

Bibliometric Analysis of E-government, E-governance, and Digital Transformation: Trends, Challenges, and Prospects

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ABSTRACT

This study provides an in-depth bibliometric analysis of the scientific literature on e-government, e-governance, and digital transformation, covering the period from 2011 to the first quarter of 2025. By leveraging data from the Web of Science database and analyzing it with VOSviewer (Chen, 2006), we examine the temporal evolution of publications, their thematic and geographical distribution, co-authorship networks, and predominant keywords. The results reveal a significant growth in scientific output, particularly since 2016, highlighting the interdisciplinary nature of the field with notable contributions from public administration and computer science (Rodríguez Bolívar et al., 2016). Research is globally distributed, with significant contributions from China and India. However, a fragmentation of collaborations among authors is observed, suggesting a need for increased integration. The keyword analysis confirms the centrality of e-government and the growing importance of digital transformation (Ramzy & Ibrahim, 2022). This study offers a structured mapping of the field, identifies emerging trends, and proposes avenues for future research and collaborations, thereby contributing to a better understanding of the dynamics of digital governance. It emphasizes the increased need for multidisciplinary collaboration for the design, development, and management of complex and multidimensional projects in the public sector.

Keywords: Digital Transformation, E-governance, E-government, Project Management, Public Administration, Research Trends,

INTRODUCTION

The concept of e-government, or electronic government, has become an essential component of public administration modernization worldwide (Heeks & Bailur, 2007). It encompasses the use of information and communication technologies (ICT) to enhance efficiency, transparency, and citizen participation in governmental processes (Hung et al., 2006). Its application is characterized by a diversity of approaches, varying according to national and organizational contexts (Nam, 2014). Its implementation has progressed differently across countries, particularly at the local level, to ensure the involvement of all stakeholders (Norris & Moon, 2005). This has led to the establishment of tailored initiatives in certain countries, such as e-inclusion strategies or the use of open data strategies. For example, regional governments in Spain have developed innovative approaches to ensure equitable access to digital services (Muñoz et al., 2018), while South Korea has demonstrated the effectiveness of open data in addressing urgent social problems, such as the mask shortage during the pandemic (Kim, 2020).

These examples illustrate that digital transformation is now a strategic imperative for organizations across all sectors to improve services and strengthen resilience, thereby redefining the design, delivery, and consumption of services, including in the public sector (Mergel, 2019). This implies adapting the concept to specific contexts and adopting a holistic approach to achieve desired outcomes, with the primary objective of generating a significant impact on the quality of public services. Ghana's experience, for instance, demonstrates the importance of a well-structured approach to improving service quality (Osei-Kojo, 2017).

These large-scale initiatives are inherently complex projects that require rigorous management tailored to the specificities of the public sector. The evolution of e-government generally follows a four-stage model, ranging from simple online presence to the complete transformation of public services (Yildiz, 2007). This progression demands a

multidimensional strategic approach to project management, integrating technological, organizational, and social challenges.

The synergy between e-government, e-governance (which emphasizes participation and democratic governance via ICT), and digital transformation constitutes a dynamic and constantly evolving research area (Linders, 2012). Recent studies show that the adoption of e-government depends on multiple factors, including citizen trust, innovation, and acceptance factors (Jameel et al., 2019). The COVID-19 pandemic also acted as a catalyst for the adoption of digital technologies in governance, accelerating digitalization processes (Agostino et al., 2021). This transformation proved particularly critical, with specific constraints and opportunities that redefined the approach to governmental digitalization (Fletcher & Griffiths, 2020).

Given the complexity and fragmentation of this field of study, a systematic and quantitative analysis of the scientific literature is crucial to understanding its dynamics, identifying emerging trends, and delineating future research directions. This study aims to fill this gap by presenting an in-depth bibliometric analysis of the scientific literature on e-government and digital transformation, based on a corpus of publications indexed in leading databases.

The objective of this article is to provide a detailed mapping of the research landscape in this domain, highlight challenges and prospects, and formulate relevant recommendations for future research. We will examine the temporal evolution of publications, the thematic and geographical distribution of contributions, co-authorship networks, and predominant keywords. The results of this analysis will offer valuable insights for researchers, policymakers, and practitioners, by identifying promising research areas, key players, and implications for the design and implementation of e-government and digital transformation initiatives, particularly from a project management perspective.

