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The acceptance and adoption of technology on government environment: a bibliometric analysis

Hildawati[1], Muslimin Wallang[2], Mohd Dino Khairri Shariffuddin[2]
[1]Ghazali Shafie Graduate School of Government, University Utara Malaysia, Kedah, Malaysia
[2]School of Government, University Utara Malaysia, Kedah, Malaysia

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ABSTRACT

This study examines technology acceptance and adoption in government, particularly in the context of public service delivery, through a bibliometric analysis conducted using VOSviewer. The analysis aims to identify key research trends, thematic relationships, and emerging patterns in the field of digital governance. Data were retrieved from the Scopus database, covering publications related to the acceptance and adoption of technology in government from 2020 to 2025. The network visualization results indicate that artificial intelligence (AI), digital governance, public transport, e-health, and COVID-19 are among the dominant research themes, reflecting the rapid adoption of technology in transforming public services. The co-occurrence analysis reveals strong linkages among topics such as public health, AI, blockchain, and public trust, underscoring the increasing integration of digital technologies within governance systems. Furthermore, the overlay visualization demonstrates a thematic shift from fundamental studies on acceptance factors—such as trust, security, and digital literacy—toward implementation-oriented strategies, including digital transformation, smart governance, and public service efficiency. The findings suggest that technology adoption in public service continues to expand and diversify; however, significant challenges remain, particularly concerning data security, transparency, and citizen trust. Future research should focus on exploring the application of AI, the use of blockchain for governance, and the integration of internet of things (IoT) in smart city development to support a sustainable, efficient, and citizen-centric digital transformation in the public sector.

Corresponding Author:

Hildawati
Ghazali Shafie Graduate School of Government, University Utara Malaysia
Kedah, Malaysia
Email: hildrias81@gmail.com

1. INTRODUCTION

The government sector has undergone a profound digital transformation, with e-government emerging as a central driver of this evolution [1]. As digital governance becomes increasingly integral to administrative reform, e-government plays a vital role in modernizing public management systems and enhancing service delivery mechanisms. E-government functions as a digital system that serves as a centralized repository for managing public administration data, service records, civil documents, and electronic submission and payment processes for public services [2]. Beyond its basic administrative functions, e-government facilitates the integration of population data [3], licensing administration [4], and social and financial services through secure online platforms [5]. These capabilities underscore its potential to transform traditional bureaucratic systems into more data-driven, efficient, and transparent governance models.

Conceptually, e-government refers to the use of digital technologies and the internet by national and local governments to disseminate information and deliver services to citizens, businesses, and other institutions [6]–[8]. It encompasses various web-based applications implemented across local, regional, and national levels to enhance the accessibility, responsiveness, and efficiency of public administration [9]. At its core, e-government reflects the adoption of information and communication technology (ICT) to strengthen transparency, accountability, and the effectiveness of governance systems [10]. In Indonesia, e-government development focuses on advancing a modern, responsive, and participatory governance framework that aligns with rapid technological progress and shifting public expectations [11].

In this global context, countries such as Denmark, South Korea, Iceland, Australia, New Zealand, and Sweden have become benchmarks for e-government innovation. These nations have leveraged digital governance to improve efficiency, transparency, and citizen engagement. Conversely, developing countries remain at different stages of adoption. Indonesia, for instance, has made significant strides in recent years through strategic initiatives such as Presidential Regulation No. 95 of 2018 on the electronic-based government system (SPBE). This policy mandates the integration of digital services across government institutions to promote transparency and efficiency in public service delivery.

Despite these advancements, successful implementation requires deliberate planning, inter-agency collaboration, and stakeholder engagement centered on user needs [6]. E-government strengthens administrative efficiency by streamlining documentation processes, enhancing service quality, and mitigating bureaucratic redundancies [12], [13]. The system offers a range of benefits, including improved information security, reduced risks of data loss, faster public access to information, better inter-agency communication, and lower operational costs [14], [15].

Nevertheless, the transition toward digital governance is accompanied by persistent challenges. Key barriers include limited resources, inadequate training for officials and citizens, and generally low digital literacy levels [14], [16], [17]. Technical obstacles, such as unstable system infrastructure [18], data security concerns [19], and inconsistent platform performance [20], often constrain optimization efforts. Moreover, organizational and behavioral factors—such as user fatigue due to constant technological change, lack of confidence in system usage [21], and fluctuating public trust [22] significantly influence adoption outcomes [23], [24].

