Margetts and Dunleavy, 2013; Brodny and Tutak, 2022; Roth et al., 2023). These circumstances include elements like resource availability, political initiatives, economic inequality, political instability, and cultural diversity. These elements can have a significant impact on how citizens' expectations and needs for new technologies are shaped, as well as how prepared organisations are to implement them in their service delivery. Similarly, cultural norms and social values affect how much voters trust their government and how well it can adopt new technology (Robinson, 2020). The success or failure of digital governance projects in the public sector is determined by these criteria. For instance, bureaucratic roadblocks and opposition from dishonest officials – many of whom fear losing their jobs as a result of the introduction of new technologies – can impede digital governance in nations with high levels of corruption and weak institutional frameworks (Twizeyimana and Andersson, 2019; Xanthopoulou et al., 2022). Similarly, low levels of digital literacy, inadequate digital infrastructure, and a lack of attention on digital policy and regulation can all contribute to slow or ineffective adoption of new technologies and digital

governance (Dias, 2020; Nguyen et al., 2022). National policies established by political leaders can help or impede the implementation of digital governance initiatives (Tangi et al., 2021 Androniceanu et al., 2022). For instance, where political leaders support such innovations or reforms, digital governance initiatives usually obtain higher levels of commitment, funding, expenditures, and resources (Sohag et al., 2021; Yuan et al., 2021). On the other hand, in countries where political leaders are not persuaded or interested in digital initiatives, their adoption may be slow or nonexistent (Ingrams et al., 2020). The study of Nugraha et al. (2022) concluded in that the information technology culture inside the municipal government is significantly influenced by five factors including the technocratic the utopianism, the anarchy, the feudalism, the dictatorship, and the federalism. Moreover, the application of new technologies in public administration may be impacted by outside factors such as international agreements and legislation (Vasyltsiv et al., 2022; Gladkova and Ragnedda, 2020).

The weak pace of digital transformation and the usability issues that arise in interactions between the government and citizens have been attributed to resource and regulatory restrictions (Kuhlmann and Heuberger, 2023). Despite ongoing state and public initiatives to address digital inequality, Gladkova and Ragnedda (2020) looked at additional external factors and found that digitalisation efforts in Russia are significantly impacted by factors like the socioeconomic development of federal districts, objective factors like infrastructure availability, and regional disparities. The pandemic problem and its notable impacts on digitalisation have been discussed by Aristovnik et al. (2021), Müller et al. (2023), Xanthopoulou et al. (2023), Shao et al. (2023), and other experts.

3.3 Organisational factors

The lack of knowledge management and information sharing between departments and organisations is another obstacle to the public sector's digital transformation (Ruiz-Alba et al., 2019). The resistance of government servants who are afraid of losing their employment further impedes this shift (Basyal and Wan, 2020). Other unfavourable aspects include the hardware, particularly the insufficient and erratic internet access that businesses experience. Organisational culture and structure may significantly influence digital innovation, especially in the public sector (Xanthopoulou et al., 2022). Strict corporate cultures and regulations, for example, hinder how novel stimuli are interpreted and stifle creativity and new ideas (Bilal et al., 2018). This is because, since biases in information processing and interpretation are involved, strict adherence to established norms can result in the astonishing resemblance of individual thoughts and ideas. Strong cultures limit productivity, performance, efficiency, and service quality in public companies and stifle innovation (Hüsers et al., 2017). As a significant reform, digital transformation necessitates an innovative and adaptable organisational culture (Hartl and Hess, 2017). Thus, one challenge that comes up is how to define what constitutes a "digital culture".

