Available online at: http://jurnal.utu.ac.id/jppolicy

Jurnal Public Policy

| ISSN (Print) 2477-5738 | ISSN (Online) 2502-0528 |

Transformation of E-Government's Impact on Transparency in Public Services: A Systematic Review and Bibliometric Analysis

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ARTICLE INFORMATION

Received: November 17, 2025
Revised: March 23, 2026
Accepted: March 28, 2026
Available online: July 21, 2026

KEYWORDS

Data Digitization, E-Government, Accessibility, Public Services, Transparency.

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A B S T R A C T

This study aims to analyze the transformative role of e-government in enhancing transparency in public service delivery in the era of digitization. A systematic literature review was conducted using the Scopus database from 2004 to 2024. Trend analysis and visualization techniques with RStudio software were applied to identify dominant research themes, influential authors, and leading institutions in the e-government and public service literature. The findings demonstrate that e-government substantially contributes to improving efficiency, accessibility, and transparency of public services by integrating digital technologies. Nevertheless, persistent challenges, including the digital divide and data security risks, continue to constrain effective implementation of e-government systems. Theoretically, this study highlights the need to integrate technological advances with social and economic dimensions to strengthen inclusive and sustainable public services. From a practical perspective, the research provides actionable insights for governments and policymakers in designing e-government strategies that are responsive to societal needs and technological innovations. Despite its contributions, this study is limited by including the limited scope of the literature reviewed and the retrospective nature of the analysis, which may limit relevance to future developments. Future research should incorporate broader data sources and examine emerging digital innovations to enhance the effectiveness of e-government initiatives.

INTRODUCTION

The development of digital technology has revolutionized various aspects of life, including the public service sector (Cai, 2023; Latupeirissa et al., 2024; Mittal & Gautam, 2023). E-government emerged as one of the digital solutions to improve the efficiency, transparency, and accessibility of public services to the public (Abu-Shanab, 2017). Through the implementation of e-government, the government is expected to create more e-government's impact on transparency in public services, resulting in better governance (Al-Besher & Kumar, 2022). This digital transformation in public services is supported by various modern technologies such as the internet, information systems, and mobile applications that enable easier and faster interaction between the government and the community (Lawelai et al., 2024). Along with the increasing public expectations for quality and efficient services, e-government is expected to be a bridge that facilitates the realization of more responsive and accountable public service governance.

However, the implementation of e-government in public services faces various challenges that hinder the achievement of these goals (Amegavi et al., 2018). On the one hand, technological readiness, data security, and system integration are significant technical obstacles. On the other hand, limited human resources and budgets often limit the government's ability to develop and maintain the necessary digital infrastructure (Dauliyeva & Yeraliyeva, 2022). In developing countries, this challenge is further complicated by the problem of conventional organizational culture and lack of public awareness about the benefits of e-government. Although many efforts have been made to accelerate this transformation, there is still a gap between expectations and reality in achieving e-government's impact on transparency in public services.

Various literatures have discussed important aspects of e-government, but many studies focus on the technological aspects and less on the challenges and non-technical factors such as inclusiveness, affordability, and transparency in public services (Muñoz & Sánchez, 2015; Yang & Rho, 2007; Zhang & Kaur, 2024). Digital governance theories often emphasize the application of information technology as the main solution to improve public services, while social, cultural, and economic aspects are less of a focus (Charalabidis et al., 2022). Theories such as Good Governance and Public Value show that e-government is not just about technology, but also involves factors of trust, public participation, and transparency (Abdulkareem & Mohd Ramli, 2022). This gap in literature poses a challenge in understanding the critical factors needed to achieve more e-government's impact on transparency in public services.

