Journal of Economics, Finance and Management (JEFM)
ISSN: 2958-7360
Vol. 4, No. 6, December 2025

E-Government and Service Quality Research: A Science Mapping-Based Bibliometric Analysis

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Abstract : This study systematically examines the scientific literature on e-government and service quality using a bibliometric approach, aiming to identify major research themes, influential authors, leading journals, most-cited articles, and country-level contributions. Additionally, it seeks to uncover the conceptual, intellectual, and social structures of the field, as well as to map the knowledge base concerning the development, implementation, and evaluation of e-government initiatives designed to enhance public service quality. Articles indexed in the Scopus database between 2001 and 2025 were analyzed. The findings are presented in two main stages. The first stage provides a quantitative overview of the field, including tables, charts, and maps, highlighting key performance indicators such as publication output, citation metrics, and international collaboration networks. The second stage employed an inductive analysis to identify three principal clusters in the cited literature and to determine research gaps based on the bibliometric findings. The results indicate that while research on e-government has expanded considerably over the past decade, the quality of public services delivered through digital platforms remains uneven across countries. Developing economies face greater challenges in both adoption and implementation compared to developed nations. Overall, these findings provide a comprehensive overview of the field, offering valuable insights for scholars regarding future research directions related to e-government service quality, thereby guiding further studies to address existing gaps and improve digital public service delivery.

Keywords: Bibliometric analysis; digital government; e-government; e-service quality; service quality; science mapping

Digital Object Identifier (DOI): https://doi.org/10.5281/zenodo.**18049002**

1. Introduction

The digital transformation of public administration has elevated e-government into a key driver of enhanced service delivery, enabling governments to provide more efficient, transparent, and citizen-centric services. Scholars define e-government as the use of information and communication technologies (ICTs), particularly the Internet, by governments to achieve better governance (OECD, 2014; Rawat, 2020. This modern approach to governance supports not only enhanced administrative efficiency but also promotes effectiveness, openness, transparency, innovation, participation, and public trust (OECD, 2014, Sangki, 2018). Additionally, the implementation of e-government helps reduce bureaucratic barriers and improves service accessibility (Paselle et al., 2025).

Despite the global benefits of digital governance, disparities persist across countries. Developing nations often encounter challenges such as infrastructure limitations, digital divides, and institutional resistance, which impede the equitable rollout of e-government initiatives (Paselle et al., 2025). Research on service quality within e-government has become central, as it plays a crucial role in shaping citizen trust and satisfaction. Scholars have adapted models like SERVQUAL to the context of e-government, integrating factors such as ease of use, security and privacy, system reliability, and trustworthiness to evaluate service delivery performance in the digital sphere (Paselle et al., 2025).

Although a considerable number of review studies on e-government have been conducted, most remain confined to specific dimensions rather than offering a comprehensive perspective. Tremblay-Cantin et al. (2023) synthesized research on citizens' adoption of e-government services, whereas Sá et al. (2016) and Desmal et al. (2022) examined online service quality models, including those applied to mobile government services. The evolution of e-government has been explored through leadership and bibliometric perspectives by Elmatsani (2024) and Song et al. (2024). In parallel, Arias et al. (2018); Mohamed and Mohammed (2023) reviewed digital government and service quality; however, their works were constrained by the common shortcomings of traditional reviews, such as narrow keyword searches and reliance on limited databases, which excluded specialized e-government journals and may have led to the omission of significant studies. Consequently, despite offering useful insights, prior research has not provided a comprehensive understanding of the relationship between e-government and public service quality on a global scale. This gap highlights the need for a more systematic review using bibliometric analysis and science mapping to capture the intellectual structure of the field, trace its development, and identify research gaps and future opportunities.

Bibliometric analysis has become increasingly popular in business research due to the advancement of accessible software (e.g., CiteSpace, Gephi, Leximancer, VOSviewer) and databases such as Scopus and Web of Science, as well as the cross-disciplinary transfer of methods from information science (Donthu et al., 2021; Khan et al., 2021, Öztürk et al., 2024). Its growing use reflects not a trend but its utility in managing large volumes of data and generating impactful research outcomes. Scholars employ bibliometric analysis to uncover trends in article and journal performance, collaboration patterns, and the intellectual structure of a field (Donthu et al., 2021; Verma & Gustafsson, 2020). By making sense of massive, objective datasets (e.g., citations, publications, keyword occurrences), it enables researchers to map cumulative knowledge, identify gaps, generate novel ideas, and position their contributions within the broader literature. Bibliometric analysis techniques are commonly categorized into two primary approaches: (1) performance analysis and (2) science mapping. Performance analysis focuses on assessing the contributions of various research constituents, whereas science mapping highlights the connections and intellectual interactions among them (Donthu et al., 2021). Science mapping examines the relationships between research constituents, thereby revealing how knowledge evolves and connects within a given domain (Baker et al., 2020; Donthu et al., 2021). By focusing on intellectual interactions and structural connections,

this approach is particularly valuable for understanding the fragmented yet rapidly growing body of work on e-government quality. Using techniques such as citation analysis, co-citation analysis, bibliographic coupling, co-word analysis, and co-authorship analysis, researchers can identify influential studies, core themes, and collaborative networks that shape the field (Donthu et al., 2021). When integrated with network analysis, these techniques provide a comprehensive view of both the bibliometric and intellectual structures of a research domain (Baker et al., 2020; Tunger & Eulerich, 2018). Applied to e-government quality, science mapping enables scholars to trace the evolution of key concepts such as trust, user satisfaction, and service efficiency, while also identifying emerging research streams and gaps that offer valuable directions for future inquiry.

The aim of this study is to conduct a bibliometric analysis to identify and examine the scientific literature on e-government and service quality. Specifically, the study seeks to uncover the main topics, authors, sources, most cited articles, and countries contributing to the field, as well as to map its conceptual, intellectual, and social structure. In doing so, the study will identify the knowledge base underpinning the intersections of e-government, digital governance, and public service quality.

To meet these objectives, articles indexed in the Scopus were retrieved and analyzed, encompassing publications from 2001 to through August, 2025. This timeline allows for a comprehensive understanding of the evolution of academic interest and thematic development in the field over time. Research questions (RQ) guiding this study include:

RQ1: What are the main themes, influential authors, key sources, and contributing countries in e-government and service quality research?

RQ2: Which articles and citation networks are most prominent in the field?

RQ3: What gaps exist in the literature, and what directions for future research can be proposed?

This paper is structured as follows: Section 1 introduces the study, outlining its objectives and research questions. Section 2 reviews bibliometric analysis methods. Section 3 describes the methodology, including the search and selection process. Section 4 presents the results, followed by the discussion in Section 5. Finally, Section 6 concludes the paper by highlighting key insights and suggesting directions for future research.