METHODOLOGY

This study was conducted using a rigorous bibliometric approach to analyze the research landscape of e-government, e-governance, and digital transformation. Bibliometric analysis is a quantitative method for evaluating the productivity and impact of scientific research (Wirtz & Daiser, 2018). This methodological approach is widely recognized in various research fields, as demonstrated by recent studies on artificial intelligence in cybersecurity (Abbas et al., 2019). The adopted methodology includes the following steps:

Data Collection Strategy

Bibliographic data were extracted from the Web of Science database, renowned for its extensive coverage and quality in scientific publications. This database is widely used for bibliometric analyses due to its reliability and international coverage (Dias, 2019). The search was performed using a combination of relevant keywords to capture the entire research corpus related to our topic.

The keywords used included: “e-governance,” “e-government,” “digital transformation,” as well as other related terms to ensure maximum comprehensiveness. This multi-keyword approach provides a comprehensive view of the research domain (Almeida, 2014). The research period was defined from 2011 to the first half of 2025, covering a decade and a half of research evolution in this field.

Analysis Tools

The collected data corpus was analyzed using specialized bibliometric software. VOSviewer was used to create network maps and density visualizations, allowing for the exploration of co-authorship collaborations, keyword co-occurrences, and the geographical distribution of publications (Chen, 2006). This software is widely recognized in the scientific community for bibliometric analysis and research network visualization.

These tools facilitated the identification of trends, thematic clusters, and key players within the literature. The use of visualizations allows for a better understanding of the complex relationships between different elements of the research corpus.

Bibliometric Indicators

Several bibliometric indicators were calculated and analyzed, including:

- Temporal evolution of publications: To observe the growth dynamics of research over the years.
- Thematic distribution: To identify the most active disciplinary areas and the interdisciplinary nature of the subject.
- Geographical distribution: To understand the contribution of different countries and regions to the literature.
- Co-authorship networks: To visualize collaborations and identify research structures.
- Keyword analysis: To determine central concepts and emerging themes.

This methodological approach ensures the robustness and reproducibility of our analysis, providing a solid basis for interpreting the results and formulating relevant conclusions for managing digital transformation projects in the public sector.

RESULTS

Temporal Evolution of Publications

The analysis of the temporal evolution of publications reveals a significant growth dynamic in research on e-government and digital transformation (Figure 1). Between 2011 and 2015, a moderate increase in the number of publications was observed, followed by a notable acceleration from 2016 onwards (Song et al., 2024). Scientific production experienced continuous growth between 2016 and 2024, reaching a peak in 2024.