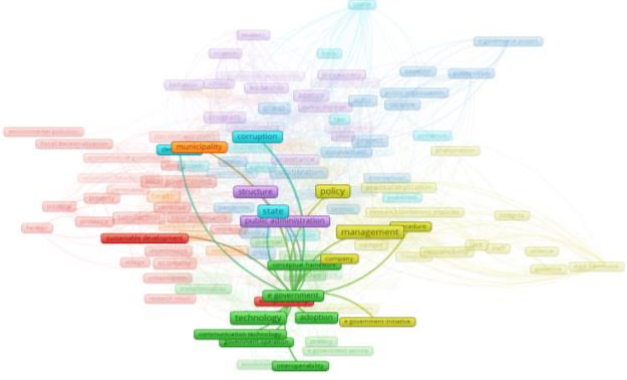

Figure 1. Research Gap and Novelty

https://doi.org/10.35308/jpp.v12i3.10798

Figure 1 shows that past research on e-government closely related to topics such as "information technology," "system adoption," and "policy management" dominate the literature over the past two decades. However, topics related to social aspects such as "transparency," "civic engagement," and "inclusive governance" are still relatively under-explored, despite starting to gain attention since 2010 (Bertot et al., 2010; Bisogno et al., 2022). This imbalance indicates not merely a lack of attention, but a structural bias in the literature that prioritizes technological efficiency over governance outcomes, resulting in limited theoretical and empirical explanations of how and why transparency emerges or fails to emerge within e-government practices. Consequently, existing studies provide fragmented insights that are insufficient to inform policy design aimed at embedding transparency and inclusiveness as core governance principles.

The solution to this problem can be sought through an in-depth understanding of the trends and evolution of research related to e-government and public services from 2004 to 2024. Over the past two decades, research on e-government has focused on technological aspects at first, but then shifted to managerial and policy aspects with the increasing need for inclusive and equitable services (Zhemchugova et al., 2023). The mapping of topic trends shows that since 2010, aspects of transparency and public participation in e-government have started to receive special attention (Bertot et al., 2010; Bisogno et al., 2022). The research also shows the development from the perspective of e-government as a technical tool to a strategic tool to realize more democratic governance. Thus, identifying these trends can help in formulating a more comprehensive approach to understanding the role and challenges of e-government in public service delivery in the era of digitalization.

This study aims to analyze how the transformation from manual services to digital platforms through e-government can improve transparency in public services in the digital era. This study also examines the important role and challenges faced by e-government in achieving these objectives, highlighting how technology, organizational culture, and community involvement influence the success of e-government implementation. By identifying these key factors, this study seeks to provide a comprehensive understanding of how e-government can bridge the gap in public services and meet public expectations for accessibility and transparency.

The significance of this research lies in its contribution to formulating effective policies and strategies that can strengthen e-government practices. By addressing challenges such as the digital divide, data security, and varying levels of technological readiness, this research offers actionable insights to help governments build an inclusive, transparent, and responsive public service framework. However, existing policy-oriented studies often assume that digital adoption will automatically lead to transparency, while overlooking deeper institutional and governance-related constraints that prevent transparency from being fully realized in practice. The ultimate goal is to support the development of fair and adaptive governance in the digital age.

This research is significant because it contributes to enriching the literature on e-government, especially in the context of inclusiveness and transparency of public services, which remain insufficiently theorized. Despite the rapid expansion of e-government systems, transparency remains difficult to achieve due to persistent structural and socio-institutional barriers, including fragmented data governance, limited interoperability between digital systems, unequal digital literacy, and weak accountability mechanisms. Existing studies predominantly focus on technological implementation and service efficiency, providing limited explanation of why transparency outcomes lag behind digital transformation. By explicitly addressing this gap, the findings of this research assist governments, academics, and practitioners in understanding the underlying governance challenges and in identifying evidence-based strategies to improve public service quality and accelerate the realization of transparent governance through digital technology.

METHOD

This study employs a systematic literature review to examine the transformation of e-government and its impact on transparency in public services, guided by the need to map research trends, challenges, and opportunities. A systematic literature review was chosen as it ensures an organized, comprehensive, and unbiased analysis of existing studies, facilitating the identification, evaluation, and synthesis of relevant literature (Amjad et al., 2023). This method is particularly effective in providing insights into the evolving themes and gaps in e-government research.

Data was sourced from the Scopus database, a widely recognized and reliable repository for academic literature in diverse fields (Lawelai, 2023).. The search terms (TITLE-ABS-KEY (public AND services) AND TITLE-ABS-KEY (transparent OR transparency) AND TITLE-ABS-KEY (e-government)) were applied to identify studies published between 2004 and 2024, limited to journal articles and conference proceedings in English. This timeframe ensures coverage of the most relevant and contemporary research. The selected documents were exported in CSV format for analysis.