2. Literature Review

2.1. E-government and service quality

The relationship between e-government and service quality has been a central theme in public administration and information systems research over the past two decades. E-government is broadly defined as the use of information and communication technologies (ICTs) by governments to deliver services, enhance transparency, and improve interactions with citizens, businesses, and other stakeholders (Güler & Büyüközkan, 2023; United Nations, 2024). Service quality, in this context, refers to the effectiveness, efficiency, and user satisfaction with digital public services. Studies have emphasized that the success of e-government initiatives depends not only on technological adoption but also on how well these platforms meet citizens' expectations of accessibility, reliability, and responsiveness (Parasuraman, Zeithaml, & Berry, 1988; Shareef et al., 2014).

Research on e-government service quality is largely descriptive, addressing only certain aspects of service quality, and has included collecting users' opinions on e-government web page factors, benchmarking e-government implementation, and adapting instruments originally developed to assess user perceptions and evaluation criteria of e-commerce website quality (Papadomichelaki & Mentzas, 2012). Scholars have increasingly applied the SERVQUAL model and its derivatives to evaluate the quality of e-government services. Dimensions such as reliability, responsiveness, assurance, empathy, and tangibility remain relevant, but they have been adapted to fit the digital environment, often incorporating additional factors such as system

security, usability, and trust (Alanezi et al., 2010; Akinci et al., 2010). Trust, in particular, has been consistently identified as a critical determinant of user satisfaction and continued use of e-government platforms (Carter & Bélanger, 2005; Rana et al., 2015). Furthermore, service quality in e-government has been linked to broader governance outcomes, including citizen participation, social inclusion, and institutional legitimacy (Dwivedi et al., 2017).

2.2 Bibliometric analysis and science mapping approach

Bibliometric analysis, a method that enables a comprehensive review of all literature relevant to any research field, has been receiving increasing attention (Öztürk et al., 2024). Advanced bibliometric analysis is a reliable tool that objectively evaluates the global impact of scientific work, uncovers research structures and interdisciplinarity, and traces knowledge flows and socio-economic issues (Van Raan, 2014, Donthuet al., 2021). Owing to its methodological advantages and practical convenience, bibliometric analysis has recently been extensively applied in business and management, facilitated by advancements in database processing, software tools, and visualization techniques (Öztürk et al., 2024). The main methods of science mapping include co-citation analysis, bibliographic coupling, co-word analysis, and co-authorship analysis (Donthu et al, 2021; Chen et al., 2023). These techniques provide a systematic way to visualize and understand the intellectual structure of a research field. Co-citation analysis helps identify seminal works and the foundations of knowledge. Bibliographic coupling enables the discovery of emerging topics by linking studies that share common references. Co-word analysis reveals thematic trends and the evolution of concepts in the literature. Finally, co-authorship analysis highlights collaboration patterns among researchers and institutions. Together, these methods allow scholars to uncover both the historical roots and the current dynamics of scientific fields, thereby supporting more informed research directions.

Bibliometric studies have revealed a steady growth in research output addressing e-government and service quality. Early works primarily explored technological adoption and digital divide issues, while more recent studies have examined user experience, mobile government, and smart governance as extensions of the traditional e-government paradigm (Yildiz, 2007). Geographic patterns also show that most research has been concentrated in developed economies, though emerging markets have gained more attention in recent years as governments in Asia, Africa, and Latin America expand their digital service infrastructures (Heeks & Bailur, 2007; Alcaide-Muñoz et al., 2017). Additionally, the integration of artificial intelligence, blockchain, and data analytics in e-government systems raises new challenges and opportunities for service quality evaluation (Wirtz & Müller, 2019). This bibliometric analysis therefore seeks to systematically map the intellectual structure of the field, identify influential works and emerging themes, and provide a knowledge base for future research on e-government and service quality.

3. Research Method

This study adopts a bibliometric analysis approach to systematically examine the body of research on e-government and service quality. Bibliometric analysis has become a widely accepted method for quantitatively assessing scientific outputs, identifying research trends, and visualizing intellectual structures within a given field. The analysis was conducted in several steps, as detailed below. This study follows the bibliometric analysis guidelines proposed by Donthu et al. (2021) and is conducted in four main steps using data retrieved from the Scopus database, which is recognized as one of the most comprehensive sources of peer-reviewed publications. First, the scope and objectives were clearly defined, with the study focusing on the intersection of e-government and service quality to identify intellectual structures, influential studies, emerging themes, and research gaps in this domain. Second, data were systematically collected from Scopus by applying relevant keywords such as “e-government” and “service quality” in the advanced search function, with the search restricted to peer-

reviewed journal articles, conference papers, and review articles to ensure quality and relevance; the final dataset was exported in CSV format for further analysis. Third, the retrieved data were processed and analyzed using CiteSpace software to conduct co-citation analysis, co-authorship analysis, and keyword co-occurrence analysis, thereby mapping the knowledge structure, identifying influential authors and institutions, and detecting thematic clusters and research frontiers. Finally, the results were interpreted and reported by organizing the findings into intellectual, social, and conceptual structures, which highlight the evolution of research on e-government and service quality and are discussed in terms of theoretical contributions, practical implications, and directions for future research.

The research data for this study were extracted from the Scopus database (https://www.scopus.com) on August 2, 2025. The bibliographic records retrieved from this database were primarily analyzed using statistical and bibliometric techniques, which are widely recognized as robust methods for mapping the intellectual structure of a field (Donthu et al., 2021). The data collection and validation process was conducted in several steps. First, the research team defined the query expression. An initial search was performed based on core subject keywords, followed by the identification of related terms to refine the second round of queries.

The main keywords related to electronic governance were “E-government” and “Digital government,” while the keywords associated with service quality were “service quality” and “e-service quality.” Based on these, the final search formula was structured as follows:

(TITLE-ABS-KEY ("E-government" OR "Digital government") AND TITLE-ABS-KEY ("service quality" OR "e-service quality")) AND (LIMIT-TO (LANGUAGE , "English"))

Detailed information on language restrictions, document types, research time span, and the number of retrieved records is presented in Table 1. The retrieval was restricted to English-language publications within the time span of 2001 - 2025, and only articles, conference papers, conference reviews, and review articles were included. Non-article materials such as book chapters (32), books (4), errata (1), and retracted items (4) were excluded, resulting in a final dataset of 505 documents. Specifically, the dataset consists of 263 journal articles, 215 conference papers, 16 conference reviews, and 11 review articles.

The retrieved records were exported into VOSviewer for further processing and bibliometric mapping. The software confirmed that no duplicate records existed, thereby validating the use of the full dataset as the research sample. This comprehensive dataset serves as the basis for analyzing the intellectual, conceptual, and social structures of research on e-government and service quality. Science mapping techniques, including citation analysis, co-citation analysis, bibliographic coupling, and co-word analysis, were mainly employed in this study (Donthu et al., 2021; Chen et al., 2023).