Drawing on these dynamics, this study aims to conduct a bibliometric analysis to map research trends in digital service adoption and acceptance across different governance contexts. The analysis focuses on identifying key publication patterns, major journal contributions, author influence, citation performance, and the geographical distribution of studies. Additionally, keyword mapping and network visualization using VOSviewer will be employed to understand thematic developments and intellectual structures within the field. The main objective is to synthesize empirical evidence on digital service adoption in government environments, generating insights to inform future research agendas and policymaking. This study is expected to provide a comprehensive overview of the global discourse on e-government adoption, highlighting both the challenges and opportunities that shape the acceleration of digital transformation within the public sector.

2. LITERATURE RIVIEW

The development of theories on technology acceptance and adoption began with the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975). TRA explains how individual attitudes and social norms shape one's intention to perform a particular behavior, including the acceptance of technology. The model posits that behavioral intention (BI) is determined by two main factors: attitude toward behavior (ATB) and subjective norm (SN) [25].

Subsequent theoretical advancement emerged with Ajzen's theory of planned behavior (TPB), which extends TRA by introducing an additional construct—perceived behavioral control (PBC). PBC refers to the degree to which an individual perceives control over performing a specific action. TPB has been extensively applied in technology acceptance research to elucidate how external and contextual factors influence users' BI and actions [26].

In line with the rapid evolution of digital technologies, Davis (1989) developed the technology acceptance model (TAM), specifically aimed at explaining technology acceptance within information systems [27]. TAM identifies two core determinants: perceived usefulness (PU), referring to the degree to which an individual believes that technology enhances their performance, and perceived ease of use (PEU), referring to how effortless the technology is to use. Over time, TAM has become one of the most influential and widely adopted models in information systems research and has undergone multiple refinements and extensions to accommodate emerging technological contexts.

To develop a more comprehensive framework for understanding technology adoption, Venkatesh *et al.* [28] proposed the unified theory of acceptance and use of technology (UTAUT). This model synthesizes core

components from the TRA, the TPB, and the TAM, while introducing four principal determinants: performance expectancy (PE), referring to the perceived benefits and efficiency gains of using technology; effort expectancy (EE), denoting the degree of ease associated with technology use; social influence (SI), describing the impact of social networks and peers on an individual's decision to adopt technology; and facilitating conditions (FC), representing the availability of organizational and technical support that enables effective technology utilization. Empirical studies have demonstrated that UTAUT provides stronger explanatory and predictive power for technology acceptance, particularly within organizational and work-related contexts.

In 2012, Venkatesh *et al.* [29] further refined this framework by developing UTAUT2, which focuses on technology acceptance at the individual or consumer level. The extended model incorporates three additional constructs: hedonic motivation, referring to the enjoyment and satisfaction derived from using technology; price value (PV), capturing the perceived trade-off between the benefits and monetary or effort-related costs of technology use; and habit, which reflects the degree to which repeated behaviors become automatic in users' interaction with technology. UTAUT2 has since been widely applied to examine technology adoption in various personal, social, and commercial contexts, offering deeper insights into behavioral dynamics beyond organizational settings.

The UTAUT3 extends the earlier UTAUT and UTAUT2 frameworks to better explain the factors influencing technology acceptance and usage. First introduced by Farooq *et al.* [30], UTAUT3 refines the UTAUT2 model by incorporating the construct of personal innovativeness in information technology (PIIT), which measures an individual's willingness and propensity to adopt new technologies. Additionally, the model removes the PV construct, which was deemed less relevant in certain adoption contexts. These theoretical enhancements demonstrate the continuous evolution of technology acceptance models, offering a more comprehensive understanding of user behavior while adapting to the dynamic digital landscape and supporting more effective technology implementation across diverse domains.

Beyond these frameworks, Everett Rogers' diffusion of innovation (DOI) theory provides another significant perspective on technology adoption [27]. DOI explains how technological innovations spread across social systems over time and classifies adopters into five categories based on the rate of adoption: innovators, early adopters, early majority, late majority, and laggards. The theory remains widely applied in examining how innovations are diffused and assimilated within societies, offering valuable insights for understanding large-scale technology adoption patterns.

As digital technology continues to advance, various technology acceptance models have evolved to incorporate emerging factors such as artificial intelligence (AI), the internet of things (IoT), and blockchain-based innovations. Future research in this domain is expected to further expand in scope, providing deeper insights into how users adapt to increasingly complex and rapidly evolving technological environments [31].

At present, a substantial body of academic literature employs bibliometric analysis to explore research on technology acceptance and adoption, yielding valuable insights. For example, studies using bibliometric and CiteSpace analyses have evaluated the distribution of articles, author contributions, and keyword patterns within this field. Moreover, VOSviewer software has been widely utilized to map and visualize research related to technology acceptance and adoption within the period from 2016 to 2025 [32]. These analyses typically examine aspects such as research types, theoretical frameworks applied, methodological approaches, collaboration networks among authors, and the journals that publish relevant studies. Despite the growing number of bibliometric investigations, research gaps remain—particularly in understanding the evolution of thematic trends and the shifting focus of emerging research topics. Addressing these gaps is crucial to developing a more comprehensive perspective on the progression and future directions of technology acceptance and adoption studies.