The collected data was analyzed using RStudio to create bibliometric visualizations, including thematic maps and keyword networks, which highlight trends and topic evolution in e-government research. These visual tools helped identify key contributors, influential institutions, and recurring challenges, such as the digital divide and data security. The PRISMA statement guided the research process to ensure transparency and reproducibility in selecting, appraising, and synthesizing the literature (Sarkis-Onofre et al., 2021).

By employing visualization techniques, the study illustrates the progression from technical discussions of system adoption to broader themes like public participation and governance inclusivity. This structured and data-driven approach provides a robust foundation for understanding the transformative impact of e-government on transparency in public services. A flowchart (Figure 2) outlines the steps in the methodology to enhance clarity for readers.

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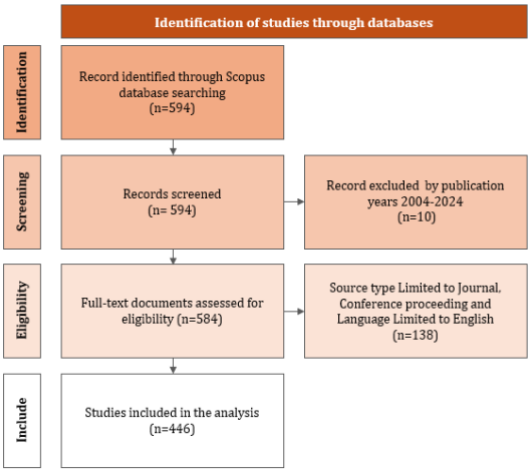

Figure 2. Modified PRISMA diagram illustrating the process of article selection in a systematic review.

RESULTS AND DISCUSSION

Number of publications and collaboration maps

The analysis of publication counts and collaboration maps in literature review research offers valuable insights into the dynamics of research in a given field. The number of publications provides an indication of the level of research activity and scientific development over time, while the collaboration map illustrates the interactions and networks between researchers, institutions and countries. These two elements conceptually demonstrate how knowledge and innovation spread, and how collaboration can enhance the quality and impact of research. By gaining an understanding of these patterns and relationships, researchers can identify trends, strengths and opportunities within their field of study.

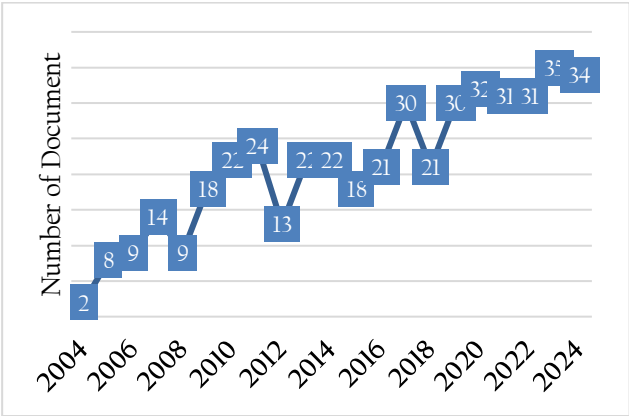

Figure 3. Annual Scientific Production of e-Government's Impact on Transparency in Public Services

Figure 3 shows the number of research documents related to e-government and public services from 2004 to 2024. From the graph, there is a significant upward trend in the number of research documents over the past two decades. At the beginning of the period, particularly between 2004 and 2010, the number of documents published was relatively small, although it showed an increase from 2 documents in 2004 to 18 documents in 2010. This shows that interest in the topic of e-government and public services was still in its early stages in the 2000s, along with the concept of e-government as part of digitalization efforts in public governance. Although there were small fluctuations in some years, in general this period reflected an initial increase in research related to the application of information technology in the public sector (Abdelhakim et al., 2022).

Furthermore, between 2011 and 2017, there was a significant increase in the number of documents, with the highest number reaching 30 documents in 2016 and 2018. This increase indicates an increased interest in the topic of e-government, which may be influenced by the development of digital technology and the growing awareness of the importance of transparency and inclusiveness in public services. Small decreases in some years, such as in 2013, may be due to a variety of factors, including changes in research focus or limited research budgets in this area. This trend shows increasing attention to the development of e-government as a tool to realize more efficient and transparent public services.