Table 1: Research data retrieval process in Scopus

Retrieval Setting Subjects	Retrieve Settings and Results
Database	Scopus (15/8/2025)
Retrieval mode (546)	TITLE-ABS-KEY ("E-government" OR "Digital government") AND TITLE-ABS-KEY ("service quality" OR "e-service quality"))
Type of literature	Article; Conference Paper; Conference review Review Artical
Excluded	**Non-article and review: 41** - Book chaper: 32 - Book: 4 - Erratum: 1

	- Retracted: 4
Language type	English
Time span	2001 - 2025
Retrieval results	**Total paper: 505** - Article: 263 - Conference Paper: 215 - Conference review: 16 - Review Artical: 11

Source: Analysis results from VOSviewer software

4. Results

4.1. Overviews

4.1.1 Publication Trends

The chart illustrates the development of scientific publications on e-government and service quality from 2001 to 2025. The horizontal axis (X-axis) represents the timeline, while the vertical axis (Y-axis) shows the number of scholarly outputs, including journal articles, conference proceedings, book chapters, and reviews. The blue line indicates the number of publications per year, whereas the orange line reflects the cumulative number of publications over the observed period.

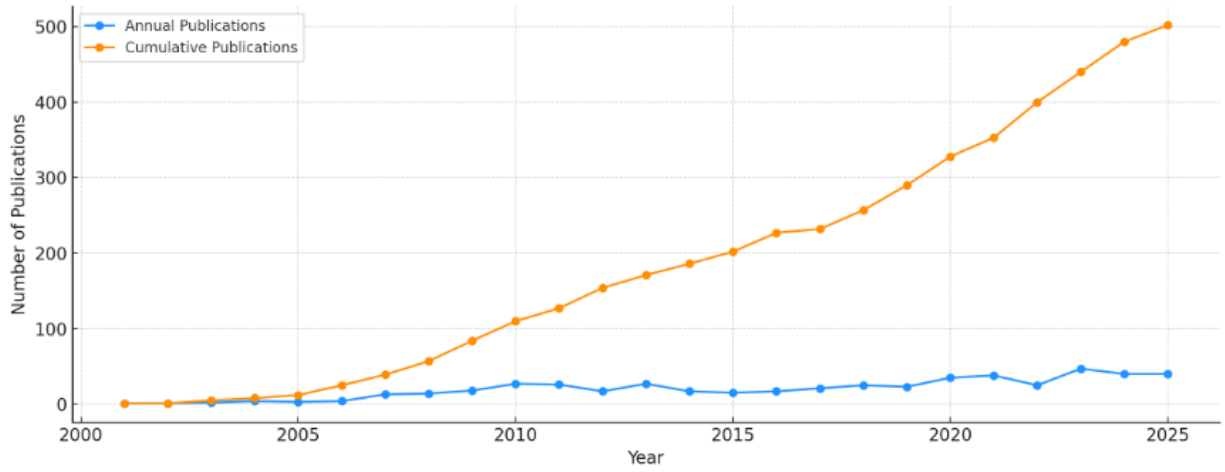
During the initial phase (2001–2006), the annual number of publications remained very low, fluctuating between 1 and 4. Nevertheless, between 2004 and 2006, there were early signs of growth, as cumulative publications increased from 3 to 12. The early growth phase (2007-2012) witnessed a strong upward trend, with remarkable increases in 2009 (18 publications), 2010 (27), and 2011 (26). By the end of 2012, the cumulative total had reached 127, signaling that the research field was beginning to attract significant scholarly attention.

The stable development phase (2013–2019) was characterized by consistent annual outputs ranging from 15 to 25 publications. By 2019, the cumulative number of publications had reached 328, reflecting steady development though without major breakthroughs. In contrast, the strong growth phase (2020-2024) marked a surge in productivity, with notable peaks in 2020 (38 publications), 2022-2023 (47 each year), and 2024 (40). The cumulative total rose sharply to 480 by the end of 2024. This acceleration can be attributed to the global shift toward digital governance and the heightened demand for studies on e-service quality, particularly as the COVID-19 pandemic accelerated the adoption of digital public services.

For the current year 2025 (data up to August 2025), 22 publications have been recorded, and this number is expected to increase by the end of the year. At present, the cumulative total stands at 502 publications, confirming the sustained growth trajectory of the field.

From a broader perspective, several key trends emerge. First, the long-term pattern demonstrates strong and sustained development, as evidenced by the steadily rising cumulative curve. Second, breakthrough periods can be observed between 2007-2012 and after 2020, reflecting the influence of rapid technological progress, digital transformation agendas, and the impacts of COVID-19. Finally, despite year-to-year fluctuations, the average annual output has stabilized at approximately 40 publications in recent years, suggesting that the field has matured into a well-established and significant domain of research.

In conclusion, the findings indicate that scholarly interest in e-government and service quality has not only grown consistently but has also become increasingly central to administrative sciences and public management studies. This trend underscores the importance of digital governance in the context of global digital transformation and highlights its role as a cornerstone of contemporary public sector research.



Source: Analysis results from VOSviewer software

Figure 1. The number of annual published papers from 2001 to 2025

4.1.2. Bibliometric analysis of countries and institutions

The bibliometric results reveal the top 10 most productive countries in the field of e-government and service quality research. Indonesia ranks first with 71 publications (13.5%), reflecting its growing academic interest in this domain, although its citation count (568) and total link strength (9) indicate moderate impact and collaboration compared to others. China follows with 59 publications (11.3%), but it stands out with a considerably higher citation count (912) despite having fewer international collaboration links (5), suggesting strong influence but relatively limited global networking. Malaysia, with 38 publications (7.3%), demonstrates a balance between output and collaboration, achieving 574 citations and the highest link strength among the top three (15), showing that its research is well-connected internationally.

India holds the fourth position with 32 publications (6.1%), supported by 452 citations and 5 collaboration links, reflecting steady but less globally integrated contributions. The United Kingdom, though with only 29 publications (5.5%), demonstrates exceptional impact with the second-highest citation count (1,251) and strong link strength (11), highlighting the high quality and recognition of its research. Similarly, the United States records 29 publications (5.5%), yet dominates in terms of citations (2,376, the highest) and collaboration (link strength of 15), signifying its central role and influence in shaping the field.

In the Middle East, Jordan appears with 22 publications (4.2%) and a respectable 454 citations, alongside strong collaboration links (10). Greece, although contributing fewer papers (19; 3.6%), achieves 765 citations, indicating high impact per publication. Saudi Arabia also contributes 19 publications (3.6%), with 486 citations and strong collaboration ties (13), suggesting increasing regional importance. Thailand closes the list with 19 publications (3.6%) and 687 citations, supported by a link strength of 8, reflecting a growing research presence in Southeast Asia.

Overall, the analysis highlights that while Indonesia and China lead in publication volume, the United States and the United Kingdom dominate in terms of citations and influence, demonstrating a clear distinction between quantity and impact in global research on e-government and service quality.

