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Citizen Trust and Digital Governance Transformation: Ethical Challenges and Artificial Intelligence Governance in the Public Sector

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Abstract

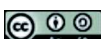
The study explores the development of academic research on citizen trust in AI-enabled public governance, with a particular emphasis on ethical considerations, explainable AI, and digital transformation of government. Data were collected from the Scopus database using a scientometric approach and analyzed using Biblioshiny in RStudio to perform bibliometric mapping. The study revealed the publication patterns, leading authors, leading countries, highly cited papers, research issues, and collaborative networks from 2021 to 2025. The data indicate a significant increase in publications, reflecting growing academic interest in transparency, accountability, and trust in public-sector AI applications. The intellectual structure of the field was shaped by key research themes, including artificial intelligence, explainable artificial intelligence, AI governance, and trust. The United States, Germany, the United Kingdom, the Netherlands, and China have been the main donating countries to scientific production. The findings also reveal that explainability, ethical governance, institutional legitimacy, and algorithmic transparency are important elements for increasing citizen trust and facilitating the uptake of AI-based public services. This paper contributes to the literature by providing a comprehensive assessment of global research trends and future directions for trustworthy, inclusive, and citizen-centric digital government.

Keywords: Citizen trust, artificial intelligence governance, explainable artificial intelligence, digital governance, public sector transformation

Abstrak

Studi ini mengeksplorasi perkembangan penelitian akademis tentang kepercayaan warga terhadap pemerintahan publik yang didukung oleh AI, dengan penekanan khusus pada pertimbangan etis, AI yang dapat dijelaskan, dan transformasi digital pemerintah. Data dikumpulkan dari basis data Scopus menggunakan pendekatan scientometric dan dianalisis dengan menggunakan Biblioshiny di RStudio untuk melakukan pemetaan bibliometrik. Studi ini mengungkap pola publikasi, penulis terkemuka, negara terkemuka, makalah yang banyak dikutip, isu penelitian, dan jaringan kolaboratif dari tahun 2021 hingga 2025. Data tersebut menunjukkan peningkatan signifikan dalam publikasi, yang menunjukkan minat akademis yang semakin besar dalam transparansi, akuntabilitas, dan kepercayaan dalam aplikasi AI sektor publik. Struktur intelektual bidang ini dibentuk oleh tema-tema penelitian utama seperti kecerdasan buatan, kecerdasan buatan yang dapat dijelaskan, tata kelola AI,

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dan kepercayaan. Amerika Serikat, Jerman, Inggris Raya, Belanda, dan China telah menjadi negara-negara utama yang menyumbang pada produksi ilmiah. Temuan tersebut juga mengungkapkan bahwa keterjelasan, tata kelola etis, legitimasi institusional, dan transparansi algoritmik adalah elemen penting untuk meningkatkan kepercayaan warga dan memfasilitasi penerapan layanan publik berbasis AI. Makalah ini memberikan kontribusi pada literatur dengan menyediakan penilaian komprehensif tentang tren penelitian global dan arah masa depan untuk pemerintahan digital yang dapat dipercaya, inklusif, dan berpusat pada warga.

Kata Kunci: Kepercayaan warga, tata kelola kecerdasan buatan, kecerdasan buatan yang dapat dijelaskan, tata kelola digital, transformasi sektor publik

INTRODUCTION

Digital transformation has increasingly reshaped public administration through e-government, automation, and artificial intelligence (AI), creating new opportunities to improve public service delivery, administrative efficiency, and accountability (Hornjak, 2024). However, technological capability alone does not determine the success of digital government. Citizen trust remains an important condition for the acceptance and legitimacy of technology-enabled public services (Kala et al., 2024). Although digital technologies can improve service quality, citizens may continue to prefer human interaction with public officials, suggesting that technological efficiency should be accompanied by transparency, responsiveness, and a human-centered approach (Jaspers & Migchelbrink, 2023; Ranerup & Henriksen, 2019). Public trust, therefore, represents an increasingly important dimension of digital government transformation.