Studies in this field generally focus on systematic reviews and literature analyses, encompassing research that applies theoretical models such as the TAM, TPB, TRA, UTAUT, UTAUT2, and UTAUT3, as well as studies that cite the original UTAUT framework. With the rapid advancement of information technology, academic research on technology acceptance and adoption has grown substantially over the past two years. Consequently, tracking and synthesizing the expanding body of literature on this topic has become increasingly complex. Therefore, it is essential for researchers to develop a deeper and more comprehensive understanding of research trends to enhance user experience and strengthen the effective utilization of information technology.

Although literature review methods provide valuable insights into the evolution of research and the challenges encountered over time, they also present certain limitations. A key limitation lies in the subjective nature of analysis and the restricted number of articles typically included. Moreover, most existing studies have been carried out on a regional scale with limited temporal and thematic scope, constraining the ability to fully capture global patterns in technology acceptance and adoption research. To overcome these challenges, this study employs VOSviewer software to conduct scientific metrology analysis and visual network

mapping. The research performs a comprehensive bibliometric and qualitative analysis of literature on technology acceptance and adoption covering the period from 2020 to 2025, drawing data from the Scopus core collection.

The main objective of this study is to provide an extensive and in-depth overview of the global evolution of technology acceptance and adoption research while elucidating the knowledge structure underpinning this theoretical domain. Furthermore, this paper aims to identify the evolutionary trajectory of technology acceptance and adoption studies and to propose potential directions for future research at various stages of development. Through this approach, the study seeks to objectively reveal the current state of scholarship on technology acceptance and adoption, offering a robust scientific reference that can serve as a foundation for future investigations in this field. Additionally, the findings are expected to hold significant relevance for information science and related disciplines, enriching theoretical understanding and guiding subsequent empirical research.

3. METHOD

This study adopts a qualitative research methodology [33]–[35] combined with a literature review approach [36], [37], employing bibliometric analysis to examine trends in scholarly publications related to digital service adoption indexed in the Scopus database. The dataset was retrieved from Scopus, covering the period from 2020 to March 3, 2025, using the primary keywords "technology acceptance and technology adoption in government" and the additional keyword "public service." The data collection process followed the guidelines of the preferred reporting items for systematic reviews and meta-analyses (PRISMA), with minor adjustments to accommodate the study's objectives.

To ensure methodological transparency and reproducibility, the study selection process was defined a priori and reported in accordance with PRISMA 2020. The information source was the Scopus database, and searches were limited to English-language publications dated 2020 through March 2025. Records were eligible if they were peer-reviewed research articles examining technology acceptance or adoption within government or public service contexts and employed acceptance/adoption frameworks or related constructs (e.g., TAM, UTAUT, DOI, trust, privacy). Records were excluded if they fell outside the time window, were non-article items (editorials, notes, short communications, encyclopedia entries, or conference abstracts without full papers), focused on private-sector settings without a public context, or were purely technical studies lacking acceptance/adoption variables. Duplicate records were removed using DOI/title de-duplication procedures. The resulting inclusion and exclusion criteria are summarized in Table 1 and align with the PRISMA flow diagram reported in the results section.

Table 1. Study selection criteria (PRISMA-consistent)

Domain	Inclusion	Exclusion (with reasons)
Information source	Scopus database	Other sources not searched (not applicable)
Timeframe	Publications dated 2020 to March 2025	Outside the specified timeframe
Document type	Peer-reviewed research articles	Non-articles: editorials, notes, short communications, encyclopedia entries; conference abstracts without full papers
Language	English	Non-English
Topic scope	Technology acceptance/adoption in government or public services	Private-sector or non-government settings without a public-service context
Theoretical relevance	Uses acceptance/adoption constructs or frameworks (e.g., TAM, UTAUT, DOI, trust/privacy and related constructs)	Purely technical studies without acceptance/adoption variables or frameworks

After compiling the table, the next step is to search for documents that meet the criteria listed in Table 1. The initial search identified 1,259 articles containing the specified keywords published between 2000 and March 2025. The results were then refined by selecting only publications from 2020 onward, narrowing the dataset to 704 articles. Further filtering was applied to include only peer-reviewed research articles, yielding a sample of 569 studies. The next step in the screening process involved reviewing articles that met several criteria, including the use of appropriate methodologies and the presentation of complete and transparent data, resulting in 305 eligible articles. In the final stage, 273 research articles were included in the analysis, as their focus was deemed relevant to the objectives of this study. Figure 1 illustrates the article screening and analysis process.