Numerous studies have shown that before extending these trials to the entire firm, it is important to foster inside enterprises a culture of risk-taking and small-scale experimentation with digital technology. Glinkina et al. (2020) claim that a flexible environment with flexible principles is necessary to be able to take advantage of advancements and be ready for regular upgrades. This emphasises how important it is to match actions to the flexible ideas that software development approaches have inspired

(Horlach et al., 2017). In order for an organisation to be more competitive and inspire employees, leadership is another crucial internal factor that can influence the adoption of digital governance in the public sector (Al-Alawi et al., 2023; Glinkina et al., 2020; Williamson, 2014). As such, top management and leadership need to practice different management styles and develop skills to be better equipped to face unforeseen challenges and discontinuities (Xanthopoulou et al., 2023). While inadequate leadership can hinder innovation and delay the uptake of new technologies, strong leadership can foster a culture of experimentation and innovation (Hoai et al., 2022). Innovations include new technology, digital governance, and reforms in general (Lapuente and Van de Walle, 2020). A number of problems have surfaced, such as a risk-averse culture and employee and citizen aversion to innovation (Dobrolyubova, 2022). The literature's main conclusions demonstrate that leaders play a crucial role in the creation of a digital culture because it is up to them to forge connections with a variety of distant stakeholders and concentrate on facilitating collaborative processes in challenging settings while also attending to moral issues.

An increasing number of firms have made their workplaces digital, particularly during a pandemic. The phrase 'e-leadership' describes a social influence technique that uses advanced information technology (AIT) to mediate changes in behaviour, attitudes, feelings, and/or performance with people, groups, and/or organisations. The phrase 'e-leader' was coined to characterise a new type of leader who engages with technology on a regular basis. These days, a lot of jobs need a high degree of technological competence and rapid learning. In order to support and motivate employees throughout demanding assignments requiring a high degree of cognitive capacity and steep learning curves, managers must invest in upskilling their workforce. Increased connection and information sharing are also causing changes in organisational boundaries and activities.

Additionally, the dark side of digital revolution has presented leaders with new ethical challenges. Scholars studying leadership have been attempting to monitor the consequences of digitisation processes in recent decades. This conclusion is further supported by reports that leadership, as an internal component, serves as an incentive for the adoption of new technology. It is crucial for managing change and embracing the new digital reality that the organisation's senior leadership support the successful integration of new technology (Alvarenga et al., 2020). Al-Alawi et al. (2023) provide similar evidence in their study, indicating that employee resistance, organisational culture, and top management support had an impact on digitalisation, particularly during the COVID-19 era when stress levels surged due to changed working circumstances.

Cross-functional cooperation is emphasised in the literature as a crucial component of digital transformation when it comes to the internal environment (Duygan et al., 2023). According to research, businesses need to develop strategies that embrace the consequences of digital transformation and improve operational performance in order to innovate with these technologies at the organisational level (Sembekov et al., 2021). In this process of digital transmission, strategy is crucial. Al-Mansour (2021) asserts that there is a strong relationship between digital innovation, digital technology, and digital transformation, as well as several connections between them. Furthermore, it is recommended by Arvidsson and Holmström (2017) to comprehend and investigate digitalisation as a strategic practice. Şandor (2012) emphasises that internal organisational elements should receive more attention in study, stating that "the massive change in our society cannot be explained only by technological (especially ICT) factors."

Moreover, Al-Alawi et al.'s research findings from 2023 highlight how crucial it is for businesses to have a successful digital transformation plan. Conducting proactive planning concerning personnel, procedures, technology, and their coordination inside the company is essential for carrying out an organisational transformation program. Effective knowledge management is crucial for carrying out and maintaining these kinds of organisational transformation projects. According to Al-Mansour's research from 2021, effective strategy was the most frequently cited success element for digital transformation and is still seen as the most important component at that particular point in time.

3.4 Employees' background and characteristics

Digital skills are a step towards learning many other new things. They can improve public employees' confidence in using technology at work and in everyday life. Many jobs today require digital skills. Many technological advances have left nations and companies facing numerous obstacles in the modern era. Most nations' public sectors are working to use new technology and adjust to the changing environment. As a result, businesses enhance not just their own productivity but also the lives and contentment of their constituents.