The emergence of AI in public-sector decision-making has expanded these concerns beyond conventional e-government. AI can support administrative processes and policy development, but its adoption also raises questions about algorithmic bias, information security, accountability, transparency, and the legitimacy of automated decisions (Alrawahna et al., 2025; Bokhari et al., 2025). Public trust is consequently relevant to the development of AI-enabled public services because citizens must perceive AI-supported decisions as reliable, understandable, and consistent with public values. Explainable artificial intelligence (XAI) has emerged in this debate as a mechanism to improve transparency and enable stakeholders to understand how AI systems make decisions (Khakurel & Rawat, 2022). At the same time, transparency alone may not automatically generate trust, particularly when greater disclosure reveals institutional weaknesses or poor government performance (Knoll et al., 2023).

Despite the growing literature on AI governance, XAI, citizen trust, and digital government, the knowledge structure connecting these themes remains fragmented across disciplines and research communities. Existing studies have addressed individual dimensions such as e-government trust, algorithmic transparency, AI governance, and explainability (Bian et al.,

2025; Criado et al., 2020), but there is still limited systematic mapping of how these themes have evolved together within the public governance literature. This gap is particularly important because the rapid expansion of AI applications has shifted research attention from digital service adoption toward questions of ethical governance, institutional legitimacy, accountability, and citizen-centered AI. A comprehensive scientometric assessment is therefore needed to identify the development and intellectual structure of this emerging research field.

Accordingly, this study employs a bibliometric and scientometric approach to map research on citizen trust, AI governance, explainable artificial intelligence, and digital government transformation. Rather than measuring the empirical impact of technology on citizens or examining citizens' preferences directly, the study investigates publication trends, influential authors and documents, leading countries, collaboration patterns, keyword structures, thematic developments, and emerging research directions during 2021–2025. The analysis also examines how research has evolved from e-government and institutional trust toward AI governance, explainability, transparency, ethics, and trustworthy digital government.

This study contributes to the literature by integrating these interconnected themes within a single scientometric framework. Unlike studies that focus on specific applications, individual governance mechanisms, or isolated dimensions of public trust, this research provides a broader mapping of the field's intellectual, conceptual, and collaborative development. The findings are intended to identify dominant and emerging themes and to highlight future research agendas concerning public administration, policy development, institutional legitimacy, citizen trust, and responsible digital governance.

RESEARCH METHODS

This study employed a scientometric approach to examine the development, intellectual structure, and emerging themes of research on citizen trust, AI governance, and explainable artificial intelligence (XAI) in public governance. The study was designed as a bibliometric/scientometric mapping study rather than a systematic literature review (SLR). Accordingly, the analysis focused on quantitatively mapping publication trends, citation patterns, collaboration networks, keyword relationships, and thematic structures rather than conducting a qualitative synthesis of individual studies. Bibliographic data were retrieved from the Scopus database on 15 June 2026, selected because of its broad coverage of peer-reviewed scholarly literature (Baas et al., 2020).

The final search query was: (TITLE-ABS-KEY ("Citizen Trust") OR TITLE-ABS-KEY ("AI Governance") OR TITLE-ABS-KEY ("Explainable Artificial Intelligence")) AND PUBYEAR > 2020 AND PUBYEAR < 2026 AND (LIMIT-TO (SUBJAREA , "SOC")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (OA , "all")). The search was restricted to publications from 2021 to 2025, the Social Sciences subject area, research articles, English-

language publications, journal sources, and open-access records. These criteria were applied to establish a focused and reproducible bibliographic corpus.

Screening and Data Preparation

The initial Scopus search yielded 20,547 records. After applying the predefined publication-year, subject-area, document-type, language, source-type, and open-access filters, 1,205 records remained for screening. Subsequently, 455 records were excluded, resulting in a final dataset of 750 publications. The selection process was documented using a modified PRISMA 2020 flow structure (Page et al., 2021). to transparently report the identification, filtering, screening, and final selection stages. PRISMA was used as a reporting framework for the bibliographic selection process and does not indicate that the study constitutes an SLR.

The final records were exported from Scopus in CSV format and processed using R version 4.4.2, with the Bibliometrix package and Biblioshiny interface. Data preparation involved checking metadata completeness, identifying potential duplicate records, and standardizing author keywords and related textual fields to minimize inconsistencies in subsequent analyses. The cleaned dataset of 750 publications was then prepared for scientometric analysis.

