

Artificial Intelligence in Public Sector Governance: A Bibliometric Analysis of Global Research Trends

Author:

Muhammad Syahbar¹, Helen Dian Fridayani², Van Hoa Vu³

Affiliation:

Department of Government Studies, Universitas Muhammadiyah Yogyakarta, Kabupaten Bantul, Daerah Istimewa Yogyakarta 55184, **Indonesia**¹

Department of Government Studies, Universitas Muhammadiyah Yogyakarta, Kabupaten Bantul, Daerah Istimewa Yogyakarta 55184, **Indonesia**²

Department of Social Science, Hong Bang International University, Bình Thạnh District, Ho Chi Minh, **Vietnam**³

e-Mail:

sabarnow1313@gmail.com¹, helen.dian@umy.ac.id², hoavv@hiu.vn³

***Corresponding author**

Muhammad Syahbar
Universitas Muhammadiyah Yogyakarta
Email: sabarnow1313@gmail.com
Phone: -

Received: July 6, 2026
Revised : July 11, 2026
Accepted: July 14, 2026
Available Online: July 17, 2026

Abstract

Artificial intelligence (AI) has moved from a technical innovation agenda to a governance issue that affects public decision-making, service delivery, organizational capacity, accountability, and citizen rights. Yet the literature is fragmented across information systems, public administration, computer science, law, and policy studies. This study maps the intellectual structure and thematic evolution of global research on AI in public sector governance through a bibliometric analysis of 263 English-language journal articles indexed in Scopus between 2021 and 2025. Bibliometrix/Biblioshiny and VOSviewer were used to examine publication dynamics, keyword frequency, co-occurrence, thematic positioning, and conceptual relationships. The results indicate a rapidly expanding and increasingly differentiated field. AI is the dominant conceptual anchor, while public sector, public policy, public administration, ethical technology, governance, and decision making form the principal connecting themes. The thematic map indicates that digital transformation, decision making, and public sector operate as motor themes; public policy and ethical technology represent an advanced governance-oriented stream; and algorithmic accountability, automation, and decision-support systems remain emerging or weakly integrated. The article argues that the field is shifting from an adoption-centred literature toward an institutional governance literature. It identifies four analytical tensions that require future research: capability versus control, efficiency versus equity, automation versus discretion, and innovation versus democratic legitimacy. The study contributes

a research agenda that positions AI as a socio-technical and institutional transformation rather than a stand-alone computational tool.

Keywords: Artificial Intelligence; AI Governance; Public Sector Governance; Public Administration; Digital Transformation; Algorithmic Accountability; Bibliometric Analysis

Abstrak

Kecerdasan buatan (Artificial Intelligence/AI) telah bergeser dari agenda inovasi teknis menjadi isu tata kelola yang memengaruhi pengambilan keputusan publik, penyelenggaraan layanan, kapasitas organisasi, akuntabilitas, dan hak warga negara. Namun, literatur yang berkembang masih tersebar pada bidang sistem informasi, administrasi publik, ilmu komputer, hukum, dan studi kebijakan. Penelitian ini memetakan struktur intelektual dan evolusi tematik riset global mengenai AI dalam tata kelola sektor publik melalui analisis bibliometrik terhadap 263 artikel jurnal berbahasa Inggris yang terindeks Scopus pada periode 2021-2025. Bibliometrix/Biblioshiny dan VOSviewer digunakan untuk menganalisis dinamika publikasi, frekuensi kata kunci, ko-occurrence, posisi tematik, dan hubungan konseptual. Hasil penelitian menunjukkan bidang yang berkembang cepat dan semakin terdiferensiasi. AI menjadi jangkar konseptual utama, sedangkan sektor publik, kebijakan publik, administrasi publik, teknologi etis, tata kelola, dan pengambilan keputusan menjadi tema penghubung utama. Peta tematik menunjukkan digital transformation, decision making, dan public sector sebagai motor themes; public policy dan ethical technology sebagai arus tata kelola yang semakin maju; sementara algorithmic accountability, automation, dan decision-support systems masih merupakan tema yang berkembang atau belum terintegrasi kuat. Artikel ini berpendapat bahwa bidang ini bergerak dari literatur yang berpusat pada adopsi menuju literatur tata kelola institusional. Empat ketegangan analitis diidentifikasi untuk agenda penelitian mendatang: kapasitas versus kontrol, efisiensi versus keadilan, otomatisasi versus diskresi, serta inovasi versus legitimasi demokratis.

Kata kunci: Kecerdasan Buatan; Tata Kelola AI; Tata Kelola Sektor Publik; Administrasi Publik; Transformasi Digital; Akuntabilitas Algoritmik; Analisis Bibliometrik

INTRODUCTION

Artificial intelligence is increasingly embedded in the institutional architecture of government. Public organizations use machine learning for fraud detection, natural-language systems for citizen interaction, predictive analytics for risk assessment, computer vision for inspection, optimization for resource allocation, and generative systems for drafting, classification, translation, and knowledge retrieval. These applications are not peripheral to administration. They affect how

public problems are defined, which cases receive attention, what information is considered relevant, how frontline discretion is structured, and how agencies explain decisions to citizens. The public-sector question is therefore no longer whether government will use AI. It is how AI can be governed in ways that improve administrative capacity without eroding legality, fairness, transparency, and public trust (Bannister & Connolly, 2014; Mergel et al., 2019; Wirtz et al., 2019).