In the period 2019 to 2024, the number of published documents remained relatively stable, with slight fluctuations and a peak of 35 documents in 2023. This shows consistency in research interest in this topic in the era of advanced digitalization. The stability in the number of studies over the past five years indicates that e-government has become a mature topic in the academic literature, with research focusing not only on technology implementation but also on the challenges of achieving inclusiveness and transparency (Azad & Zablith, 2022). This illustrates that along with increasing public awareness and demands for more e-government's impact on transparency in public services, e-government is becoming an increasingly important aspect and needs to be continuously researched to understand its impact in depth in governance in the digital era.

Figure 4. Countries' Collaboration World Map

Figure 4 illustrates a world map showcasing country cooperation, emphasizing the digital era's interconnectedness and partnerships between nations. This visualization is essential for understanding how e-government initiatives can enhance transparency in public services. By depicting collaboration intensity through varying shades of blue, the map reveals that nations with stronger partnerships are better equipped to exchange knowledge, share technology, and adopt best practices. Such collective efforts are fundamental in addressing shared challenges and improving the efficiency and quality of public services.

However, realizing the full impact of e-government on transparency in public services remains a complex task. The map highlights disparities in digital infrastructure, policy frameworks, and levels of technology adoption across regions, which create barriers to effective collaboration and equitable digital service distribution. Overcoming these obstacles requires targeted actions to bridge the digital divide, align policy frameworks, and develop robust digital infrastructures that foster inclusive e-government practices.

The World Map of Country Cooperation is a powerful tool to illustrate both the potential and challenges of e-government in the digital age. It underscores the critical role of international collaboration in achieving transparent and inclusive public services. By leveraging the strengths of global partnerships and addressing existing gaps, governments can work collectively towards building a more equitable, accessible, and efficient digital future for all citizens.

Trends and Issues in E-Government's Impact on Transparency in Public Services

In literature reviews, trends and topics show how a field of study develops and what is most important. 'Trends' describe how issues change and evolve in research (George et al., 2020). A research topic is a specific area of study, such as the social impact of technology, the application of a particular policy, or a case study in a particular region. By analyzing trends and topics, literature reviews can help identify research gaps, potential new contributions, and future directions in the field.

Figure 5. WordCloud Topics of e-Government's Impact on Transparency in Public Services

Figure 5 presents a WordCloud that visually represents topics related to the impact of e-government on transparency in public services. The most prominent terms in this WordCloud, such as "e-government," "public services," "transparency," and "public administration," reflect their frequency and significance in discussions surrounding this subject (Al-Khanjari et al., 2014). The varying sizes of the words highlight their relative importance, providing a concise yet powerful visual summary of the interconnected themes within the context of e-government.

The findings emphasize the critical role of e-government in promoting transparency, efficiency, and accessibility in public administration by leveraging information and communication technology. By integrating digital tools such as information systems and online platforms, e-government enables governments to deliver more responsive and affordable public services, especially in remote or underserved areas (Al-Khanjari et al., 2014). This transformation can streamline bureaucratic processes, accelerate decision-making, and enhance citizen participation in governance.

Nonetheless, the implementation of e-government in the digital age faces significant challenges. The digital divide remains a key barrier, with unequal access to technology and the internet persisting in certain regions or among specific community groups. Additionally, concerns around data security and privacy, exacerbated by rising cyber threats and risks of personal data breaches, pose further obstacles (Tse et al., 2015). To overcome these challenges, governments must prioritize the development of inclusive digital policies and robust infrastructure, as well as implement strong security measures to safeguard user data and privacy. Through a collaborative and strategic approach, e-government has the potential to create more inclusive, transparent, and accountable public services in the digital era.

The impact of e-government on transparency in public services lies in its ability to foster greater accountability and openness in governance processes. By digitizing administrative functions and enabling real-time access to information, e-government facilitates the disclosure of policies, budgets, and decision-making mechanisms to the public (Das, 2024). This openness not only builds trust between the government and its citizens but also encourages active public participation by providing platforms where citizens can voice opinions and monitor government activities. Furthermore, the integration of digital technologies, such as blockchain and cloud computing, enhances the reliability and security of data while reducing opportunities for corruption and inefficiency (Habib et al., 2022; Nguyen et al., 2020). However, achieving transparency through e-government requires addressing systemic challenges, including the standardization of digital policies and bridging gaps in digital literacy across different societal groups. Governments must prioritize inclusivity and equitable access to these digital platforms to ensure that transparency efforts reach all levels of society, fostering a governance environment where accountability and trust are universal principles.