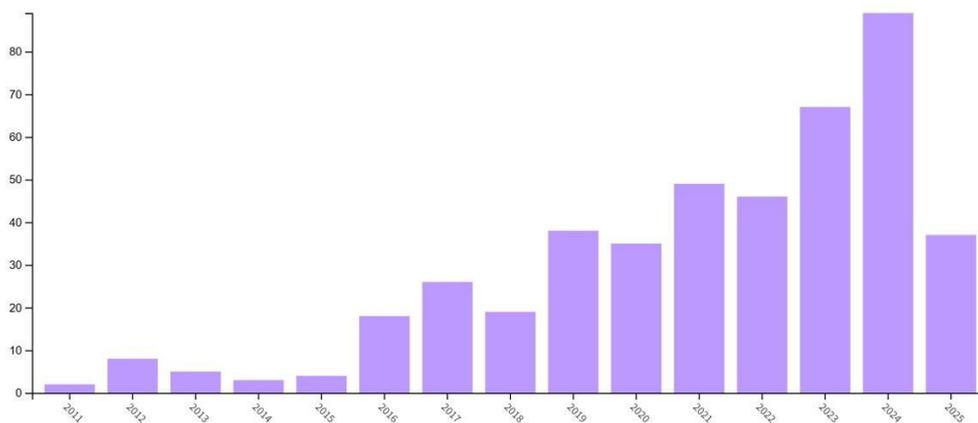


Figure 1: Temporal evolution of publications

This growth reflects a growing interest from the scientific community in the digitalization of the public sector and aligns with global trends observed in other bibliometric studies in the field (Ramzy & Ibrahim, 2022). This dynamic is strongly correlated with the acceleration of public service digitalization and major events such as the COVID-19 pandemic, which acted as a catalyst for the adoption of digital technologies in governance (Agostino et al., 2021). Recent studies confirm that the pandemic accelerated digital transformation in the public sector, creating new opportunities and challenges for project management. This transformation was accompanied by a specific organizational response from governments that had to rapidly adapt their digital structures (Moser-Plautz & Schmidhuber, 2023).

Thematic Distribution of Publications

The thematic distribution of publications highlights the interdisciplinary nature of the field (Figure 2). The most represented disciplines are Public Administration and Interdisciplinary Applications of Computer Science, emphasizing the convergence between public management and digital technologies (Rodríguez Bolívar et al., 2016).



Figure 2: Thematic distribution of publications

Information sciences, political science, and interdisciplinary social sciences also hold important positions, reflecting the diversity of methodological approaches used in this field (Heeks & Bailur, 2007). This interdisciplinarity is characteristic of e-government research, which requires an understanding of both technological aspects and organizational dynamics.

The disciplinary diversity is remarkable, with contributions from related fields such as management, economics, communication, and environment. The presence of fields like sustainable green sciences and technologies or environmental studies indicates a growing consideration of sustainability issues in the digital transformation of the public sector and the impact of digitalization, particularly in the post-pandemic context (Kuzior et al., 2022, Estevez & Janowski, 2013). However, several literature reviews have explicitly identified the fragmentation of e-government research as a systemic problem (Benlahcene et al., 2024; Hwang & Murphy, 2017). A major empirical study concludes that “digital government studies are conducted across multiple disciplines but lack true interdisciplinary work” (Hwang & Murphy, 2017). This fragmentation is characterized by undertheorized and scattered research (Benlahcene et al., 2024). The literature documents “research silos” where computer scientists focus on technical optimization without understanding the public administration context. Conversely, political scientists analyze impacts on democracy without mastering technical constraints.

Geographical Distribution of Publications

The analysis of the geographical distribution of publications reveals a global dynamic in research (Song et al., 2024). China (59 publications), India (44), England (37), and Brazil (30) are among the main contributors, highlighting the importance of digital transformation in emerging and developed economies. This geographical distribution reflects differences in political priorities and research investment among countries. Emerging economies like China and India show strong commitment to e-government research, likely due to their large-scale national digitalization initiatives and significant demographic factors (Figure 3).