Indeed, digital skills have been extensively discussed in the literature. Similar findings are reached by Xanthopoulou (2022), Kuhlmann and Heuberger (2023) and Safarov (2021) who refer to the lack of digital competence, i.e., the skills necessary to use electronic administrative services and other electronic services, as well as the importance of acquiring digital skills by employees, the lack of which significantly slows down the pace of development of electronic and digital services, making them inaccessible to a wide range of users. Given the need for changes and reforms in public administration, it is imperative that employers invest in their workers' digital abilities, especially in light of recent developments like digital governance, which emphasise the need for a more creative and flexible organisational culture. Another obstacle to digitalisation is the absence of knowledge management and information exchange between departments and organisations (Ruiz-Alba et al., 2019; Zakopoulos et al., 2024). Digital governance and the adoption of new technologies in the public sector may also be hampered by civil servants' reluctance out of concern for their jobs (Basyal and Wan, 2020; Lorentz et al., 2021).

The effective application of digital governance and the acceptance of new technologies both depend on skills (Sembekov et al., 2021; Xanthopoulou et al., 2023). According to Al-Alawi et al. (2023), there is a favourable correlation between the success of digitalisation in the workplace and digital abilities or talents. It is essential for civil personnel to possess the abilities needed to operate and maintain modern technology. Reduced adoption rates, inefficiencies, and higher expenses might result from a lack of expertise. Questions regarding the need to upskill current employees (Hess et al., 2017) and the skills required for future workers who will form the digital workforce are also becoming more and more important in the literature (Kuhlmann and Heuberger, 2023) as digital technologies enable new forms of automation (Sembekov et al., 2021) and decision-making processes.

The public sector is an interesting case of research because public organisations are usually considered to be highly hierarchical and formalised. Consequently, they are characterised as less resistant to change. Many public sector organisations invest in the learning and training of their executives as a tool to further efficiency, effectiveness and

responsiveness to change. Of particular importance in research is education and continuous training which, according to them, affects organisational change. It is generally accepted that people are more likely to accept change when they see that there is something to gain. Considering the literature findings it is confirmed that training is a critical tool by which organisational performance can be undermined and positively improved in both private and public organisations. Employees' skills and knowledge can be kept up-to-date using training to stay competitive but also embrace change. The importance of education and the acquisition of digital skills is confirmed by a large number of studies (Xanthopoulou, 2022; Alomar, 2023, Al-Alawi et al., 2023; Sembekov et al., 2021; Schmitt, 2023) which share the common conclusion that employees with higher levels of education and higher professional skills are more likely to participate in training in the digital sector. Finally, regarding the personal characteristics it has been observed that the resistance to changes and innovation from civil servants due to their fear of job loss can also negatively affect the adoption of new technologies and digital governance in the public sector (Basyal and Wan, 2020; Lorentz et al., 2021).

After the literature was reviewed, it was discovered that there was a cooccurrence of a term, which is shown as a network using VOS Viewer software in Figure 12. Academics frequently examine digital governance under the prism of certain digital technologies, including their benefits, drawbacks, and associated moral dilemmas connected to their application. The issues of accessibility, the integration of digital services into public sector, the calibre of these services, and customer trust occupy a sizeable share of publications. Transparency, accountability, government transparency, and the use of digital technology in combating corruption and advancing democracy are the subjects of more research. Research on digital governance is increasingly linked to the reasons that have fuelled the swift adoption of digital technologies in recent years, including big data, blockchain, the Internet of Things, artificial intelligence, and others.

Figure 12 Keyword cooccurrences network map (see online version for colours)