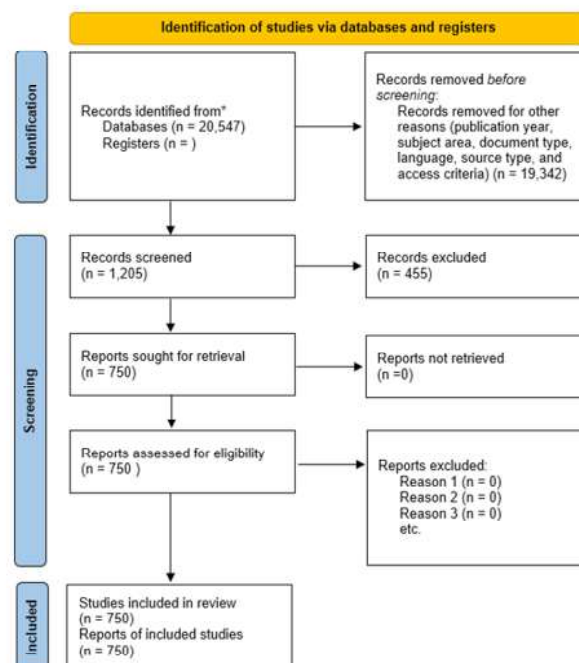


Figure 1. PRISMA Research Method

Source: Adapted from Page et al., (2021) Generated thought PowerPoint

Scientometric Analysis

The scientometric analysis examined annual scientific production, citation performance, authorship and collaboration patterns, keyword frequency and co-occurrence, thematic structures, and research theme evolution. Citation analysis was used to identify influential publications, while co-authorship analysis examined patterns of scientific collaboration. Keyword co-occurrence analysis was used to identify major conceptual clusters and relationships among research topics. Thematic analysis was conducted to identify established, emerging, and evolving themes within the research field.

The analyses were performed using Bibliometrix/Biblioshiny in R 4.4.2 to identify the intellectual, conceptual, and collaborative structures of research on citizen trust, AI governance, explainable artificial intelligence, and digital government transformation. The combination of a comprehensive Scopus search query, explicit inclusion and exclusion criteria, documented screening procedures, data-cleaning steps, and defined scientometric indicators was intended to enhance the study's transparency, reproducibility, and methodological rigor.

RESULTS, DISCUSSION, AND ANALYSIS

Key Information Data

The publication trend on explainable artificial intelligence, public trust, and AI governance increased substantially between 2021 and 2025, rising from 58 to 314 articles. This growth reflects expanding scholarly attention to accountability, transparency, ethical AI, and public trust in AI-enabled decision-making. The increasing emphasis on explainability suggests that researchers increasingly view transparency as essential for improving public acceptance and institutional legitimacy. Overall, the trend demonstrates a shift from technological adoption toward responsible, trustworthy, and citizen-centered AI governance in the public sector.

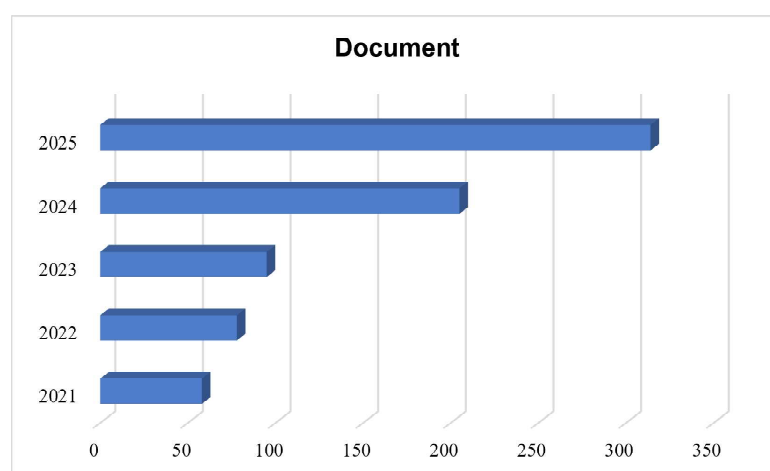


Figure 2. Number of Publications from 2021-2025
Source: Author Generated through Scopus

Figure 2 shows a substantial increase in publications on citizen trust and digital governance transformation from 2021 to 2025. The number of publications rose from 58 in 2021 to 78 in 2022 and 95 in 2023, before increasing sharply to 205 in 2024 and 314 in 2025. This accelerating growth indicates expanding scholarly attention to ethical challenges and AI governance in the public sector. The trend suggests that AI-enabled governance has become an increasingly significant research area, particularly regarding trust, transparency, accountability, and responsible digital transformation.