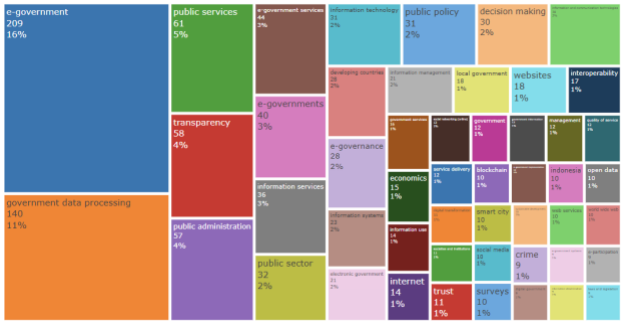

Figure 6. Topics in the TreeMap on e-Government's Impact on Transparency in Public Services

Figure 6 shows a TreeMap illustrating the main topics related to e-government's impact on transparency in public services through the government. The size and color of the rectangles indicate the frequency and relevance of these themes in the literature. "e-government" emerges as a dominant topic, suggesting that the adoption of technology in government is a central element in achieving more inclusive public services. Other large squares, such as "data governance" and "digital transparency," indicate the importance of data management and digital transparency in e-government.

The presence of "public administration" with a significant size reflects the need for efficient and accountable public administration. Previous research has confirmed that the integration of e-government with public administration can reduce bureaucracy, improve accessibility, and reduce inequity in services (Osman, 2016; Spasojević, 2015; Zhang & Kaur, 2024). The use of information technology allows the government to process data more efficiently, improving the speed and accuracy of public services. However, this integration requires a solid technological infrastructure and supportive regulations to function optimally.

Significant challenges remain, including the digital divide and data security. Differences in access to technology between urban and rural areas threaten digital inclusion, while cybersecurity threats can undermine public trust in e-government systems (Coppolino et al., 2018). Therefore, e-government strategies should include efforts to improve digital literacy, strengthen

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technology infrastructure in remote areas, and tighten data security policies. By addressing these challenges, governments can ensure that public services are inclusive, transparent, and responsive to people's needs in the digital age.

The complex interaction between digital inclusion and data management increasingly illustrates the importance of equitable access and strong data management practices in public service transparency. Citizen participation reflects progress across the spectrum towards more participatory governance, although challenges such as policy harmonization across regions remain inevitable in supporting a cohesive framework. Digital transparency continues to shine as a dominant feature, both as a driver and a measure of the success of efficient e-government initiatives (Criado & Gil-Garcia, 2019). The inequality of technological readiness and adoption of e-government solutions among regions, as demonstrated by the spread of smaller subtopics (Das, 2025), underscores the urgent need for implementation funding, infrastructure investment, and capacity-building programs. As an implied outcome, the findings confirm that improving e-government will require more than technology. It will also require the development of inclusive strategies to ensure the evolution of impactful and sustainable public services.

Thematic Maps and Topic Evolution on e-Government's Impact on Transparency in Public Services

Thematic maps show how different research topics have changed over time. The map shows the main topics and how they change over time. Topic evolution shows how research changes from one topic to another. Analyzing thematic maps and topic evolution helps literature reviews identify new research areas, gaps in knowledge and opportunities for new research. This provides a more complete and up-to-date view of the field of study.

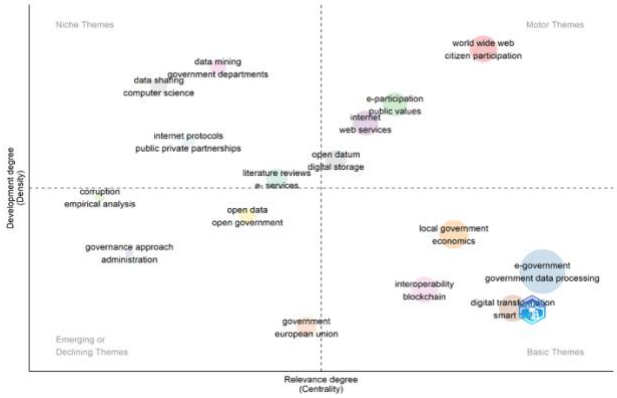

Figure 7. Thematic Map Topics on e-Government's Impact on Transparency in Public Services