Table 2: The top countries with the highest contributions

Rank	Country	N (%)	Citation	Total Link Strength
1	Indonesia	71 (13.5%)	568	9
2	China	59 (11.3%)	912	5
3	Malaysia	38 (7.3%)	574	15
4	India	32 (6.1%)	452	5
5	United Kingdom	29 (5.5%)	1251	11
6	United States	29 (5.5%)	2376	15
7	Jordan	22 (4.2%)	454	10
8	Greece	19 (3.6%)	765	3
9	Saudi Arabia	19 (3.6%)	486	13
10	Thailand	19 (3.6%)	687	8

Source: Analysis results from VOSviewer software

4.1.3 Results of citation sources analysis

The bibliometric analysis of the top 10 sources reveals a diverse range of publication outlets, including journals, book series, and conference proceedings, that have contributed significantly to the body of research on e-government and service quality.

The most productive source is the ACM International Conference Proceedings Series, with 27 documents and 182 citations, indicating that conference proceedings play an important role in disseminating new research in this field. Similarly, the Lecture Notes in Computer Science (Springer Nature) published 17 papers, showing its relevance as a platform for advancing technical and applied aspects of e-government.

Among journals, the International Journal of Electronic Government Research (IGI Global) contributed 16 articles with a total of 221 citations, highlighting its specialized focus on the topic. Another notable journal is Government Information Quarterly (Elsevier), which, despite publishing only 12 articles, achieved the highest citation impact with 1,126 citations and a total link strength of 36. This demonstrates its central role and academic influence in shaping the discourse on e-government and service quality. Similarly, Transforming Government: People, Process and Policy (Emerald Publishing) has strong visibility with 823 citations, confirming its position as a leading source for governance and public administration perspectives.

Other conference-based outlets, such as the Proceedings of the European Conference on E-Government (16 documents) and Proceedings of the Annual Hawaii International Conference on System Sciences (7 documents), further emphasize the importance of conferences in knowledge exchange and research development within this domain.

In terms of citation impact, it is clear that high-impact journals (Government Information Quarterly and Transforming Government) dominate the intellectual structure of the field, whereas conference proceedings and book series serve as primary platforms for presenting emerging studies and technical developments. Overall, the data indicate that e-government and service quality research is highly interdisciplinary, drawing contributions from information systems, computer science, and public administration, with both conferences and journals playing complementary roles in shaping the knowledge base.

Table 3: Top source had a lot of paper about this topic

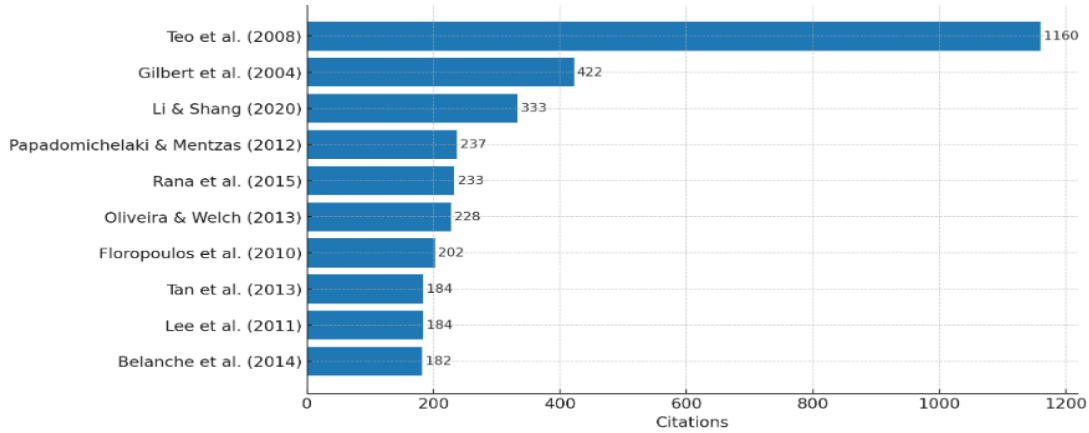
Rank	Source Name	Source Type	Publisher	Documents	Citations	Total Link Strength
1	ACM international conference proceeding series	Conference Proceeding	Association for Computing Machinery	27	182	8
2	Lecture Notes in Computer Science (LNCS)	Book Series	Springer Nature	17	186	4
3	International Journal of Electronic Government Research	Journal	IGI Global Publishing	16	221	16
4	Proceedings of the European Conference on e-Government, ECEG	Book Series	Academic Conferences and Publishing International Limited	16	71	3
5	Transforming Government: People, Process and Policy	Journal	Emerald Publishing	16	823	26
6	Electronic Government	Journal	Inderscience Publishers	12	107	12
7	Government Information Quarterly	Journal	Elsevier	11	1256	36
8	Proceedings of the Annual Hawaii International Conference on System Sciences	Conference Proceeding	IEEE Xplore	7	230	1
9	IFIP Advances in Information and Communication Technology	Book Series	Springer Nature	6	12	0
10	International Journal of Data and Network Science	Journal	Growing Science	5	81	4

Source: Analysis results from VOSviewer software

4.2. Science Mapping-Based Bibliometric Analysis

4.2.1. Citation analysis

The citation analysis identifies the most influential works shaping the field of e-government and service quality (Figure 2). The most cited study is Teo et al. (2008), with 1,160 citations, underscoring the pivotal role of trust in determining e-government success. This dominance highlights that trust is a foundational construct in explaining both adoption and effectiveness. Following this, Gilbert et al. (2004), with 422 citations, emphasizes the barriers and benefits in adopting e-government, reflecting early scholarly interest in implementation challenges.