Research Topic Trends and Thematic Evolution

This part discusses the evolution of the research theme developed during the observation period. Topic trend analysis is applied to identify the most prominent issues, track changes in research focus over time, and chart the directions of development in studies on AI governance, public trust, and the digital transformation of government.

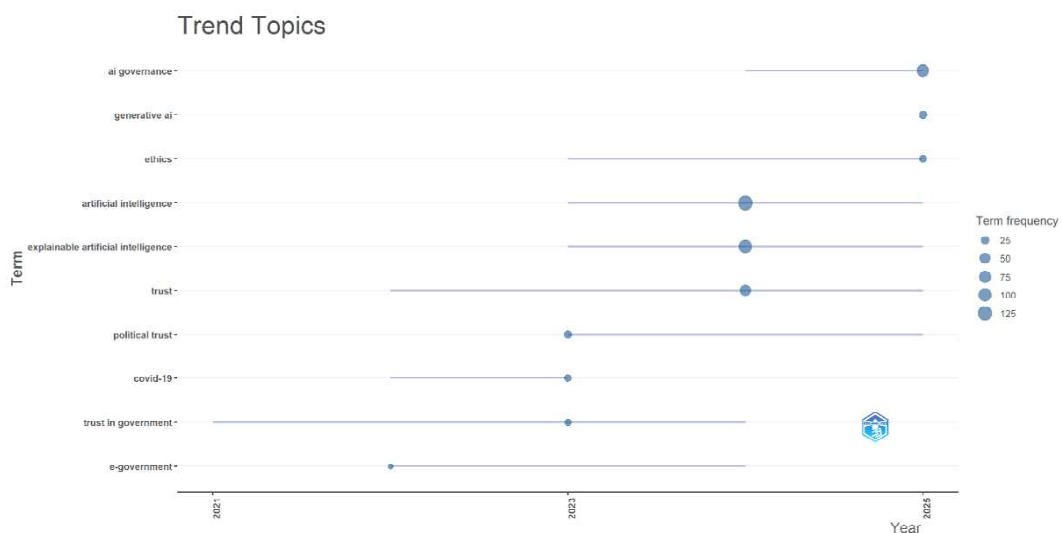


Figure 3. Research Topic Trends 2021-2025
Source: Generated by the Authors using Biblioshiny (R Studio)

Figure 3 illustrates the evolution of research topics from 2021 to 2025. Early research focused on e-government, trust in government, and COVID-19, reflecting concerns about digital public services and institutional trust. By 2023–2024, attention shifted toward political trust, artificial intelligence, and explainable artificial intelligence. In 2025, emerging themes included ethics, generative AI, and AI governance, indicating a growing emphasis on responsible and transparent AI adoption. Overall, the trend demonstrates a shift from digital government toward trustworthy, ethical, and accountable AI-enabled public governance.

Most Influential Authors and Citation Impact

In this section, the authors who have had a considerable impact on the development of the related literature of AI governance and citizen trust are identified. Citation analysis is used to assess the intellectual contribution, scientific impact, and role of researchers in shaping the research agendas and the global academic discourse.

Table 1. Famous Authors by Publications and Citations

Name	Documents	Total citations
Grimmelikhuijsen, S.	7	738
Christensen, T.	3	632
Fosch-Villaronga, E.	3	66
Gašević, D.	3	931
Kuai, J.	3	45
Mabillard, V.	3	22
Mauk, M.	3	72
Müller, R.	3	18
Ulnicane, I.	3	146
Adak, A.	2	166

Source: Author Generated through Scopus

Table 1 shows that Grimmelkhuijsen, S. has the highest publication output with seven documents and 738 citations, indicating sustained research productivity and strong scholarly impact. Gašević, D. records the highest citation count (931) despite having only three publications, suggesting that several highly influential studies significantly shaped the field. Authors with fewer documents, such as Adak, A., may reflect more recent or specialized contributions. Lower citation counts among some authors may indicate newer publications, narrower research visibility, or limited time to accumulate citations during the 2021–2025 period.