Figure 7 shows a thematic map highlighting themes related to e-government's impact on transparency in public services in the digitalization age. The map divides these themes into four quadrants based on two axes: the degree of development (density) and the degree of relevance (centrality). These quadrants categorize topics into Niche Themes, Motor Themes, Emerging or Declining Themes, and Basic Themes.

The Motor Themes quadrant, which shows high density and centrality, includes topics such as "World Wide Web," "Civic Participation," "e-Participation," "Public Values," "Internet," and "Web Services. These highlight the critical importance of citizen participation and public values in achieving e-government's impact on transparency in public services. E-participation and the use of web services are key to improving citizen participation and government transparency. This quadrant indicates that effective use of the Internet and Web services can lead to significant improvements in public participation and transparency.

The Basic Themes quadrant, which shows high centrality but low density, includes "e-government," "government data processing," "digital transformation," "smart," "interoperability," and "blockchain." While these topics are highly relevant, they still need to evolve to realize their full potential. Digital transformation and the use of technologies such as blockchain and interoperability are major challenges that need to be addressed to achieve e-government's impact on transparency in public services in the digital era. Previous research shows that while e-government can reduce bureaucracy and increase efficiency, the full benefits can only be realized with a strong digital infrastructure and supportive policies (Goloshchapova et al., 2023; Parida et al., 2023; Zhang & Kaur, 2024).

However, significant challenges remain, such as the digital divide and data security. Disparities in access to technology between urban and rural areas threaten digital inclusion, while cybersecurity threats can undermine public trust in e-government systems (Coppolino et al., 2018). Therefore, e-government strategies must include efforts to improve digital literacy, strengthen infrastructure in remote areas, and improve data security policies. Addressing these challenges will ensure that e-government systems are not only inclusive, but also transparent and responsive to public needs in the digital era.

The results of this study show that the issues included in the thematic map on transparency in public services through the implementation of e-government illustrate the dynamic interrelationship between emerging technologies and governance priorities. Effective e-government strategies require the integration of digital tools such as blockchain and interoperability (Lykidis et al., 2021), as well as comprehensive policies to address systemic challenges such as the digital divide and personal data security risks. This approach is critical to transforming e-government into a robust mechanism for improving information transparency, equity, and public trust in government services.

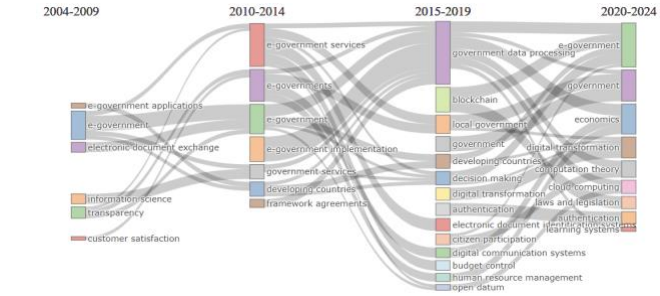

Figure 8. Thematic Evolution of e-Government's Impact on Transparency in Public Services

Figure 8 shows the thematic evolution of e-government's impact on transparency in public services from 2004 to 2024, by grouping dominant research topics according to distinct temporal phases and their relevance to public service governance. During the 2004-2009 period, key themes were centered on e-government applications, electronic document exchange, information science, transparency and customer satisfaction. These patterns reflect an early stage of e-government development in which digital initiatives were primarily oriented

toward improving administrative efficiency and service usability. Analytically, transparency in this phase was positioned as an auxiliary outcome of technological adoption rather than as a core governance objective. This indicates that early e-government research emphasized system functionality and user satisfaction over institutional accountability, thereby framing transparency as a technical by-product rather than a transformative governance principle. As a consequence, the potential of e-government to fundamentally reshape public sector transparency and accountability structures remained limited during this initial phase.

