The Determinants of Digital Transformation in Public Institutions; A Systematic review

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Abstract – This study seeks to systematically review the key determinants of digital transformation in public institutions, addressing the growing need for a comprehensive understanding of this complex and multidimensional phenomenon. Digital transformation has emerged as a strategic priority for governments worldwide, driven by increasing demands for efficiency, transparency, and citizen-centric service delivery. A systematic literature review (SLR) was conducted using the PRISMA framework to ensure methodological rigor and transparency. A total of 20 peer-reviewed articles published between 2019 and 2024 were selected from major academic databases, including Scopus, Web of Science, and ScienceDirect. The selected studies were examined through thematic analysis to identify and classify the principal determinants influencing digital transformation. The findings indicate that digital transformation in public institutions is shaped by four primary dimensions: technological, organizational, environmental, and individual factors. Among these, technological, organizational, and environmental determinants are the most influential, whereas individual-level factors remain relatively underexplored. The analysis also underscores the growing importance of advanced technologies, particularly artificial intelligence, in accelerating transformation initiatives. Furthermore, the study highlights that successful digital transformation requires a holistic and integrated approach that aligns technological infrastructure with organizational readiness, supportive policy frameworks, and human capabilities. This research contributes to the existing literature by offering a comprehensive framework that synthesizes fragmented insights from prior studies. It also provides practical implications for policymakers and public sector leaders, emphasizing the need for balanced and coordinated strategies. Future research should focus on individual-level determinants and empirically validate the proposed framework across diverse institutional contexts.

Keywords: *Digital Transformation; Public Sector; E-Government; Artificial Intelligence; Systematic Review*

1. Introduction

Digital transformation has emerged as a fundamental driver of organizational change in the contemporary era, reshaping how institutions operate, deliver services, and create value. It is broadly defined as the integration of digital technologies into all aspects of an organization, resulting in profound transformations in processes, structures, and

value creation mechanisms (Vial, 2021; Gong & Ribiere, 2021). In the public sector, digital transformation extends beyond technological adoption, encompassing organizational restructuring, cultural shifts, and the redesign of public service delivery systems (Mergel et al., 2019).

The growing importance of digital transformation in public institutions is closely linked to increasing demands for efficiency, transparency, and citizen-centric services. Governments worldwide are leveraging advanced technologies such as artificial intelligence (AI), big data analytics, and smart systems to enhance public value and improve decision-making processes (Criado & Gil-Garcia, 2019; Dwivedi et al., 2021). The United Nations E-Government Survey (2024) highlights digital transformation as a critical enabler of sustainable development, emphasizing its role in improving governance, accessibility, and inclusiveness in public service delivery (United Nations, 2024).

Recent global events, particularly the COVID-19 pandemic, have significantly accelerated digital transformation initiatives in the public sector. Governments were compelled to rapidly adopt digital tools and platforms to ensure the continuity of essential services, leading to an unprecedented shift toward e-government and digital communication channels (Agostino et al., 2021). For instance, public institutions increasingly relied on digital platforms, including social media and online service portals, to interact with citizens and disseminate information effectively during the crisis (Padeiro et al., 2021). This acceleration has further underscored the strategic importance of digital transformation as a resilience mechanism in times of disruption.

Despite these advancements, digital transformation in public institutions remains a complex and challenging process. The literature identifies numerous barriers that hinder innovation and transformation efforts, including organizational rigidity, resistance to change, limited digital skills, and regulatory constraints (Cinar et al., 2019). Additionally, technological challenges such as inadequate infrastructure and cybersecurity concerns continue to pose significant obstacles. The complexity of these challenges is amplified by the unique characteristics of the public sector, including bureaucratic structures, political influences, and accountability requirements.