Leading Countries in AI Governance Research

This section evaluates the geographical distribution of research by country. The analysis is conducted to understand global contribution patterns, research capacity, and the positions of leading countries in advancing research on AI governance, transparency, and public trust.

Country Scientific Production

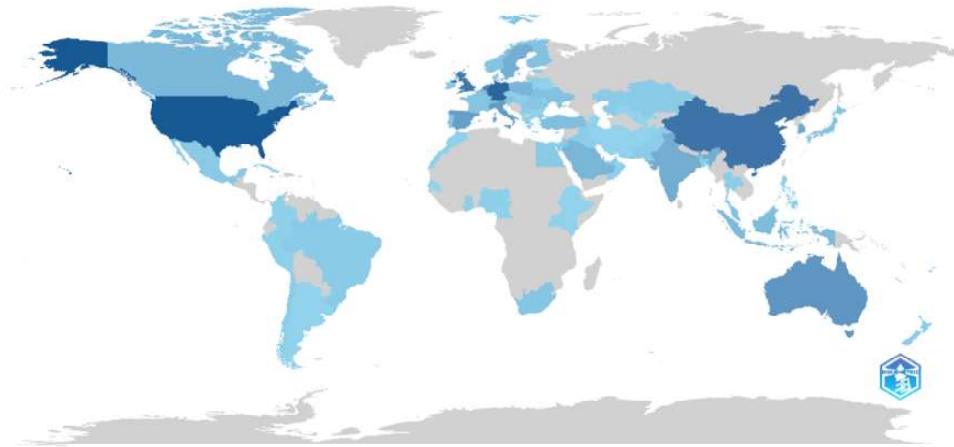


Figure 4. Most Productive Countries from 2021-2025

Table 2. Country Scientific Production by Year, 2024–2025

Country	Year	Articles
USA	2025	216
GERMANY	2025	193
CHINA	2025	167
UNITED KINGDOM	2025	162
NETHERLANDS	2025	142
GERMANY	2024	114
UNITED KINGDOM	2024	103
USA	2024	103
NETHERLANDS	2024	84
CHINA	2024	81

Source: Author generated through Rstudio

Figure 4 and Table 2 illustrate the geographic distribution and annual scientific output on citizen trust and AI-enabled public governance. In 2025, the United States recorded the highest annual output with 216 articles, followed by Germany (193), China (167), the United Kingdom (162), and the Netherlands (142). In 2024, Germany led with 114 articles, followed by the United Kingdom and the United States, each with 103. These patterns indicate strong research capacity across North America, Europe, and Asia in shaping the emerging AI governance agenda.

Most Influential Publications and Citation Impact

This section highlights publications with the highest citation rates and the greatest influence in the field of research. The analysis of influential documents helps explain the theoretical foundations, conceptual developments, and key contributions that shape the direction of research on AI governance and explainable AI.

Table 3 Ten most Cited Documents

Paper	Tc	TC per Year	Normalized TC
KHOSRAVI H, 2022, COMPUT EDUC	691	138,20	12,85
LANGER M, 2021, ARTIF INTELL	569	94,83	7,84
TAEIHAGH A, 2021, POLICY SOC	415	69,17	5,72
VAN DER WAA J, 2021, ARTIF INTELL	384	64,00	5,29
MESKE C, 2022, INF SYST MANAGE	366	73,20	6,81
ASKR H, 2023, ARTIF INTELL REV	345	86,25	7,78
MANSOOR M, 2021, GOV INF Q	309	51,50	4,26
LAUX J, 2024, REGUL GOVERNANCE	298	99,33	13,87
SIALA H, 2022, SOC SCI MED	282	56,40	5,24
GARCEZ AA, 2023, ARTIF INTELL REV	276	69,00	6,22

Source: Author Generated through Rstudio

Table 3 shows that Khosravii (2022) received the highest total citations (691), followed by Langer (2021) with 569 and Taeihagh (2021) with 415. These highly cited studies likely reflect their relevance to emerging debates on artificial intelligence, governance, policy, and digital transformation. Lau et al. (2024) recorded the highest normalized citation score (13.87), suggesting a strong impact relative to publication year. High citation levels may result from theoretical relevance, methodological contributions, broad applicability, and early publication within the rapidly expanding AI governance literature.