Source: Analysis results from VOSviewer software

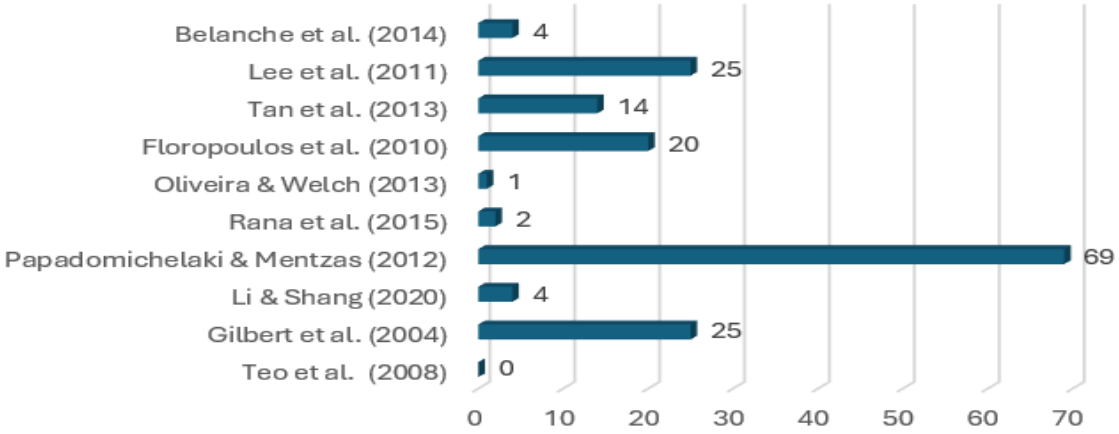
Figure 2. The citation analysis

More recent contributions, such as Li & Shang (2020) with 333 citations, shift the focus toward service quality, perceived value, and continuous use intention, illustrating a growing concern for user experience and long-term engagement. Other highly cited works, including Papadomichelaki & Mentzas (2012) (237 citations) and Rana et al., (2015) (233 citations), contribute significantly by introducing and validating measurement models such as the E-GovQual scale and integrated IS success models. Meanwhile, studies like Oliveira & Welch (2013) on social media in governance and Floropoulos et al. (2010) on taxation systems broaden the thematic scope of the field. Overall, citation analysis demonstrates that the most impactful contributions revolve around trust, adoption challenges, service quality, and success measurement frameworks, establishing these as the central pillars of e-government research (see Figure 2).

4.2.2. Co-citation analysis

Co-citation analysis is particularly valuable for scholars aiming to uncover seminal works and the foundational intellectual structure of a field (Donthu et al., 2021). Among the four major techniques in science mapping, it has become the most widely adopted, as it effectively identifies publications that have received substantial scholarly attention in the past and highlights those frequently cited together within a specific research domain (Chen et al., 2023). The results of the analysis reveal that Papadomichelaki & Mentzas (2012) stands out with 69 co-citation links, demonstrating that the E-GovQual scale serves as a methodological cornerstone, frequently referenced alongside other frameworks in empirical studies. Likewise, Gilbert et al. (2004) and Lee et al. (2011), each with 25 links, occupy central positions in discussions on adoption factors, service quality, and trust, functioning as complementary references across diverse streams of research. Floropoulos et al. (2010) with 20 links and Tan (2013) with 14 links also emerge as important bridging works, particularly in the context of service quality assessments and IS success models. Interestingly, although Teo et al. (2008) is the most cited study overall, it registers zero co-citation links, indicating its role as a seminal yet standalone contribution rather than one integrated into broader theoretical conversations. In

contrast, more recent studies, such as Li & Shang (2020) and Belanche et al. (2014), show limited co-citation connectivity (four links each), reflecting both their relative novelty and the gradual process of integration into scholarly networks. Overall, while citation analysis underscores the foundational influence of certain works, co-citation analysis demonstrates how methodological frameworks and adoption-oriented studies form the connective tissue that links different strands of e-government and service quality research (Figure 3).



Source: Analysis results from VOSviewer software

Figure 3. The co-citation analysis by links

Based on the dataset of cited references (Table 4), the results of the co-citation analysis demonstrate the intellectual structure of the field by highlighting the most frequently co-cited works and their underlying theoretical foundations (Donthu et al., 2021). The results of co-citation analysis from VOSviewer reveal that eleven frequently co-cited publications cluster into two dominant intellectual traditions concerning e-government service quality and adoption (see Table 4).

The first cluster of studies concentrates on examining user satisfaction, trust, and acceptance of e-government services. Research within this cluster emphasizes citizens' perceptions and evaluations of digital government services, particularly in terms of usefulness, ease of use, and overall service quality. Notable contributions include Alawneh et al. (2013), who investigated user satisfaction with e-government services in Jordan, highlighting the significance of citizen-centered approaches. Carter and Bélanger (2005) explored determinants such as trust, innovation, and acceptance that influence the adoption of e-government services, emphasizing trust as a foundational construct. Foundational theoretical concepts were introduced by Davis (1989), who proposed perceived usefulness and perceived ease of use as central dimensions in assessing user acceptance of information technology. Methodological rigor in this domain was advanced by Fornell and Larcker (1981), who advocated for structural equation modeling techniques to account for latent variables and measurement error. Papadomichelaki and Mentzas (2012) contributed a multi-item scale for evaluating e-government service quality, offering practical tools for empirical assessment. Furthermore, Venkatesh et al. (2003) integrated multiple theoretical perspectives to provide a unified model of information technology acceptance, while Verdegem and Verleye (2009) developed a comprehensive framework for measuring user satisfaction in e-government contexts. Collectively, these studies highlight the pivotal role of perceived service quality, trust, and usability in influencing citizen engagement with digital government services.

By contrast, in Cluster 2, seminal studies such as Petter et al. (2013), William et al. (2003), Layne & Lee (2001), and Seddon (1997) emerge as highly influential, focusing on the success of information systems and the development of E-government models. These works collectively

provide foundational frameworks and conceptual models that have shaped subsequent research, highlighting the critical role of theoretical rigor in understanding system success and implementation strategies (Donthu et al., 2021).

Table 4: Co-citation analysis based on cited references

No.	Author/Year	Title	Source	Clutter
1	Alawneh et al. (2013)	Measuring user satisfaction from e-Government services: Lessons from Jordan	Government Information Quarterly	1
2	Carter & Bélanger (2005)	The utilization of e-government services: citizen trust, innovation and acceptance factors	Information Systems Journal	1
3	Davis (1989)	Perceived usefulness, perceived ease of use, and user acceptance of information technology	Mis Quarterly	1
4	Fornell & Larcker (1981)	Evaluating Structural Equation Models with Unobservable Variables and Measurement Error	Journal Of Marketing Research	1
5	Papadomichelaki & Mentzas (2012)	E-govqual: A multiple-item scale for assessing e-government service quality	Government Information Quarterly	1
6	Venkatesh et al. (2003)	User Acceptance of Information Technology: Toward a Unified View	MIS Quarterly	1
7	Verdegem & Verleye (2009)	User-centered E-Government in practice: A comprehensive model for measuring user satisfaction	Government Information Quarterly	1
8	Petter et al. (2013)	Information Systems Success: The Quest for the Independent Variables	Journal Of Management Information Systems	2
9	William et al. (2003)	The Delone and Mclean model of information systems success: a ten-year update	Journal Of Management Information Systems	2
10	Layne & Lee (2001)	Developing fully functional E-government: A four stage model	Government Information Quarterly	2
11	Seddon (1997)	A respecification and extension of the Delone and Mclean model of is success	Information systems research	2

Source: Analysis results from VOSviewer software

4.2.3. Bibliographic coupling

The size of each circle reflects the number of times a publication has been cited by other documents within the dataset. Larger circles represent studies with broader influence that serve as foundational works in the field. The most prominent publications include Gilbert et al. (2004), Li & Shang (2020), Teo et al. (2008), and Papadomichelaki & Mentzas (2012), indicating that these are key studies that have shaped or exerted significant influence on subsequent research (see the table summarizing highly cited publications).

Publications located close to each other on the map are more strongly connected, meaning they cite a substantial number of common references, thereby sharing a knowledge base or belonging to the same research topic. The lines connecting the circles represent these relationships, with line thickness indicating the strength of the connection.