Moreover, digital transformation is inherently a multidimensional phenomenon influenced by a wide range of determinants. Prior studies suggest that these determinants can be categorized into technological, organizational, environmental, and individual factors (Verhoef et al., 2021; Mustapa et al., 2022). However, existing research often focuses on specific aspects of digital transformation, such as e-government services (Panayiotou & Stavrou, 2021) or AI adoption (Wirtz et al., 2019), without providing a comprehensive and integrated understanding of the key determinants across different contexts.

This fragmentation in the literature highlights a critical research gap. There is a lack of systematic and comprehensive reviews that synthesize existing knowledge on the determinants of digital transformation in public institutions. Addressing this gap is essential for developing a holistic understanding of the factors that influence successful digital transformation and for guiding policymakers and practitioners in designing effective strategies. This study aims to conduct a systematic review of the determinants of digital transformation in public institutions. Specifically, it seeks to identify, categorize, and analyze the key factors influencing digital transformation processes, and to develop an integrated framework that enhances both theoretical understanding and practical implementation. By doing so, this study contributes to the growing body

of literature on digital transformation and provides valuable insights for advancing digital governance in the public sector.

2. Methodology

This study adopts a systematic literature review (SLR) approach to identify and analyze the key determinants of digital transformation in public institutions. The systematic review method is particularly suitable for synthesizing fragmented and multidisciplinary knowledge, enabling a comprehensive understanding of complex phenomena such as digital transformation (Vial, 2021). By following a structured and transparent process, this approach enhances the reliability, replicability, and rigor of the findings.

To ensure methodological robustness, the review process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, which provides standardized procedures for identifying, screening, and selecting relevant studies. The literature search was conducted across major academic databases, including Scopus, Web of Science, and ScienceDirect, due to their extensive coverage of high-quality peer-reviewed research in information systems and public administration.

A structured search strategy was employed using carefully selected keywords combined with Boolean operators. The primary search terms included “Digital Transformation,” “Public Sector,” “E-Government,” and “Digital Innovation,” combined using “AND” and “OR” to maximize coverage. The search was limited to peer-reviewed journal articles published between 2019 and 2024 to ensure the inclusion of recent developments related to emerging technologies such as artificial intelligence and smart governance (Dwivedi et al., 2021; United Nations, 2024).

The selection of studies was guided by predefined inclusion and exclusion criteria to ensure relevance and quality. Only peer-reviewed journal articles written in English and explicitly addressing digital transformation within public sector contexts were included. Both empirical and conceptual studies were considered. Conversely, conference papers, reports, non-English publications, and studies unrelated to public institutions were excluded. Duplicate records were also removed during the screening process.

The study selection process followed a structured filtering procedure, as illustrated in Figure 1. Initially, 156 articles were identified through the first search string, while an additional 90 articles were retrieved using a second search string. After removing 40 duplicate articles, 206 articles remained for further evaluation. These articles were then screened based on titles, abstracts, and full-text analysis using the predefined inclusion and exclusion criteria, resulting in the exclusion of 186 articles. Ultimately, 20 articles were selected and included in the final review.

A systematic data extraction process was conducted to collect relevant information from each selected study. A standardized extraction form was developed to capture key details, including authorship, publication year, research context, methodological approach, and main findings. Particular attention was given to identifying the determinants influencing digital transformation in each study.

The extracted data were analyzed using a thematic analysis approach, which enabled the identification of recurring patterns and key themes across the literature. The analysis combined both deductive and inductive reasoning. The deductive component was informed by established frameworks such as the Technology-Organization-Environment (TOE) framework, while the inductive component allowed new themes

to emerge directly from the data. As a result, the determinants of digital transformation were systematically categorized into four main dimensions: technological, organizational, environmental, and individual factors. This classification is consistent with prior research emphasizing the multidimensional nature of digital transformation (Verhoef et al., 2021; Mustapa et al., 2022).