Research Themes and Keyword Trends

This section analyzes the keywords that most frequently appear in the publications under review. The frequency of keyword occurrences is used to identify dominant themes, inter-research topic relationships, and developments in academic focus related to artificial intelligence, digital governance, and public trust.

Figure 5. Frequently Appearing Keywords from 2021-2025

Terms	Frequency
Explainable Artificial Intelligence	213
Artificial Intelligence	125
AI Governance	80
Trust	60
Machine Learning	55
Transparency	30
Governance	24

Countries, Institutions, and Author Collaboration Network

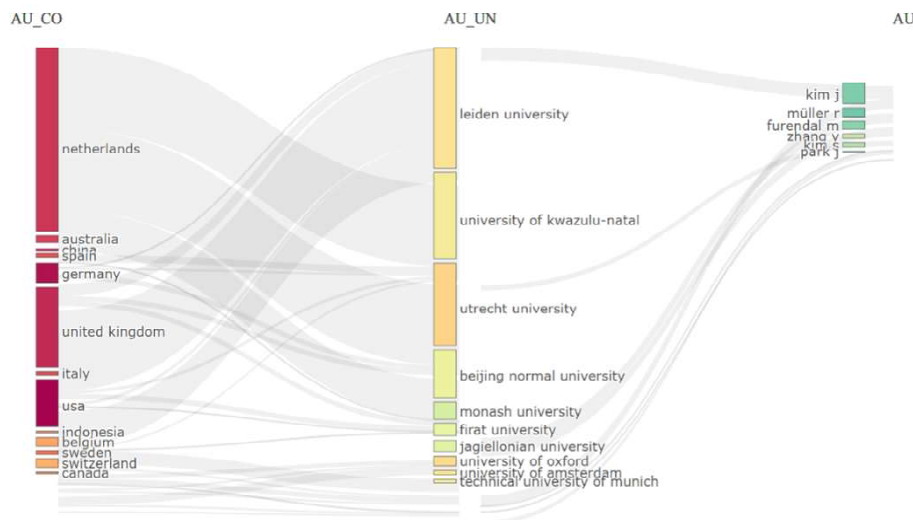


Figure 6. Three-Field Plot of Countries, Institutions, and Authors (AU_CO, AU_UN, AU)

Figure 6 is a three-field plot based on the Sankey diagram, illustrating the relationships among countries, affiliations, and authors in the study of artificial intelligence governance, explainable artificial intelligence, and citizen trust. Countries such as the Netherlands, the United Kingdom, the United States, Germany, and China have close ties with leading institutions, including Leiden University, Utrecht University, Beijing Normal University, and the University of Oxford. The thickness of the lines reflects the strong relationships between elements. Therefore, this visualization verifies that international collaboration and the role of academic institutions are important factors in constructing a global research network.

DISCUSSION

The bibliometric mapping indicates a clear shift in research on AI-enabled public governance from conventional e-government toward broader concerns with AI governance, explainability, ethics, transparency, and citizen trust. The sharp growth in publications between 2021 and 2025 and the prominence of these interconnected themes suggest that AI is increasingly examined not simply as a tool for administrative efficiency, but as a technology that can reshape how public authority is exercised, justified, and scrutinized. This shift places AI adoption within a broader debate on responsible and legitimate public administration.

The prominence of normalized Explainable Artificial Intelligence (XAI) demonstrates that explainability has become a central concern in the emerging governance literature. Its importance extends beyond an algorithm's technical capacity to produce explanations. In public administration, explanations are relevant because AI-supported decisions may affect citizens' access to services, resource allocation, and other administrative outcomes (Carullo, 2023). Langer et al., (2021) emphasize that explanations should respond to the needs of

different stakeholders. Therefore, explainability can support administrative accountability by making AI-supported decisions more understandable and open to scrutiny.

However, explainability should not be treated as synonymous with accountability or automatically assumed to generate trust. van der Waa et al., (2021) show that different explanations may produce different levels of understanding and decision quality. This suggests that the governance value of XAI depends on whether explanations are meaningful, accessible, and appropriate for their intended stakeholders. Public organizations, therefore, require complementary mechanisms, including human oversight, institutional responsibility, documentation, and opportunities to review or contest AI-supported decisions (Kuehnert et al., 2025). The central issue is consequently not only whether AI can explain its outputs, but whether public institutions remain accountable for decisions supported by AI.