For data processing and analysis, the retrieved results were exported from Scopus in RIS format and subsequently imported into VOSviewer software to construct bibliometric maps and visualize research

networks. In addition, Mapchart software was utilized to display the geographical distribution of publications based on keywords and country affiliations.

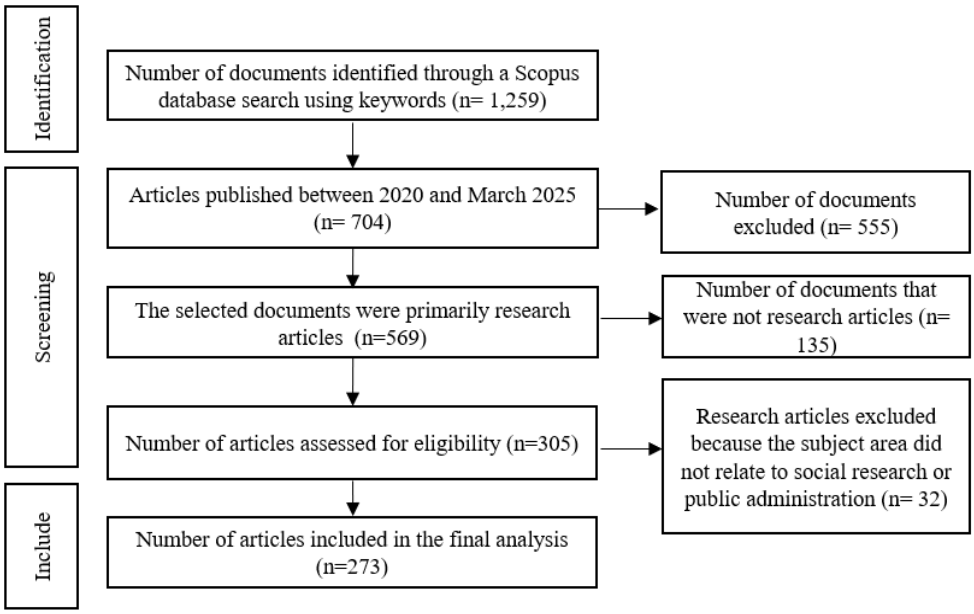

Figure 1. PRISMA flowchart

4. RESULS AND DISCUSSION

Between 2000 and 2025, five articles have received the highest number of citations, marking them as seminal works that have significantly influenced academic discourse. These studies serve as foundational references in research on technology acceptance and technology adoption in government, particularly in the context of public service innovation and digital governance transformation. Table 2 presents a list of highly cited articles along with their authors and corresponding journals, highlighting publications with the greatest influence on academic metrics. The article titled "A survey on blockchain for information systems management and security," authored by David Berdik in 2021 and published in the Journal of Information Processing and Management, has received 688 citations [38]. This publication ranks as the most frequently referenced source in subsequent research studies.

Table 2. Most cited articles

No.	Author	Title	Journal	Publication year	Cites
1	Berdik *et al.* [38]	A survey on blockchain for information systems management and security	Information Processing and Management	2021	688
2	Kuziemski and Misuraca [39]	AI governance in the public sector: three tales from the frontiers of automated decision-making in democratic settings	Telecommunications Policy	2020	603
3	Fisk *et al.* [40]	Telehealth in the Context of COVID-19: changing perspectives in Australia, the United Kingdom, and the United States	Journal of Medical Internet Research	2020	516
4	Dhagarra *et al.* [41]	Impact of trust and privacy concerns on technology acceptance in healthcare: an Indian perspective	International Journal of Medical Informatics	2020	420
5	Pangbourne *et al.* [42]	Questioning mobility as a service: unanticipated implications for society and governance	Transportation Research Part A: Policy and Practice	2020	390

Following the identification of the most cited articles, citation data were analyzed using VOSviewer software to determine the most frequently occurring keywords in related research. VOSviewer facilitated the mapping and visualization of bibliometric trends in the field of technology acceptance and technology

adoption in government, particularly within the domain of public service. This stage provides a comprehensive understanding of the conceptual development, research patterns, and emerging themes that define the evolution of this field.

Co-occurrence analysis in technology acceptance and technology adoption in government research, particularly in public service. Co-occurrence refers to the frequency with which two or more keywords or topics appear together within a publication. This frequency reflects the thematic relationships and conceptual linkages among research areas within a particular field of study. In the context of technology acceptance and technology adoption in government research, particularly related to public service, co-occurrence analysis serves as a valuable tool for identifying dominant research themes and frequently explored concepts. This analysis was conducted using visualization results generated through VOSviewer software, which facilitates the mapping of relationships between keywords across a wide range of academic publications.