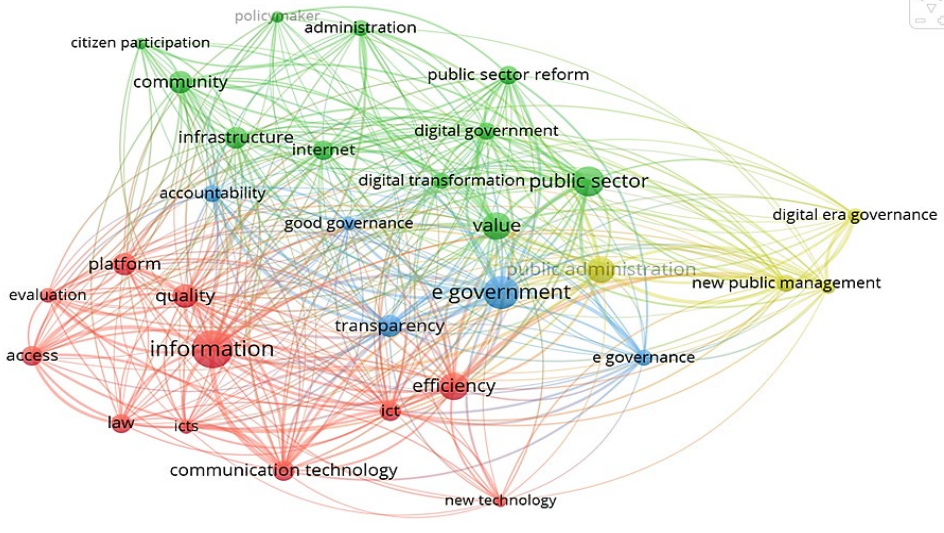
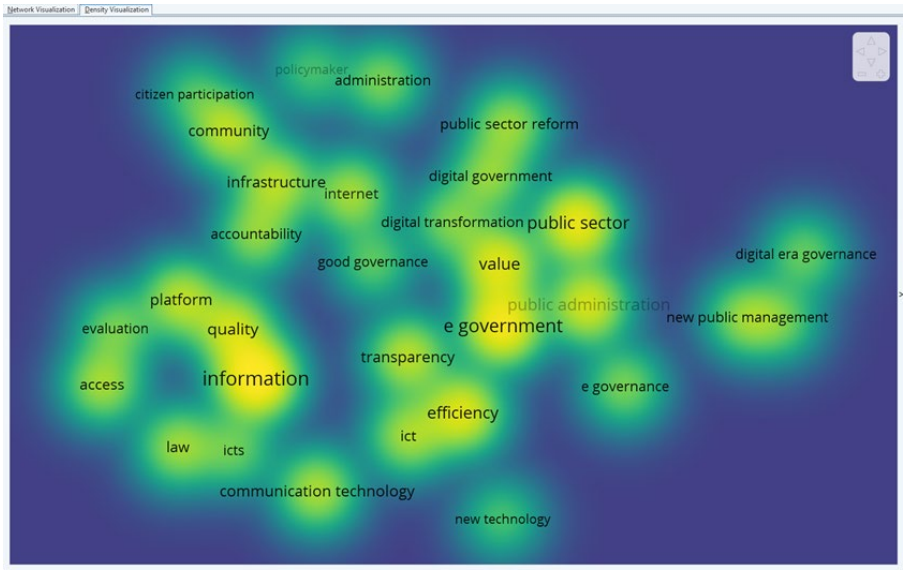


Figure 13 provides an illustrative depiction of the expansive scholarly inquiry into the subject matter. The colour concentrations within the figure correspond to the increasing

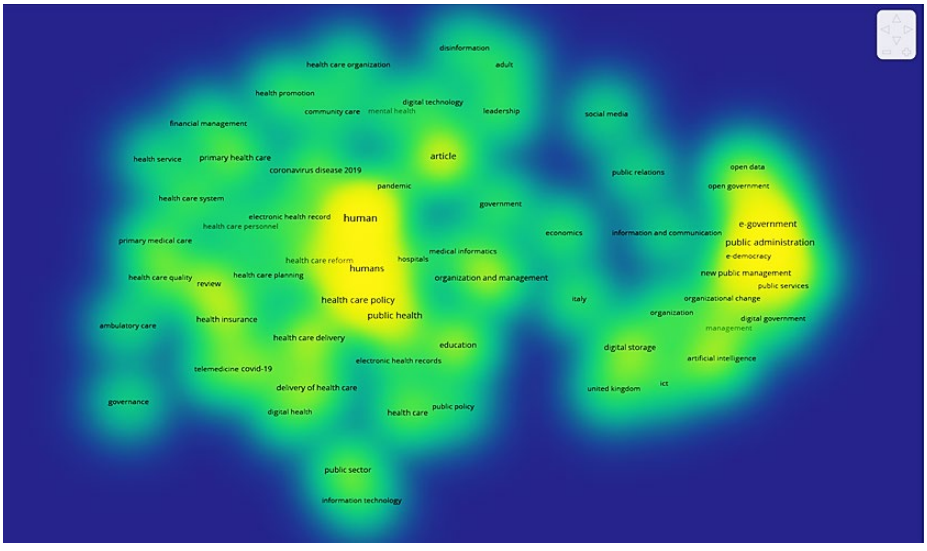
depth of academic investigation, reflecting heightened levels of research activity and scholarly engagement with the topic.