Although the VOS analysis segmented the dataset into nine clusters, three clusters stand out as particularly prominent, represented by red, green, and blue; reflecting distinct thematic and temporal patterns within the field of e-government research (See Figure 4).

Red Cluster (Cluster 1): Core and Foundational Studies

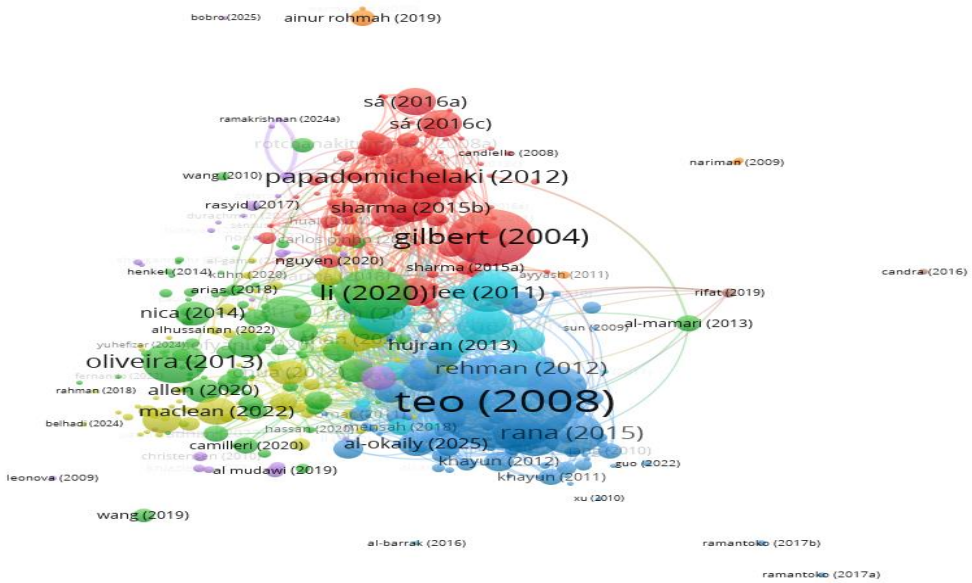
The red cluster represents the central and arguably oldest body of research, encompassing highly influential studies that have laid the groundwork for e-government scholarship. Key contributions include Gilbert et al. (2004), who examined barriers and benefits associated with e-government adoption, highlighting organizational and technological challenges in the public sector. Papadomichelaki and Mentzas (2012) introduced the e-GovQual scale, providing a validated multi-item instrument for assessing e-government service quality. Li and Shang (2020) extended this line of research by analyzing the relationships among service quality, perceived value, and citizens' continuous-use intention, offering empirical evidence from China on how service perceptions affect sustained engagement. Al Hujran et al. (2013) similarly explored citizen-centered evaluation of digital services. The temporal breadth of studies within this cluster indicates a core and enduring research theme, emphasizing trust, service quality, and adoption behavior as foundational constructs in e-government research.

Green Cluster (Cluster 2): Emerging and Recent Research

The green cluster comprises more recent investigations, reflecting a dynamic and evolving research front. MacLean and Titah (2022) conducted a systematic literature review examining e-government impacts from a public value perspective, emphasizing the societal and organizational contributions of modern digital services. Allen et al. (2020) focused on citizen co-production in smart city initiatives, using empirical data from mobile big data platforms to assess the extent to which participatory e-government approaches enhance urban service delivery. Oliveira and Welch (2013) explored social media adoption in local government, linking technological affordances to organizational tasks and contextual factors. Collectively, this cluster reflects a shift toward contemporary modalities of e-government, including participatory platforms, social media integration, and value co-creation, highlighting an expanded focus on practical and citizen-oriented dimensions.

Source: Analysis results from VOSviewer software

Figure 4.



Bibliographic coupling Analysis

Blue Cluster (Cluster 3): Distinct Research Branch

The blue cluster appears more independent, representing a distinct thematic branch within the broader e-government literature. Teo et al. (2008) empirically examined trust as a critical determinant of e-government success, while Hidayat Ur Rehman et al. (2023) investigated the role of user awareness in evaluating e-government system success, emphasizing cognitive and informational factors in citizen engagement. Rana et al. (2015) validated an integrated IS success model within the context of e-government initiatives, focusing on system effectiveness and user satisfaction. The cluster's relative independence, as indicated by fewer shared citations with the other clusters, suggests a research trajectory centered on evaluating system performance and success, rather than service quality or adoption barriers.

In summary, these three clusters collectively delineate the intellectual structure of e-government research, illustrating an evolution from foundational studies on adoption and service quality (red cluster), through emerging investigations into participatory and value-oriented dimensions (green cluster), to a specialized strand emphasizing success evaluation and trust mechanisms (blue cluster). The temporal and thematic differentiation underscores both continuity and diversification, providing a comprehensive perspective on the field's development. Overall, these results are consistent with the analysis of highly cited publications presented in the table above, confirming the consistency and reliability of the data.

4.2.4. Co-word (keyword co-occurrence) analysis

Co-occurring keyword analysis, which identifies keywords appearing together in publications, is a key bibliometric method for uncovering knowledge structures and relationships among research topics. As noted by Radhakrishnan et al. (2017), keyword co-occurrence networks (KCNs) map keywords as nodes and their connections as co-occurrence frequencies, enabling systematic evaluation of research trends and structures. This approach offers a comprehensive view of the field, helping researchers detect saturated areas, linkages between streams, and research gaps that guide the development of meaningful and novel research questions. Visualization results using VOSviewer show that in the network, each node represents an entity (e.g., article, author, country, institution, keyword, journal); in this case, a node represents a keyword. Node size indicates keyword frequency, while the presence and thickness of links reflect co-occurrence between keywords, and colors denote thematic clusters, with nodes and links illustrating topic coverage and relationships within each cluster (Donthu et al., 2021). In this study, based on the keywords in the dataset, the co-occurrence analysis indicates seven main themes (Figure 5).

Theme 1: Acceptance and Use of E-Government and Mobile Government Services: This theme focuses on the acceptance and usage of e-government and mobile government services. Key areas include e-government, m-government, smart cities, and online tax services. The primary subjects are citizens and users, with research examining user behavior such as adoption, continuance intention, and satisfaction. Theoretical frameworks commonly used include UTAUT, while influencing factors include perceived ease of use, perceived usefulness, system quality, information quality, and citizen trust. Studies often focus on developing countries such as India and Saudi Arabia and employ surveys and behavioral research methods. Representative studies in this theme include AlAwadhi and Morris (2009), Al-Hujran et al. (2015); Rana et al. (2015); Shareef et al. (2011); and Susanto and Aljoza (2015). These studies collectively emphasize that technological, organizational, and trust-related factors are central to understanding the adoption and sustained use of e-government and m-government services.