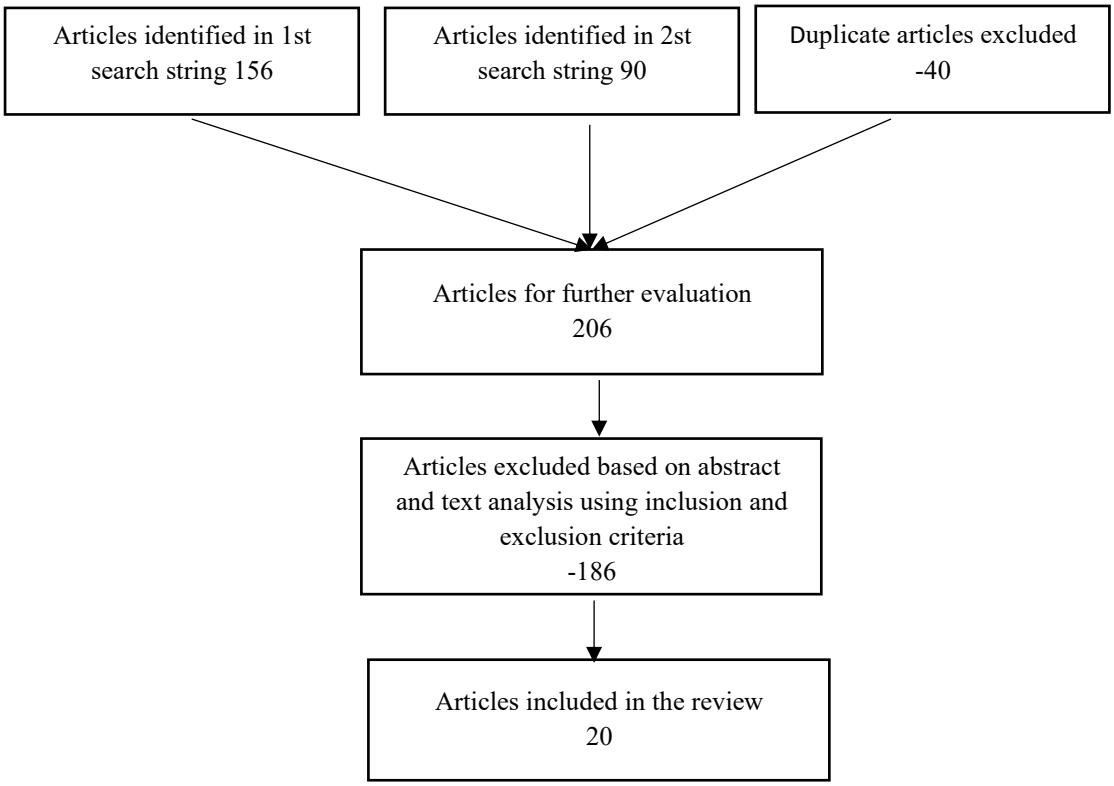

Figure 1: The Systematic Review Process

3.Results

3.1 Descriptive Overview of the Selected Studies

The systematic review resulted in a final sample of 20 peer-reviewed articles that met the predefined inclusion criteria, providing a comprehensive foundation for analyzing the determinants of digital transformation in public institutions. This section presents a descriptive overview of the selected studies in terms of their methodological approaches, research contexts, and thematic orientations. As illustrated in Table 1, the selected studies exhibit a high degree of diversity in both research design and analytical focus. Qualitative methodologies, particularly case studies and interview-based approaches, are prominently employed to explore the organizational and institutional dynamics of digital transformation in depth (Mergel et al., 2019). At the same time, quantitative studies contribute by examining patterns of digital service adoption, user behavior, and performance outcomes within public sector environments (Pieterson &

Ebbers, 2020). Additionally, several conceptual and review-based studies provide theoretical insights and frameworks that guide the understanding of digital transformation processes (Vial, 2021; Verhoef et al., 2021).

From a contextual perspective, the reviewed literature spans a wide range of geographical settings, including both developed and developing countries. A significant proportion of the studies focus on European contexts, particularly in relation to e-government development and digital society indicators (Lnenicka et al., 2024). Other contributions explore diverse national settings, highlighting variations in institutional capacity, technological infrastructure, and governance models. This geographical diversity strengthens the robustness of the analysis while emphasizing the context-dependent nature of digital transformation in public institutions.