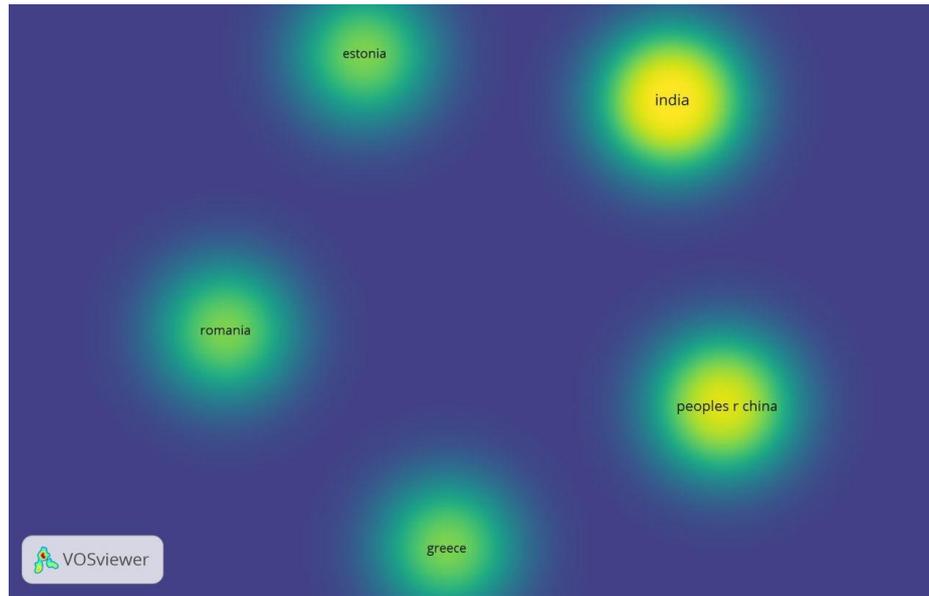


Figure 3: Geographical density of publications

Europe is also well represented with countries such as England, Germany, Greece, Italy, Austria, Belgium, the Netherlands, Denmark, Norway, and Estonia (Figure 4). This strong European representation is explained by the European Union’s digital integration policies and innovative e-government initiatives developed in this region (Ebbers et al., 2016), notably e-inclusion strategies implemented in countries like Spain (Muñoz et al., 2018).



Figure 4: Geographical distribution of publications

Co-authorship Network

The analysis of the co-authorship network reveals a relatively fragmented collaboration structure in the field of synergy between e-government, e-governance, and digital transformation. This fragmentation is consistent with observations from other bibliometric studies that highlight the challenges of international and interdisciplinary collaboration in this domain (Ramzy & Ibrahim, 2022).



Figure 5: Co-authorship network

Three distinct groups of authors have been identified, each represented by a different color (red, blue, green). The red cluster shows close collaboration among certain authors. However, other authors appear isolated, with no significant co-publication links with other authors in the network.

The low density of observed collaboration, where the majority of authors have no direct links with each other, suggests the existence of relatively independent research teams or those working on very specific themes within each group. This fragmentation can be attributed to cultural, linguistic, and institutional differences that characterize international research.

E- Keyword Analysis

Keyword analysis (Table1) reveals the central concepts and predominant themes in the literature. The term “e-government” is the most frequent and most strongly connected, confirming its central role in the field (Yildiz, 2007).

Table 1: Most frequent keywords

Keyword	Occurrences	Total link strength
e-government	27	40
digital transformation	17	25
e-governance	15	24
transformation	8	21
framework	6	18
digital government	6	14
ict	5	14
information	5	14
digital governance	6	13
governance	6	13

The keywords “digital transformation” (17 occurrences, link strength of 25) and “e-governance” (15 occurrences, link strength of 24) are also very present, highlighting the importance of digital transformation and governance aspects in contemporary research (Linders, 2012). This predominance reflects the evolution of the field towards a more integrated approach to governmental modernization.

Other terms such as “framework,” “ICT” (information and communication technologies), “information,” “digital government,” and “governance” reveal the diversity of research areas, ranging from technological aspects to conceptual frameworks and societal implications.

The co-occurrence map (Figure 6) of keywords visually illustrates the relationships between these terms. Two major thematic clusters stand out:

- Red Cluster: Centered on “e-government,” “digital transformation,” “digital government,” “ICT,” “digital governance,” “governance.” These terms are highly interconnected, reflecting a strong conceptual synergy around the digital transformation of public administration.
- Green Cluster: Groups “e-governance,” “framework,” “information,” “transformation.” This group emphasizes the methodological, structural, and informational aspects of digital governance.