Theme 2: Quality and Acceptance of E-Services Across Sectors

This theme addresses the quality and acceptance of e-services across multiple sectors, including e-commerce, e-government services, e-learning, and telecommunication services. Research often applies frameworks such as the Technology Acceptance Model (TAM), the IS Success Model, and other theoretical foundations. Key variables examined include e-service quality, perceived value, system quality, information quality, and user interface effectiveness.

In addition, some studies consider managerial perspectives as stakeholders, focusing on the reliability, effectiveness, and strategic implementation of service delivery. Methodologically, many works employ advanced statistical analyses such as PLS-SEM to validate measurement models and test causal relationships. Representative studies include DeLone and McLean (2003), Parasuraman et al. (2005), who introduced the E-S-QUAL framework for assessing online service quality; and Zeithaml et al. (2002), who examined the role of perceived value in consumer evaluation of e-services. In the context of e-government, Papadomichelaki and Mentzas (2012) analyzed user satisfaction with online public services, while Floropoulos et al. (2010) assessed the efficiency and quality of online tax services in Greece.

Theme 3: Digital Transformation and E-Government Applications in the Public Sector

This theme centers on the digital transformation of public administration and the application of e-government technologies to enhance governance and service delivery. Core keywords include digital government, e-government applications, public administration, public organizations, and public services. Research in this theme primarily explores implementation processes, evaluation mechanisms, quality control, user experience, decision-making, and transparency. Conceptual models are commonly employed to frame the modernization of public services, while methodologies often include literature reviews, case studies, and data mining approaches to capture emerging patterns and assess effectiveness. Representative studies include Belanche et al. (2014), Gilbert et al. (2004), Li and Shang (2020), Oliveira and Welch (2013), and Rana et al. (2015). Collectively, these works emphasize that digital transformation in the public sector requires not only technological advancement but also strategic management, citizen-centric design, and robust mechanisms for transparency and accountability.

Theme 4: Socio-Economic Impacts and ICT/AI Performance in E-Government

This theme analyzes the socio-economic effects and performance of ICT, particularly artificial intelligence (AI), in the context of e-government. Core technologies include ICT, AI, and digitalization, which are applied to e-government and e-participation initiatives, public policy development, and public service delivery. Research in this area emphasizes outcomes such as efficiency, performance, service quality, reliability, and the implications of investment in digital infrastructure. Methodologies commonly employed in this research stream include factor analysis, econometric modeling, and economics-based approaches to evaluate both technological adoption and its broader socio-economic implications. Several studies have examined this topic from diverse perspectives, including Elnaghi et al. (2019), Alcaide-Muñoz et al. (2017), Rana et al. (2015), and Papadomichelaki & Mentzas (2012). Collectively, these studies demonstrate that the integration of ICT and AI not only improves service efficiency and reliability but also generates significant socio-economic benefits, thereby reinforcing the strategic role of digital technologies in advancing sustainable governance.

Theme 5: Technology and Social Media for Public Value Creation in Government

This theme investigates how technology and social media are leveraged to create public value, with particular emphasis on governance approaches and the development of citizen trust. Core subjects include government and local government, public value, and citizen engagement. Key tools encompass the Internet, social media platforms, and technology adoption processes, which are increasingly central to fostering interaction between governments and citizens. Measured outcomes frequently include citizen satisfaction, trust, transparency, accountability, and sustainability, reflecting the multidimensional impact of digital tools on governance. Methodologically, studies often employ structural equation modeling (SEM) to test causal relationships, complemented by case studies from diverse national contexts such as China, Indonesia, and Jordan. Representative works include Al-Hujran et al. (2015); Oliveira and Welch (2013); Shareef et al. (2011), , and Susanto & Aljoza (2015); Tan et al. (2013). Collectively, these studies demonstrate the strategic role of technology and social media in enhancing citizen participation, trust, and public value creation. Collectively, these studies

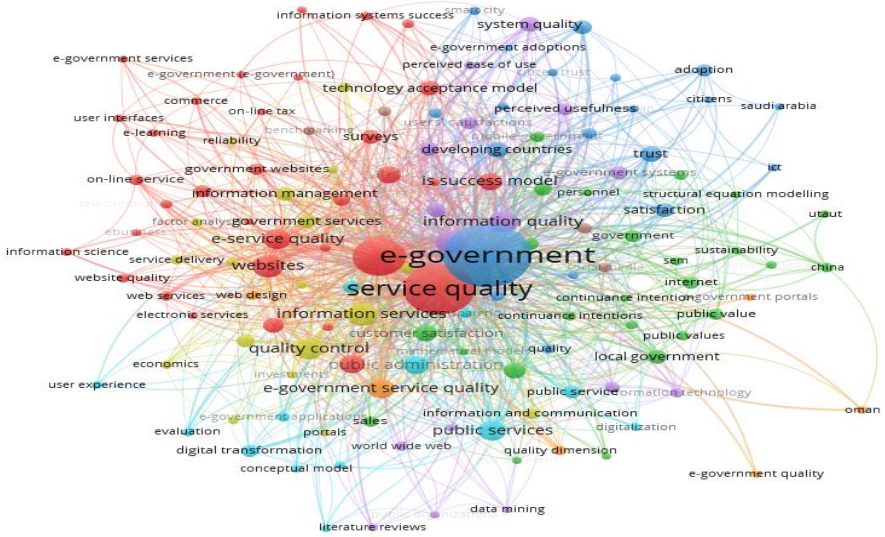
underscore that technology and social media are not merely communication channels but strategic governance tools that enhance citizen participation, strengthen trust, and support sustainable public value creation.

Theme 6: User Satisfaction with E-Government Service Quality:

This theme examines user satisfaction with e-government service quality through the application of mathematical and statistical models. Core domains include government data processing, online portals, and the World Wide Web, reflecting the digital infrastructures that enable public service delivery. Independent variables often encompass service quality dimensions, information technology capabilities, and management practices, while dependent outcomes are typically measured in terms of customer satisfaction, public satisfaction, and service effectiveness. Research in this area frequently applies structural equation modeling (SEM) and other advanced quantitative techniques to analyze complex relationships between service quality factors and user satisfaction. Representative studies include Papadomichelaki & Mentzas (2012), Floropoulos et al. (2010), Teo et al. (2008), and Rana et al. (2015). These studies demonstrate that enhancing user satisfaction requires not only robust technological systems but also effective management practices and continuous evaluation of service quality dimensions.

Theme 7: Evaluation of E-Government Portals and Government Websites:

This theme focuses on the evaluation of e-government portals and government websites, with particular attention to their design, quality, and functionality. Key subjects include the assessment of e-government portals and official government websites, with evaluation criteria spanning service quality, system quality, information quality, usability, and web design. Research in this area often employs benchmarking techniques and regression analysis to identify the critical factors influencing overall website quality and user satisfaction. Methodologies also include comparative assessments across different websites or case studies that highlight best practices and challenges in specific contexts. Representative studies include Alanezi et al. (2012); Alawneh et al. (2013); Li & Shang (2020); Papadomichelaki & Mentzas (2012); Sá et al. (2016); Tan et al. (2013). These studies emphasize the evaluation of e-government portals with a focus on design, usability, service quality, trust, and user experience.