Figure 13 Density visualisation of issues/terms related to digital governance (see online version for colours)



Source: VOS viewer

Figure 14 Density visualisation of most studied sectors of public sector (see online version for colours)



Source: VOS viewer

Regarding the most discussed cases of public administration, Figure 14 illustrates terms such as ‘public health’, ‘e-government’, ‘digital government’, ‘healthcare policy’,

'artificial intelligence', 'telemedicine COVID-19', and 'electronic health records'. This suggests that the body of work being analysed may pertain to the intersection of technology, healthcare, and public administration.

4 Discussion

The broad use of terms like 'digitalisation', 'digital governance', and 'digital transformation' in relation to public sector and reforms is one of the first conclusions to be taken from the literature study. Moreover, the majority of them focus on the external and technological factors that affect digitalisation; organisational factors are also covered, but the public sector is not the subject of many studies particularly. Regarding technology, an empirical research conducted in the Greek public sector in 2023 by Xanthopoulou et al. revealed a good correlation between digital governance, service quality, safety, trust, and transparency in public services. The same study discovered that internal elements including company culture, leadership, and skill sets do not significantly affect outcomes, in contrast to earlier findings. Further study on the influence of other cultures on the changes may take this conclusion into account (Kuhlmann and Heuberger, 2023). Kuhlmann and Heuberger (2023) opine that residents and public employees alike recognise the benefits of digital communication, particularly the speed and user-friendliness of digital technologies. First, it is clear that conditions and barriers to a successful digital government transformation extend beyond technological ones. In fact, suggestions for further research have acknowledged the need to look into internal factors as well (Şandor, 2012).

Numerous studies indicate that institutional, legal, and organisational problems frequently impede governments' introduction and adoption of new technology. According to the results of numerous studies (Kuhlmann and Heuberger, 2023; Effah and Nuhu, 2017; Vasyltsiv et al., 2022; Chang et al., 2020), resource- and legal-related limitations have been cited as reasons for the slow progress of digital transformation and the usability issues that have arisen in German government-citizen interactions. This is frequently explained by the expectation that nearly every system, process, and governance structure will be challenged by new technology. But because of their complexity, these adjustments call for significant adjustments as well as backing from the political establishment (Margetts and Dunleavy, 2013). It follows that research indicates that effective leadership is essential to the integration of digital transformation in public companies (Hoai et al., 2022). It calls for leadership that can motivate and propel change, is flexible and welcoming of emerging technology. Enhancing decision-making procedures and the venture's performance depend on having strong central leadership.

The adoption of the digital transformation in the public sector and its effective implementation are also influenced by individual traits. According to Duygan et al.'s study from 2023, attitude development is significantly influenced by how innovation is viewed, including its compatibility and relative benefit. Xanthopoulou et al. (2023) have provided evidence to support this viewpoint based on their study of public servants who experienced elevated levels of stress and anxiety following the integration of digital technology into their everyday job routines.

Therefore, employees may resist change if their workplace has a culture that discourages innovation and adheres to rigid policies and procedures. Many academics, including Xanthopoulou et al. (2022), Alomar (2023), and Schmitt (2023), have found

that staff education and training is also essential for the successful implementation of digital transformation. They have discovered that one of the most important factors raising public employees' stress levels in relation to digital technologies is a lack of training, which in turn increases their resistance to this reform.