4.1. Network visualization based on co-occurrence

In this network visualization, various closely related keywords in technology acceptance and technology adoption in government research, particularly in public service, can be identified, as shown in Figure 2. Figure 2 presents a network visualization generated using VOSviewer, illustrating the connections among keywords in academic research. Each node (circle) represents a keyword appearing in scientific publications, while the size of the node corresponds to its frequency of occurrence. The connecting lines between nodes indicate co-occurrence relationships, showing how often particular keywords appear together within research studies.

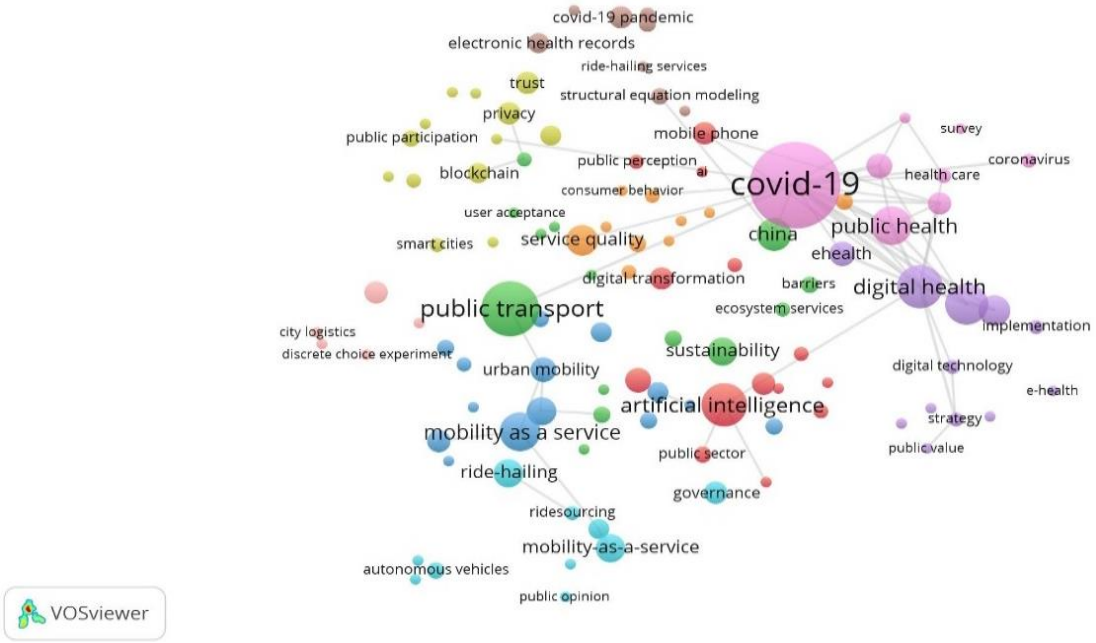

Figure 2. Network visualization based on co-occurrence

From this visualization, several key terms frequently appear in research related to digital health and public transportation. The keyword COVID-19 (light purple) is strongly associated with digital health, public health, and e-health, reflecting how the pandemic accelerated technology adoption in public services and digital healthcare systems. Similarly, the term AI is closely connected to themes such as the public sector, governance, and sustainability, suggesting an increasing adoption of AI to enhance the efficiency and responsiveness of government services. The keywords public transport and mobility as a service (blue) highlight the growing role of digital platforms in service-based transportation systems managed or supported by the government, including ride-hailing and urban mobility solutions.

The keyword COVID-19 is strongly associated with digital health, e-health, electronic health records, and public health, emphasizing that much of the research in this area focuses on how technology supports pandemic response and the digitalization of healthcare services within government systems. Additionally, the keywords AI and governance are thematically linked to public service innovation, reflecting the growing adoption of AI in government administration, particularly for enhancing digital integration and

efficiency in public service delivery. The association between blockchain and trust highlights how public confidence in digital government services can be strengthened through blockchain-based mechanisms that promote transparency and ensure data security. Furthermore, the thematic relationship between blockchain adoption and smart city development suggests that digital technologies play a critical role in advancing smart city initiatives, enabling more efficient and sustainable public transportation systems.

The visualization results demonstrate that the adoption of digital technologies in government and public services continues to expand, largely driven by pandemic-related demands. Core themes such as digital health, AI, blockchain, and smart cities represent significant areas of innovation shaping the future of digital governance. The visualization also reveals that research on technology acceptance in public services is continuously evolving, with increasing emphasis on data security, transparency, and service efficiency. These findings provide researchers with valuable insights into emerging research trajectories and potential directions for future exploration of technology acceptance and adoption within the governmental context.