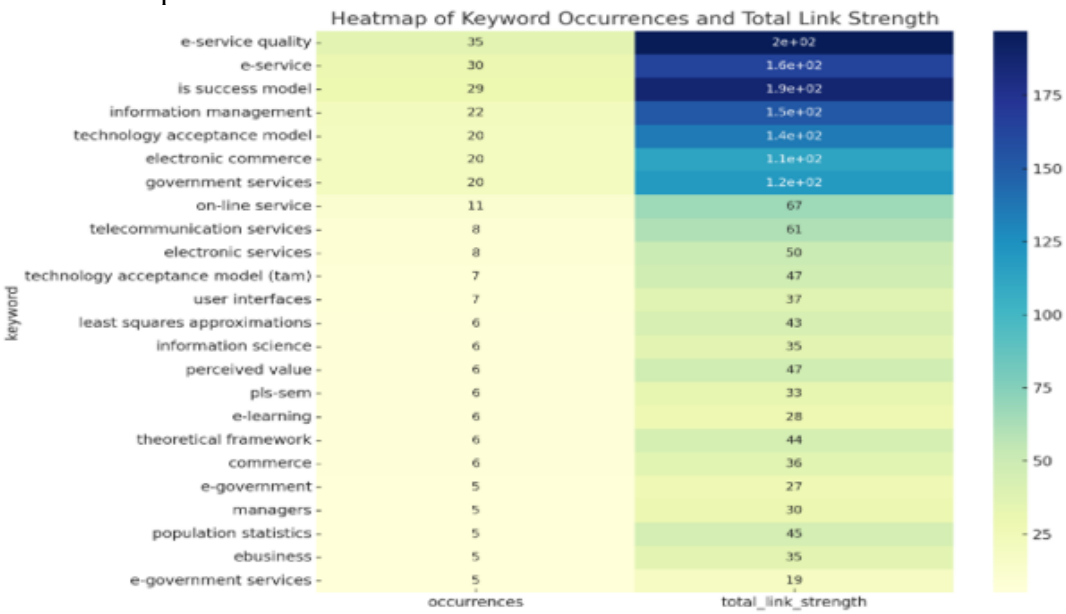


Source: Analysis results from VOSviewer software

Figure 5. Keywords cluster analysis

The keyword co-occurrence analysis reveals that several studies appear across multiple themes, underscoring the inherently interdisciplinary and interconnected nature of e-government research. Many works concurrently address technology adoption, service quality, citizen satisfaction, and digital transformation, thereby contributing to more than one thematic cluster. Such overlap highlights the multidimensional character of the field, where theoretical frameworks, methodological approaches, and practical implications are closely interlinked. Hence, the classification of studies across multiple themes should not be regarded as duplication but rather as evidence of the integrative development of e-government and service quality research.

From the results of the co-occurring keywords and keywords cluster analysis, the authors further explore future research trends (Figure 6). Topics such as e-service quality, the IS success model, and the technology acceptance model (TAM) show high occurrences and total link strength, indicating that these themes remain central and continue to attract significant scholarly attention. Future research can further explore ways to enhance online service quality, improve user experience, and develop predictive models of technology acceptance behavior. Keywords related electronic commerce, and government services also exhibit relatively high link strength, suggesting that the integration of digital technologies in education, e-commerce, and public services will continue to expand. Studies focusing on optimizing user experience and improving information management efficiency are expected to grow. Advanced methodological approaches, such as PLS-SEM and least squares approximations, remain widely applied, predicting that future research will continue to employ sophisticated statistical techniques to examine complex theoretical models.



Source: Analysis results from VOSviewer software

Figure 6. Heatmap science mapping

Some topics with low occurrences (≤6), including e-government, e-government services, e-business, managers, population statistics, perceived value, and user interfaces, highlight underexplored areas. Potential research gaps include the application of e-government and e-government services in developing countries, especially concerning user behavior, service efficiency, and satisfaction levels, as well as the role of managers in implementing e-services and optimizing user interfaces. Additionally, applying TAM and the IS success model in less-studied sectors, such as emerging public online services or local e-commerce, represents a promising avenue. Research on perceived value within the context of e-services is also needed

to better understand how users evaluate the benefits and value of online services. In summary, while central research will continue to emphasize service quality, technology acceptance models, and advanced analytical methods, significant gaps remain in e-government applications, managerial roles, user interface design, and perceived value assessment, presenting promising opportunities for future investigation (see Figure 6).

5. Conclusion

This study conducted a comprehensive bibliometric analysis of the literature on e-government and service quality published between 2001 and 2025. By examining 505 articles, the research identifies influential authors, highly cited studies, leading journals, and country-level contributions. The findings highlight three major intellectual clusters and show that although research on e-government has expanded considerably over the past two decades, significant disparities remain in the quality and effectiveness of digital public services, particularly between developed and developing economies. Beyond mapping the conceptual, intellectual, and social structures of the field, the study also emphasizes the continuing importance of themes such as e-service quality, the IS success model, and technology acceptance behavior, which remain central to scholarly inquiry.

Nevertheless, several limitations should be acknowledged. First, the analysis is based solely on the Scopus database, which may have excluded relevant studies indexed in other sources such as Web of Science, Google Scholar, or regional repositories. Second, bibliometric techniques, while effective in mapping research trends and structures, cannot fully capture the theoretical depth or contextual nuances that qualitative or mixed-method approaches might provide. Third, the temporal cut-off at 2025 means that ongoing and recently emerging studies may not yet be adequately reflected in citation patterns. Finally, variations in national contexts, including digital infrastructure, governance capacity, and cultural factors, are not fully addressed, which may limit the generalizability of the findings.

Looking forward, future research should build on the gaps identified in this study. In particular, further investigation is needed into e-government applications in developing countries, the role of managers in implementing digital services, and the optimization of user interfaces. Studies focusing on user behavior, service efficiency, perceived value, and satisfaction can also provide valuable insights for improving digital public service delivery. Methodologically, employing advanced approaches such as PLS-SEM, structural equation modeling, and mixed-method designs would allow for a more nuanced examination of complex relationships between technological, organizational, and user-related dimensions. Moreover, extending research into emerging areas such as e-learning, local e-commerce, and novel public online services represents a promising direction, particularly when integrated with established frameworks like the IS success model and TAM. Addressing these underexplored areas will help advance theoretical development while offering practical strategies for delivering high-quality, inclusive, and user-centered e-government services.

FUNDINGS

This research was funded by University of Finance - Marketing, Vietnam.

Research project code: CS-UD-48-25.

DISCLOSURE STATEMENT

The author reports there are no competing interests to declare.

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