The thematic distribution of the studies, as summarized in Table 1, demonstrates that digital transformation is a multidimensional phenomenon encompassing several interconnected domains. The literature addresses key areas such as e-government services, artificial intelligence, open data initiatives, and digital citizen engagement. For instance, some studies emphasize the strategic role of smart technologies and AI in enhancing public value and decision-making processes (Criado & Gil-Garcia, 2019; Dwivedi et al., 2021), while others focus on the evolution of digital service delivery and citizen interaction through online platforms (Padeiro et al., 2021).

The matrix presented in Table 1 reveals that technological, organizational, and environmental dimensions are consistently addressed across the majority of studies, indicating their central role in shaping digital transformation efforts. In contrast, individual-level factors, such as employee competencies and resistance to change, receive comparatively less attention. This observation suggests a potential gap in the literature and highlights the need for a more balanced and human-centered perspective in future research. This descriptive analysis confirms that the existing body of literature on digital transformation in public institutions is both dynamic and multidisciplinary. The structured overview provided in Table 1 not only synthesizes the key characteristics of the selected studies but also serves as a foundation for the subsequent thematic analysis of the determinants influencing digital transformation.

Table 1: Literature Review Matrix

No	Author(s) and Year	Technological	Organizational	Environmental	Individual	AI / Smart Tech	E-Gov Services	Open Data
1.	Agostino et al. (2021)	✓	✓	✓		✓	✓	
2.	Cinar et al. (2019)		✓	✓	✓			
3.	Criado & Gil-Garcia (2019)	✓	✓	✓		✓	✓	
4.	United Nations (2024)	✓	✓	✓		✓	✓	
5.	Dwivedi et al. (2021)	✓		✓		✓		
6.	Ehin et al. (2022)	✓	✓	✓	✓		✓	
7.	Fischer et al. (2019)	✓	✓		✓		✓	✓
8.	Gong & Ribiere (2021)	✓	✓					

No	Author(s) and Year	Technological	Organizational	Environmental	Individual	AI / Smart Tech	E-Gov Services	Open Data
9.	Kabassi (2021)	✓			✓		✓	
10.	Kutela et al. (2022)	✓		✓	✓			
11.	Lnenicka et al. (2024)	✓	✓	✓			✓	
12.	Mergel et al. (2019)		✓		✓		✓	
13.	Mustapa et al. (2022)	✓	✓	✓				✓
14.	Padeiro et al. (2021)	✓	✓		✓		✓	
15.	Panayiotou & Stavrou (2021)	✓	✓	✓			✓	
16.	Pieterson & Ebbers (2020)	✓	✓		✓		✓	
17.	Puron-Cid et al. (2022)	✓	✓	✓			✓	
18.	Verhoef et al. (2021)	✓	✓	✓		✓		
19.	Vial (2021)	✓	✓	✓				
20.	Wirtz & Müller (2019)	✓	✓			✓		

3.2 Thematic Analysis of Digital Transformation Determinants

The thematic analysis of the selected studies reveals that digital transformation in public institutions is shaped by a set of interrelated determinants that can be systematically categorized into four main dimensions: technological, organizational, environmental, and individual factors. This classification is consistent with prior research emphasizing the multidimensional nature of digital transformation (Verhoef et al., 2021; Mustapa et al., 2022). The distribution of these determinants across the reviewed studies is summarized in Table 1, which provides a structured foundation for the following analysis. The technological dimension emerges as a fundamental enabler of digital transformation, as it is consistently highlighted across the majority of the reviewed studies (see Table 1). This dimension includes factors such as IT infrastructure, system integration, data management capabilities, and cybersecurity. The findings indicate that robust technological infrastructure is a prerequisite for successful digital transformation, as it supports the implementation of advanced solutions such as artificial intelligence and smart systems (Dwivedi et al., 2021). The increasing emphasis on AI and smart technologies in the literature reflects a shift toward more sophisticated and data-driven public services (Criado & Gil-Garcia, 2019). However, technological readiness alone is insufficient without alignment with organizational and institutional capabilities.