4.2. Overlay visualization based on co-occurrence

Based on the overlay visualization results, it can be concluded that research on technology acceptance and technology adoption in government, particularly in the context of public service, encompasses a range of interrelated themes and has progressively evolved over time. Figure 3 presents the co-occurrence network visualization of keywords generated using VOSviewer, illustrating thematic relationships within research on technology acceptance and technology adoption in government, particularly in the context of public service. The visualization reveals interconnected themes such as digital health, AI, public transportation, and the impact of COVID-19 within this research domain. The overlay visualization further illustrates research development over time through a color gradient ranging from blue (2021) to yellow (2024). Keywords depicted in blue or dark green represent topics that were more prominent in earlier studies, while those in light green to yellow indicate emerging or more recent research themes. The size of each node corresponds to the frequency of keyword occurrence in academic literature, with larger nodes representing higher frequency. The connecting lines between nodes depict co-occurrence relationships, showing how often specific keywords appear together within the same studies.

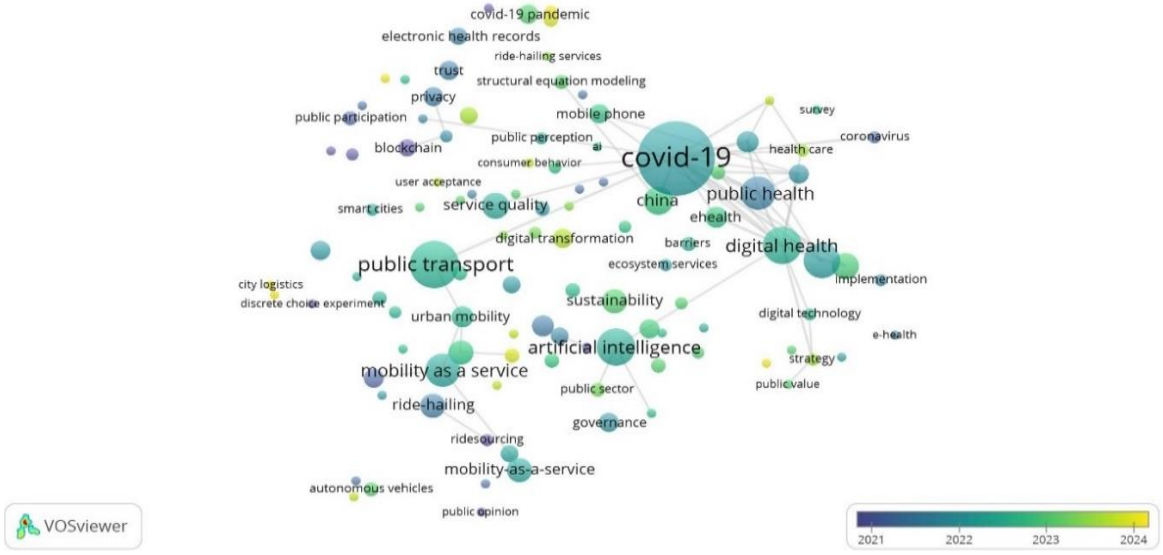

Figure 3. Co-occurrence network visualization of keywords

Several large nodes with strong interconnections represent the dominant research themes. The keyword “COVID-19” appears with high frequency, highlighting how the pandemic accelerated technology adoption in public services, particularly in areas related to digital health, public health, and e-health. “Artificial Intelligence (AI)” is another prominent keyword, closely associated with the public sector, governance, and sustainability, suggesting an increasing integration of AI in government operations and sustainability initiatives. The keywords “public transport” and “mobility as a service” demonstrate a clear linkage between transportation systems, ride-hailing platforms, and urban mobility, reflecting a broader shift toward efficient, digitally integrated transportation and service systems within the public sector.

Research conducted between 2021 and 2022 (represented in blue and dark green) primarily focused on the fundamental aspects of technology adoption, such as blockchain, trust, privacy, and structural equation modeling. These studies emphasized concerns regarding trust and security in the implementation of digital technologies within government systems. In contrast, research published between 2023 and 2024 (represented in light green and yellow) shifted its attention toward the practical aspects of digital strategy implementation, with dominant themes including digital transformation, strategic management, and public value creation. This shift indicates a transition in research focus from examining factors influencing technology acceptance to exploring the practical application of digital technologies in public service delivery.

The overlay visualization results suggest that research on technology acceptance and adoption in public services continues to evolve dynamically. Early studies predominantly examined influencing factors such as trust, user perception, and data security. However, more recent research has shifted toward strategic implementation and the broader impact of technology utilization in governance. Future research could explore opportunities to leverage AI, blockchain, and digital transformation initiatives to enhance public service efficiency, while also addressing key challenges related to data security, transparency, and public acceptance of emerging technologies within government systems.