The strong connection among XAI, transparency, and trust also highlights the institutional dimension of AI governance. Citizens do not evaluate AI systems independently from the institutions that deploy them. An understandable algorithm may still be viewed as illegitimate when the responsible institution is perceived as unfair or unaccountable (Kinchin, 2024). Similarly, transparency does not necessarily produce greater trust in every circumstance. Knoll et al., (2023) demonstrate that greater transparency can also expose institutional weaknesses. Thus, citizen trust should be understood as a product of technological reliability, institutional credibility, procedural fairness, and the quality of government communication.

This finding has important implications for institutional legitimacy. As governments increasingly use AI to support administrative decisions, legitimacy depends not only on the efficiency of these systems but also on whether citizens perceive decision-making processes as fair, understandable, and accountable (Horvath et al., 2023). AI governance should therefore connect technical transparency with mechanisms that allow citizens to question, challenge, or seek review of AI-supported decisions (Aljuneidi et al., 2024). In this sense, citizen trust is not merely an outcome of successful digitalization; it forms part of the institutional foundation that enables digital government to exercise authority legitimately (Lee-Geiller, 2024).

The thematic evolution from e-government and trust in government toward AI governance, ethics, generative AI, and XAI also indicates a transformation in the policy agenda of digital government. Governments need to move beyond policies focused primarily on technological adoption and develop governance arrangements that address algorithmic accountability, risk management, transparency, human oversight, and citizen participation (Efthymiou, 2025). In practical terms, algorithmic registries could provide information about the purpose, responsible institution, and use of high-impact AI systems. In contrast, participatory or independent audits could provide mechanisms for public and expert scrutiny (Metcalf et al., 2021). Such instruments would transform transparency from simple information disclosure into a more substantive accountability mechanism (Nieuwenhuizen, 2024).

Overall, the mapping reveals an emerging governance nexus between explainability, accountability, citizen trust, and institutional legitimacy. Its significance for public administration lies in demonstrating that responsible AI adoption requires integrating technological innovation with institutional safeguards and citizen-centered governance (Kawtar & Khadija, 2025). Future research should therefore move beyond identifying these themes to empirically test whether algorithmic registries, participatory audits, human oversight, and accessible explanation mechanisms actually influence perceptions of fairness, trust, and legitimacy across different public-sector contexts. This direction can strengthen the development of accountable, legitimate, and citizen-centered digital government.

CONCLUSIONS

This study demonstrates that research on citizen trust in AI-enabled public governance is shifting from conventional e-government toward AI governance, explainability, ethics, transparency, accountability, and institutional legitimacy. The mapping identifies an emerging governance nexus in which citizen trust is shaped not only by technological performance but also by the institutional conditions under which AI-supported decisions are explained, justified, and contested. Thus, trustworthy AI in the public sector should be understood as an institutional governance challenge rather than solely a technological one.

For scholarship and practice, the findings support a governance framework based on four complementary mechanisms: algorithmic visibility, meaningful explainability, institutional accountability, and citizen contestability. In practice, these mechanisms can be operationalized through algorithmic registries, accessible explanations, human oversight, and independent or participatory algorithmic audits. Such arrangements can move transparency beyond information disclosure toward substantive accountability and strengthen the legitimacy of AI-enabled public services.

The study has important limitations. The analysis relies exclusively on Scopus-indexed, English-language journal articles published between 2021 and 2025, and therefore does not capture the full global literature across other databases, languages, or publication types. Moreover, as a scientometric study, the findings identify research structures and thematic relationships but do not establish causal effects of specific AI governance mechanisms on citizen trust.

Future research should therefore move from bibliometric mapping toward empirical validation by testing whether algorithmic registries, participatory audits, human oversight, and accessible XAI mechanisms affect citizens' perceptions of fairness, trust, and institutional legitimacy across different public-sector contexts. Comparative and multi-database studies would further strengthen the evidence base and reduce database-specific selection effects. This agenda can advance the field by moving the discourse of trustworthy AI governance from identification to determining which institutional arrangements actually produce

accountable, legitimate, and citizen-centered AI-enabled government. Citizen Trust and Digital Governance.

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