The organizational dimension is another critical determinant that significantly influences digital transformation outcomes. As illustrated in Table 1, organizational factors are among the most frequently addressed in the literature. These include leadership commitment, organizational culture, governance structures, and resource availability. Strong leadership plays a pivotal role in driving digital transformation initiatives by setting strategic priorities and fostering innovation within public institutions (Mergel et al., 2019). Additionally, organizational culture and readiness for change are essential for overcoming resistance and ensuring the successful adoption of

digital technologies. The findings suggest that institutions with flexible structures and innovation-oriented cultures are more likely to achieve successful transformation.

The environmental dimension reflects the external context in which public institutions operate, including regulatory frameworks, governmental policies, and societal expectations. As shown in Table 1, environmental factors are widely recognized as key drivers of digital transformation. Regulatory support and policy alignment are particularly important in enabling the adoption of digital technologies and ensuring compliance with legal and ethical standards. Moreover, increasing citizen expectations for efficient, transparent, and accessible services create additional pressure on public institutions to accelerate their digital transformation efforts (United Nations, 2024). The role of external shocks, such as the COVID-19 pandemic, further highlights the importance of environmental factors in shaping transformation trajectories (Agostino et al., 2021).

In contrast, individual-level determinants receive comparatively less attention in the literature, as indicated in Table 1, yet they remain crucial for the successful implementation of digital transformation. These factors include employee skills, digital competencies, and resistance to change. The findings suggest that a lack of digital skills and training can significantly hinder transformation efforts, particularly in public sector environments characterized by rigid structures and traditional practices (Cinar et al., 2019). Furthermore, resistance to change among employees can slow down or even obstruct the adoption of new technologies, underscoring the importance of capacity building and change management strategies.

The thematic analysis demonstrates that digital transformation in public institutions is a complex and multifaceted process that requires the alignment of technological capabilities, organizational readiness, supportive environmental conditions, and individual competencies. The integrated perspective provided in Table 1 highlights the interdependencies among these determinants and emphasizes that successful digital transformation cannot be achieved through isolated efforts. Instead, it requires a holistic and coordinated approach that considers all dimensions simultaneously.

4. Discussion

The findings of this study provide a comprehensive understanding of the key determinants influencing digital transformation in public institutions, highlighting the complex and multidimensional nature of this phenomenon. By synthesizing evidence from the selected studies, this research extends prior literature and offers an integrated perspective on how technological, organizational, environmental, and individual factors interact to shape digital transformation outcomes. Consistent with previous research, the results confirm that technological factors serve as the foundational enablers of digital transformation. The widespread emphasis on IT infrastructure, system integration, and data capabilities across the reviewed studies (see Table 1) reinforces the argument that digital transformation is inherently technology-driven (Vial, 2021). However, this study goes beyond a purely technological perspective by demonstrating that technological readiness alone is insufficient. Instead, its effectiveness depends heavily on alignment with organizational structures and capabilities, supporting the view that digital transformation is as much an organizational challenge as it is a technological one (Verhoef et al., 2021).

The analysis further highlights the critical role of organizational factors, particularly leadership, culture, and governance. Strong leadership commitment emerges as a key driver of successful transformation, as it enables strategic vision, resource allocation, and institutional support (Mergel et al., 2019). This finding aligns with the broader literature on public sector innovation, which emphasizes the importance of overcoming bureaucratic inertia and fostering a culture of innovation (Cinar et al., 2019). Moreover, the results suggest that organizational flexibility and readiness for change are essential for adapting to rapidly evolving technological environments.