4.3. Density visualization based on co-occurrence

Density visualization in bibliometric analysis provides valuable insights into frequently studied research topics and areas with potential for further investigation. In the analyzed figure, brighter areas indicate topics that have been extensively explored in the academic literature, while darker areas represent underexplored themes, signaling potential research gaps. Bright yellow areas highlight the most frequently occurring keywords, showing research topics that have attracted substantial academic attention. In contrast, green to dark blue areas represent less frequently studied keywords, revealing domains that still offer opportunities for deeper exploration. The text size and color density indicate the relative influence or significance of each topic within the overall research network. This analysis enables researchers to identify emerging trends and research gaps in the field of technology acceptance and adoption within public governance, thereby guiding future studies toward areas of growing importance and innovation potential.

Figure 4 presents the density visualization produced using VOSviewer, illustrating the most frequently discussed research topics in the literature, as well as areas with potential for further exploration. Bright yellow areas indicate topics that have been extensively studied, reflecting research domains that have attracted considerable academic attention. In contrast, green to dark blue areas represent less frequently discussed topics, highlighting opportunities for future research in these emerging fields.

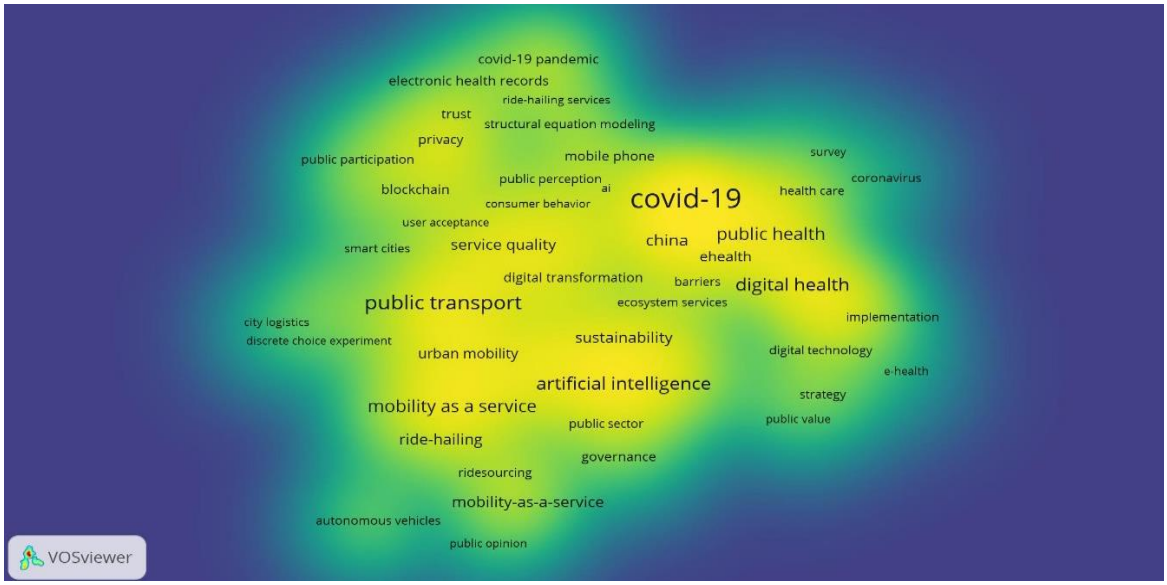

Figure 4. Density visualization generated using VOSviewer

Several high-density keywords appear in this visualization. First, COVID-19 emerges as one of the most dominant research topics, demonstrating how the pandemic accelerated technology adoption in public services—particularly in digital health, public health, and e-health. Second, AI frequently appears in

association with governance, the public sector, and sustainability, indicating that AI is increasingly being applied to enhance public administration and service delivery. Third, public transport and mobility as a Service reflect the growing integration of digital technologies in government-managed transportation systems, including ride-hailing platforms and urban mobility solutions. Research trends and future opportunities. Topics displayed in bright yellow—such as COVID-19, digital health, and AI—represent major areas of research that have dominated recent academic attention. Meanwhile, topics in green to blue shades—such as public opinion, blockchain, and digital transformation—suggest promising areas with substantial potential for future scholarly investigation.

Existing research has focused extensively on the role of technology during crises such as the COVID-19 pandemic, which catalyzed the digitalization of public services. AI continues to gain importance in government sectors, creating new opportunities for studies on AI ethics, decision-making processes, and governance impact. Blockchain and trust mechanisms remain critical to digital public service adoption, underscoring the necessity of robust policies to enhance transparency, accountability, and data security in e-government systems. Based on these findings, future research should prioritize developing effective implementation strategies for emerging technologies in government, fostering public trust in digital services, improving service efficiency, and promoting a more inclusive and sustainable digital transformation within the public sector.