In the 2010-2014 period, the themes expanded beyond technological experimentation to include e-government services, e-government implementation, government services, developing countries, framework agreements, and transparency. This expansion indicates a structural shift from system development toward large-scale institutional implementation, particularly within developing-country contexts. Analytically, the increasing prominence of transparency during this phase reflects growing awareness of governance quality, although transparency remained largely procedural and embedded within implementation frameworks rather than treated as an explicit governance outcome. This pattern suggests that e-government was increasingly viewed as an administrative reform instrument, yet its transparency effects were assumed rather than systematically examined. Previous research has shown that in developing countries, e-government can help overcome bureaucratic barriers and improve the accessibility of public services (Bhuiyan, 2011). The implication is that while implementation capacity expanded, the translation of digital adoption into substantive transparency outcomes remained constrained by institutional readiness and policy coherence.

In the 2015-2019 period, the thematic landscape became increasingly diverse, encompassing government data processing, blockchain, local government, government, developing countries, decision making, digital transformation, authentication, electronic document identification systems, citizen participation, digital communication systems, budget management, human resource management, and open data. This diversification reflects the maturation of e-government initiatives, marked by the integration of advanced digital technologies and a growing emphasis on participatory governance mechanisms. Analytically, transparency during this phase evolved from a procedural concern into a data-driven governance issue, closely linked to information accessibility, decision-making processes, and citizen engagement. This shift indicates that digital tools were increasingly deployed not only to automate services but also to support accountability and public oversight. Previous research has suggested that technologies such as blockchain can improve transparency and security in public services (Hyvärinen et al., 2017). The implication is that while technological sophistication expanded, the realization of transparency outcomes became contingent on institutional capacity, data governance frameworks, and the effective integration of participatory mechanisms.

In the 2020-2024 period, emerging themes include e-government, government, economics, digital transformation, computing theory, cloud computing, law and legislation, authentication, learning systems, and open data This thematic configuration reflects a consolidation phase in which e-government research increasingly integrates advanced digital infrastructures with legal, economic, and regulatory considerations. Analytically, transparency in this period becomes less dependent on technological availability and more contingent upon regulatory alignment, data protection mechanisms, and institutional learning capacities. This shift indicates a growing recognition that digital governance outcomes are shaped by the interaction between technology and legal-institutional frameworks rather than by innovation alone. This is consistent with research showing the need for strong regulation to ensure data security and privacy in e-government systems (Alharbi et al., 2021; Mavriki & Karyda, 2022). The implication is that without coherent legal and policy integration, the expansion of digital technologies risks reinforcing systemic vulnerabilities rather than advancing transparency and accountability in public services.

The results of this study indicate that there are both significant and persistent structural challenges in achieving e-government's impact on transparency in public services. While digital technologies demonstrate strong potential to enhance service efficiency and accessibility, analytical evidence shows that transparency outcomes remain uneven and conditional rather than automatic. This finding suggests that continuous adaptation and innovation must be accompanied by institutional readiness, governance reform, and policy coherence to effectively respond to the evolving needs and expectations of citizens in the digital age. Challenges such as the digital divide and data security are not merely technical issues but reflect deeper socio-institutional constraints, therefore requiring comprehensive, coordinated, and collaborative policy interventions to ensure that e-government systems can deliver equitable, transparent, and accountable, rather than solely responsive, public services to all citizens.

This research highlights the evolution of the topic of e-governance's impact on public service transparency, demonstrating a clear transformation in both scholarly discourse and practical implementation, from an initial focus on isolated technological applications to the integration of isolated technological applications to the integration of multifaceted digital governance strategies, including blockchain and cloud computing. Analytically, this evolution indicates that technological advancement alone is insufficient to generate transparency outcomes without complementary institutional, legal, and social frameworks. Interpreted through contemporary governance perspectives, this shift underscores the importance of adopting a multidimensional approach that transcends efficiency-oriented reforms to embed inclusiveness and accountability as core governance values (Trajkovski, 2024). The implication is that responsive governance in the digital age depends on the alignment of digital innovation with regulatory capacity, data protection, and social inclusion, particularly in addressing persistent challenges such as the digital divide, data privacy, and regulatory fragmentation. Therefore, a holistic digital governance approach is essential to ensure that public services evolve in a fair, transparent, and societally responsive manner in the digital era.