Environmental factors also play a significant role in shaping digital transformation processes. Regulatory frameworks, government policies, and societal expectations create both opportunities and constraints for public institutions. The findings underscore the importance of supportive policy environments in facilitating digital transformation, particularly in the context of smart governance and sustainable development (United Nations, 2024). Additionally, external pressures, such as increased citizen demand for efficient and transparent services, act as catalysts for transformation. The impact of the COVID-19 pandemic further illustrates how external shocks can accelerate digital adoption and innovation in the public sector (Agostino et al., 2021).

Individual-level factors receive comparatively less attention in the literature, despite their critical importance. This study identifies a notable gap in addressing human-related aspects such as digital skills, competencies, and resistance to change. While technological and organizational dimensions are well explored, the success of digital transformation ultimately depends on the individuals who implement and use these technologies. This finding suggests the need for greater emphasis on capacity building, training, and change management strategies in future research and practice (Cinar et al., 2019). This study contributes to the literature by providing an integrated framework that captures the interdependencies among the four dimensions of digital transformation. Rather than viewing these determinants in isolation, the findings demonstrate that successful transformation requires a holistic approach that aligns technological capabilities with organizational readiness, supportive environmental conditions, and skilled human resources. This integrated perspective addresses the fragmentation identified in previous studies and offers a more comprehensive understanding of digital transformation in public institutions.

From a theoretical perspective, the findings support and extend existing frameworks such as the Technology-Organization-Environment (TOE) model by incorporating individual-level factors as an additional dimension. From a practical perspective, the results provide valuable insights for policymakers and public managers, emphasizing the need to adopt a balanced and coordinated approach to digital transformation. This includes investing in technological infrastructure, fostering organizational change, ensuring supportive regulatory environments, and developing human capital. This discussion highlights that digital transformation in public institutions is not merely a technological upgrade but a systemic transformation process that requires alignment across multiple dimensions. The insights generated from this study contribute to advancing both academic research and practical implementation in the field of digital governance.

5. Conclusion

This study set out to systematically review and synthesize the key determinants of digital transformation in public institutions. By analyzing a carefully selected body of literature, the findings provide a comprehensive and integrated understanding of the factors that influence digital transformation processes within the public sector. The results reveal that digital transformation is a multidimensional phenomenon shaped by the interaction of technological, organizational, environmental, and individual determinants. Among these, technological, organizational, and environmental factors emerge as the most dominant and widely examined dimensions, highlighting their critical role in enabling and sustaining digital transformation initiatives. However, the findings also indicate that individual-level factors, such as digital skills and resistance to change, remain relatively underexplored, despite their significant impact on implementation success. This study demonstrates that successful digital transformation cannot be achieved through isolated efforts or a singular focus on technology. Instead, it requires a holistic and coordinated approach that aligns digital infrastructure with organizational readiness, supportive policy environments, and human capabilities. This integrated perspective advances the current understanding of digital transformation by addressing the fragmentation observed in prior studies and providing a more comprehensive analytical framework.

In addition to its theoretical contributions, this study offers practical implications for policymakers and public sector managers. The findings emphasize the importance of investing not only in technological infrastructure but also in organizational change management, regulatory support, and workforce development. Public institutions seeking to achieve effective digital transformation should adopt a balanced strategy that considers all dimensions simultaneously, rather than prioritizing one at the expense of others. Despite its contributions, this study is not without limitations. The review is limited to peer-reviewed journal articles published within a specific time frame, which may exclude relevant studies from other sources or earlier periods. Moreover, the contextual diversity of the selected studies may limit the generalizability of the findings across different institutional environments.

Future research should address these limitations by exploring underrepresented areas, particularly individual-level determinants and their interaction with organizational and technological factors. Additionally, empirical studies that test the proposed integrated framework across different national and institutional contexts would further strengthen the understanding of digital transformation in the public sector. This study highlights that digital transformation in public institutions is a complex and evolving process that requires a comprehensive and multidisciplinary approach. By identifying and synthesizing its key determinants, this research contributes to both academic knowledge and practical implementation, supporting the advancement of digital governance and public sector innovation.

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