5. CONCLUSION

The growth analysis of research on technology acceptance and technology adoption in public services within the government sector reveals a substantial increase in publications beginning in 2021, reaching its peak in 2023, followed by a slight decline in 2024. External factors such as the COVID-19 pandemic and the accelerated pace of digital transformation have served as major catalysts for this development, underscoring the necessity of policy adaptation and strategic technological initiatives in public service delivery. The growing number of annual citations in this field further indicates that technology-focused research in government is attracting broad scholarly attention, reflecting the increasing relevance and urgency of digital technology adoption in the public sector.

Collaboration among researchers in this domain has also intensified, as demonstrated by the network visualization generated through VOSviewer. The interconnections between keywords such as AI, digital governance, public transport, and e-health confirm that technological integration in government administration has emerged as a rapidly expanding research focus. Patterns of co-authorship in these studies illustrate a high degree of scientific collaboration and synergy, contributing to innovation and enhancing the efficiency and effectiveness of digital government systems.

From a co-occurrence perspective, this study identifies strong thematic relationships among key topics including public health, digital health, AI, and public transport. These connections suggest that digitalization of public services and the implementation of technology-driven governance have become central priorities for both researchers and practitioners. The visualizations produced using VOSviewer provide deeper insights into the interrelationships among these themes, thereby offering valuable input for policymakers seeking to design more effective technology adoption strategies in governmental contexts. Overall, this analysis highlights that technology adoption in public services is not only accelerating but also diversifying—encompassing critical dimensions such as data security, transparency, service efficiency, and public trust in digital systems. Accordingly, the findings of this study can serve as a foundational reference for formulating digital transformation policies within the public sector, ensuring that government institutions remain adaptive, responsive, and aligned with evolving societal needs and technological innovations.

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AUTHOR CONTRIBUTIONS STATEMENT

The author independently carried out all stages of this research, including conceptualization, methodology, data collection, formal analysis, and interpretation. The manuscript was solely written, revised, and finalized by the author. All responsibilities regarding the accuracy and integrity of the work rest with the author.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Hildawati	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Muslimin Wallang	✓	✓				✓		✓	✓	✓		✓	✓	
Mohd Dino Khairri Shariffuddin	✓	✓				✓		✓	✓	✓		✓	✓	

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The author declares no known competing financial interests, personal relationships, or professional associations that could have influenced the work reported in this paper. Additionally, there are no non-financial competing interests, including political, personal, religious, ideological, academic, or intellectual conflicts, that may affect the objectivity of this study. Authors state no conflict of interest.

DATA AVAILABILITY

The data that support the findings of this study are available from the author upon reasonable request. Due to [ethical/privacy/confidentiality] considerations, some data may be subject to restrictions and cannot be publicly shared.

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BIOGRAPHIES OF AUTHORS

Hildawati is a lecturer at the Lancang Kuning College of Administrative Sciences in Dumai, Indonesia. She earned her bachelor's degree in social administration from Universitas Riau in 2005. In 2012, she obtained her master's degree in public administration with a concentration in public policy from Universitas Islam Riau. Currently, she is pursuing her Ph.D. at Universiti Utara Malaysia in the School of Government. Her research focuses on the use of technology in governance. She has produced several academic manuscripts to support policy formulation in the Dumai City Government. She is also actively engaged in writing books and has obtained twelve national copyrights from the Ministry of Law and Human Rights of Indonesia for her works. She can be contacted at email: hildrias81@gmail.com or hildawati_h@uum.edu.my.

Muslimin Wallang is an associate professor at the School of Government, Universiti Utara Malaysia. He earned her bachelor's degree in public management from Universiti Utara Malaysia in 2001. In 2003, he obtained his master of science in public service management from the University of Birmingham, United Kingdom. He then completed her Ph.D. in e-government at the University of Queensland in 2008. His research focuses on public policy and administration, local government studies, particularly in the areas of e-government, ICT in the public sector, cybersecurity, and public sector management. He can be contacted at email: muslimin@uum.edu.my.

Mohd Dino Khairri Shariffuddin is an associate professor at the School of Government, Universiti Utara Malaysia. He earned his bachelor's degree in International Affairs Management from Universiti Utara Malaysia in 2001. In 2004, he obtained his master of science in political science (international relations) from Universitas Gadjah Mada, Indonesia. He then completed his Ph.D. in politics and international studies at the University of Leeds, United Kingdom, in 2008. His research focuses on comparative politics, Malaysian politics, and electoral studies, particularly in the areas of elections, leadership, and democracy. His academic interests include political economy, electoral systems, leadership, democracy and democratization, political parties, and student movements in Malaysia and Indonesia. He frequently receives research grants from leading institutions such as YADIM, FRGS, *Geran Agensi Luar* (in-country) *Awam*, and the Universiti Utara Malaysia grant. He can be contacted at email: dino@uum.edu.my.