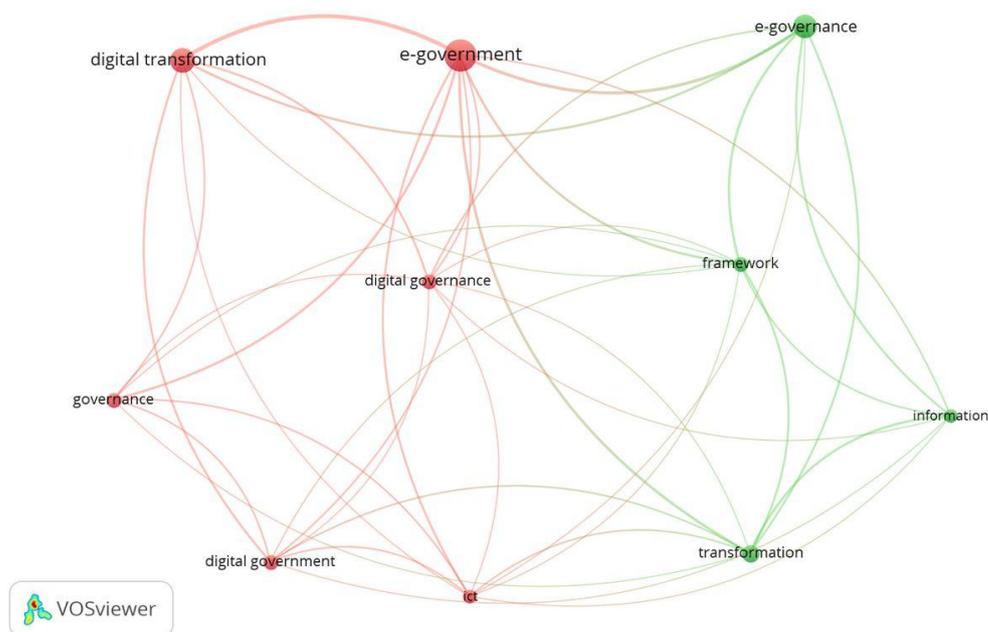


Figure 6: Co-occurrence map of keywords

This thematic segmentation reveals the different approaches adopted by researchers to study governmental digital transformation, ranging from purely technological aspects to social and participatory dimensions. The emergence of concepts related to smart cities and technological resilience, particularly in the post-COVID context, illustrates the evolution of the field towards broader concerns of sustainability and adaptation to crises (Sharifi et al., 2021)

DISCUSSION

The results of this bibliometric analysis offer a detailed mapping and valuable insights into the field of e-government and digital transformation. The exponential growth in publications, particularly between 2016 and 2024, attests to the increasing interest and academic relevance of this research area (Song et al., 2024).

This dynamic is undeniably linked to the global acceleration of public service digitalization and major events such as the COVID-19 pandemic, which forced governments to massively adopt digital technologies to ensure service continuity and communication with citizens (Agostino et al., 2021). For project management professionals, this

growth signifies an expanding field of opportunities and challenges, requiring constant adaptation of skills and methodologies. Hence the need to re-adapt traditional project management frameworks to the specificities of the public sector and the particularities of digital transformation.

The interdisciplinary nature of the field is clearly highlighted by the predominance of Public Administration and Interdisciplinary Applications of Computer Science (Rodríguez Bolívar et al., 2016). This underscores that e-government research cannot be approached from a single angle; it requires a holistic understanding that integrates public management challenges, technological advancements, and societal implications.

For project managers, this implies the need to master not only the technical aspects of digital transformation projects but also to understand organizational, political, and social dynamics (Mergel, 2019). This integrated approach is essential for the success of governmental digital transformation initiatives, as illustrated by the organizational transformation experiences observed during the pandemic (Moser-Plautz & Schmidhuber, 2023).

The geographical distribution of publications reveals global research activity, with significant contributions from emerging countries like China and India, alongside developed nations (Song et al., 2024). This geographical diversity suggests that e-government and digital transformation initiatives are universal priorities, although approaches and challenges may vary depending on national contexts and levels of digital maturity.

Project managers can leverage this diversity by studying best practices and lessons learned in different geographical contexts. Cultural and institutional differences can offer valuable insights for adapting project management approaches.

The analysis of the co-authorship network highlights a fragmentation of collaborations, a phenomenon observed in other emerging research fields (Ramzy & Ibrahim, 2022). The presence of distinct clusters and isolated authors suggests that, despite the growth of the field, international and interdisciplinary collaborations remain limited. This fragmentation could hinder knowledge sharing and the emergence of unified theories or global conceptual frameworks. For project management researchers and practitioners, this represents both a challenge and an opportunity: to build bridges between teams and approaches, thereby fostering more integrated and impactful research.

Keyword analysis confirms the centrality of e-government, while emphasizing the growing importance of digital transformation and e-governance (Yildiz, 2007). The diversity of associated terms indicates that the field is rich and covers a wide range of topics, from technical aspects to more conceptual and strategic dimensions.

This thematic richness reflects the growing maturity of the field and the evolution of research concerns, moving from a primarily technological approach to a more integrated vision including the social, organizational, and political aspects of governmental digital transformation.

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