CONCLUSION

The findings of this research highlight the vital role of e-government in enhancing transparency, efficiency, affordability, and public participation in public services, particularly in the era of digital transformation. By synthesizing evidence across two decades of scholarly work, this study demonstrates that the adoption of advanced digital technologies such as the Internet,

https://doi.org/10.35308/jpp.v12i3.10798

blockchain, and cloud computing has significantly expanded the functional capacity of public service delivery systems. At the same time, the analysis reveals a clear evolution in the e government research trajectory, shifting from a predominantly technology centered focus toward broader governance-oriented concerns, including public participation, inclusiveness, and transparency. These findings confirm that transparency is not an automatic outcome of digitalization but a governance achievement that depends on the integration of technological innovation with institutional capacity, organizational culture, and active citizen engagement.

Despite its contributions, this research has several limitations that should be acknowledged. First, the analysis relies exclusively on publications indexed in the Scopus database, which may not fully capture the breadth of e government scholarship available in other bibliographic databases or gray literature. As a result, some regional or policy focused studies may be underrepresented. Second, the dataset includes publications only up to 2024, which means that recent developments in digital governance and emerging technologies are not fully reflected in the findings.

Future research should address these limitations by incorporating multiple bibliographic databases and additional sources to provide a more comprehensive representation of e government studies. Longitudinal and empirical research examining the governance implications of emerging technologies such as artificial intelligence and machine learning can offer deeper insights into the evolving relationship between digital transformation and transparency. Furthermore, cross regional comparative studies are recommended to explore how different socio economic and institutional contexts influence the effectiveness and challenges of e government implementation, thereby strengthening the foundation for inclusive and transparent digital governance frameworks.

Acknowledgment

The authors would like to express their sincere gratitude to the National Zakat Agency of Indonesia (BAZNAS) and the Central Board of Muhammadiyah for providing the 2024 Educational Scholarship for Master's Students, which supported the first author's postgraduate education and contributed to the completion of this research. The authors also gratefully acknowledge Universitas Muhammadiyah Sidenreng Rappang for its institutional and academic support throughout the research and manuscript preparation processes. Appreciation is further extended to the research team, academic colleagues, and institutional staff for their valuable assistance, constructive feedback, and technical support during the literature collection, data processing, analysis, and preparation of the manuscript.

CRediT authorship contribution statement

Hardinda Hardinda: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, and Writing – review & editing. Muhammad Rais Rahmat Razak: Conceptualization, Methodology, Supervision, Validation, and Writing – review & editing. Herman Lawelai: Formal analysis, Methodology, Software, Validation, Visualization, and Writing – review & editing. Achmad Nurmandi: Conceptualization, Supervision, Validation, Resources, and Writing – review & editing. Imron Sohsan: Data curation, Investigation, Resources, Validation, and Writing – review & editing. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of Interest

The authors declare that they have no known competing financial interests, professional affiliations, or personal relationships that could have influenced, or appeared to influence, the research reported in this article.

Ethical Statement

This study employed a systematic literature review and bibliometric analysis based exclusively on bibliographic metadata obtained from the Scopus database. The research did not involve human participants, animals, personally identifiable information, clinical interventions, surveys, interviews, or field experiments. Therefore, institutional ethical approval and informed consent were not required. Nevertheless, the study was conducted in accordance with established principles of research integrity, transparency, responsible data use, and academic ethics.

Data Availability

The bibliographic data analyzed in this study were obtained from the Scopus database using the search strategy, inclusion criteria, and analytical procedures described in the Method section. Due to the licensing and access restrictions of the Scopus database, the original raw records cannot be deposited or redistributed publicly. However, the cleaned dataset and analytical files supporting the findings of this study are available from the corresponding author upon reasonable request and subject to the applicable terms and conditions of the database provider.

Declaration of Generative AI Use

During the preparation of this manuscript, the authors used Quillbot and Grammarly to improve the clarity and readability of the text. Output generated by the tool were carefully reviewed and edited by the authors, who take full responsibility for the content of this article. All substantive intellectual contributions, including conceptualization, analysis, interpretation of data, and final decisions regarding content, arguments, and conclusions, were carried out solely by the authors. The authors take full responsibility for the integrity, originality, and academic quality of this article.

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