The research also highlights the significance of cooperation and communication inside the company (Kuhlmann and Heuberger, 2023; Duygan et al., 2023; Roth et al., 2023 and Al-Mansour, 2021 among others). Establishing a trusting environment and addressing employees' reluctance to embrace digital change are key responsibilities of leadership. Overall, study revealed that organisational culture, leadership, and the internal environment are the most crucial components for the effective integration of digital transformation in public companies.

One of the factors driving the public sector's digitisation (Al-Mansour, 2021; Şandor, 2012; Mahmood et al., 2019) is the need for a more strategic approach. The public sector's longstanding physical presence and the absence of support for the implementation of electronic procedures are further factors influencing the digital progress. Attempts to digitise public services are confused and inconsistent when there is no comprehensive and unified digital strategy.

5 Conclusion

This study aimed to determine and analyse the most discussed factors that impact on the success of digital governance projects in the public sector through a systematic review of the literature and the use of bibliometrics. Digitalisation, especially under the conditions of the current COVID19 pandemic crisis, became one of the most important and continuous reforms of modern society in most areas of daily and working life. Overall, the research revealed that the most studied determinants of digitalisation in the public sector are contextual and technological, while there is a need for further research focusing on internal organisational and personal factors related to users. The findings demonstrate that most research focuses on political and external factors in general, including socio-political conditions and political leadership, and their impact on shaping the successful implementation of digital governance initiatives. The internal factors that have been most studied include organisational culture and leadership, while a significant part of the research refers to the importance of the existence of skills in public employees as well as their continuous training.

This study has a number of limitations that suggest other research directions. Scopus was selected despite the availability of numerous other databases, such as Web of Science, Emerald, and Wiley Online Library, because of its extensive coverage and efficient search feature, which enabled the discovery of relevant research in which other databases were missing (Dolhey, 2019; Maheshwari et al., 2023). It would also be helpful to examine papers published in other languages as only English-language papers were included. With these restrictions in mind, it is reasonable to say that this study is not exhaustive; that is, the authors feel that a comprehensive, methodical analysis is provided, and a substantial number of noteworthy papers have been incorporated. As a conclusion, it is said that this study sheds light on current trends in the literature on public sector reform and emphasises the significance of taking into account a variety of factors. Overall, the current study gives practitioners, educators, and policymakers insightful information about the variables influencing the digital transformation of the public sector.

Numerous shortcomings of this study might be interpreted as suggestions for further research. First off, this analysis only includes studies that were published between 2003 and 2024. A follow-up investigation might include other document kinds and a wider reach. Second, because the Scopus database was ultimately employed in this study, papers whose journals were not indexed in other databases were excluded. In the future, comparable analyses can potentially be carried out using another database, such Web of Science. Third, it would be helpful to analyse papers published in other languages because only those written in English were included. Additionally, as previously mentioned, the current study solely examined papers – no conference proceedings or other materials were included. As a result, the data from various sources and the findings of this study may be compared in further research. It is reasonable to say that this study is not entirely finished in light of these constraints. But a lot of important papers have been incorporated, and it is thought that a comprehensive, methodical examination has been provided. Finally, the study's findings are said to shed light on the most recent developments in the field of entrepreneurial intention literature.

Overall, the combination of all factors, technological, external, internal and personal, plays an important role in the orientation of organisations towards innovation, in the development of digital skills in collaboration and open communication, but also in the development of flexible and innovative structures and processes within public administration, elements that will encourage the adoption of digital governance. In summary, public administrators should prioritise investing in user-centric digital services that prioritise accessibility and ease of use, build a supportive organisational culture, and strengthen leadership to successfully implement digital governance. They should also strengthen their security measures to increase trust and transparency. Encouraging cross-sector collaboration and public-private partnerships, implementing a staged approach to digital transformation, and developing internal capacity through extensive training programs are essential. Furthermore, guaranteeing inclusiveness and accessibility in digital services will contribute to closing the digital divide and guaranteeing that all people will gain from new developments in technology. Public sector organisations may successfully negotiate the challenges of digital governance by adhering to these policy guidelines, which will increase citizen happiness, efficiency, and transparency.

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