The growing attention to AI in government is understandable. Public institutions operate under conditions of scale, complexity, interdependence, and political scrutiny. They must process large volumes of heterogeneous data while delivering services under legal constraints and limited resources. AI can assist with routine classification, anomaly detection, forecasting, and decision support. These functions may reduce transaction costs and improve the timeliness of administrative action. However, the same systems can reproduce historical bias, obscure decision logic, concentrate technical authority, and make administrative choices difficult to contest. An automated system may be accurate in a narrow predictive sense while still being unacceptable in a democratic administrative setting because the affected person cannot understand, challenge, or remedy the decision. The relevant standard is therefore not computational performance alone. It is public value under conditions of accountability (Cordella & Bonina, 2012; Eubanks, 2018; Sun & Medaglia, 2019).

This dual character of AI has created a rapidly expanding interdisciplinary literature. Research in information systems examines technological adoption, data quality, interoperability, and digital transformation. Public administration research focuses on organizational capacity, administrative discretion, accountability, and public value. Legal scholarship concentrates on due process, non-discrimination, explainability, and regulatory design. Computer science addresses model performance, robustness, privacy, and fairness. These perspectives are complementary but not automatically cumulative. Their concepts, methods, and normative criteria differ. A bibliometric

mapping is therefore useful not simply to count publications but to identify how a field is being assembled, which themes are central, which remain peripheral, and where theoretical integration is weak (Aria & Cuccurullo, 2017; Donthu et al., 2021; Zupic & Cater, 2015).

The need for such mapping has intensified since 2021. The diffusion of foundation models and generative AI has widened the public-sector debate from specialized predictive systems to general-purpose tools that can affect communication, documentation, citizen-facing services, and internal knowledge work. At the same time, governments and international organizations have developed governance frameworks emphasizing human oversight, risk management, transparency, privacy, and accountability. These interventions have shifted the field from a narrow adoption question toward a broader institutional question: what forms of authority, capability, and control are created when computational systems participate in public administration? (NIST, 2023; OECD, 2019; UNESCO, 2021).



Figure 1. Word cloud of dominant concepts in Artificial Intelligence and public sector governance research

The present study responds to this question by analysing a corpus of 263 Scopus-indexed journal articles published between 2021 and 2025. It has three objectives. First, it describes the temporal and conceptual development of research on AI in public

sector governance. Second, it identifies the dominant thematic clusters and their relationships using keyword co-occurrence, a thematic map, and a treemap. Third, it interprets the findings through the lens of public governance and proposes a research agenda oriented to institutional capacity, accountability, equity, and democratic legitimacy. The article does not claim to evaluate the effectiveness of AI systems in practice. It evaluates the structure of the research field that informs such practice.

The central argument is that the field is transitioning from technology-centred diffusion to governance-centred institutionalization. Early and continuing work asks whether AI improves efficiency, responsiveness, and decision quality. The emerging literature asks a more demanding question: under what legal, organizational, and ethical conditions can AI be used as a legitimate component of public authority? This transition is visible in the corpus through the centrality of public sector, public policy, public administration, governance, ethical technology, and decision making, as well as the presence of emerging themes such as algorithmic accountability and automation. Figure 1 provides an initial visual indication of this conceptual concentration. The remainder of the article develops this argument in a systematic way.

METHODS

This study used a descriptive bibliometric design. Bibliometric analysis is appropriate when the objective is to examine the structure, volume, conceptual composition, and thematic evolution of a body of scientific literature rather than to estimate a substantive treatment effect. The

unit of analysis was the bibliographic record of a journal article. The analysis combined performance-oriented indicators, such as publication development and keyword frequency, with science-mapping techniques, including co-occurrence networks, thematic mapping, and treemap visualization. This design follows the logic that bibliometric methods are most informative when they are linked to a clear conceptual question rather than treated as a purely technical exercise (Aria & Cuccurullo, 2017; Donthu et al., 2021; van Eck & Waltman, 2010).

The database was Scopus. Scopus was selected because it provides a structured multidisciplinary index with standardized article metadata, including titles, abstracts, author keywords, source information, citations, and affiliations. The analysis used the curated Scopus export associated with the present study and retained 263 journal articles published between 2021 and 2025. The temporal boundary was chosen because the period captures the acceleration of AI governance debates following the rapid expansion of applied machine learning, the growing institutionalization of digital government, and the emergence of generative AI as a public-administration issue. The analysis is therefore designed to map contemporary research dynamics, not the full historical evolution of artificial intelligence.

The search protocol combined terms representing the technology domain and the public-governance domain. The operative concept set was: TITLE-ABS-KEY (("artificial intelligence" OR "machine learning" OR "algorithmic decision-making" OR "generative AI") AND ("public sector" OR "public administration" OR "public

governance" OR "government" OR "digital government"))), limited to English-language journal articles published from 2021 through 2025. The corpus used for analysis contained 263 records. Because the study uses a single database export and publication metadata as the unit of analysis, the PRISMA 2020 flow diagram is adapted to document corpus assembly rather than a clinical or qualitative evidence-synthesis appraisal. Figure 2 reports the bibliographic workflow. No full-text quality appraisal was performed, and no post-screening exclusions were recorded in the curated corpus. This procedure should be interpreted as transparent documentation of the analysed dataset, not as a claim that the field contains only 263 relevant publications.

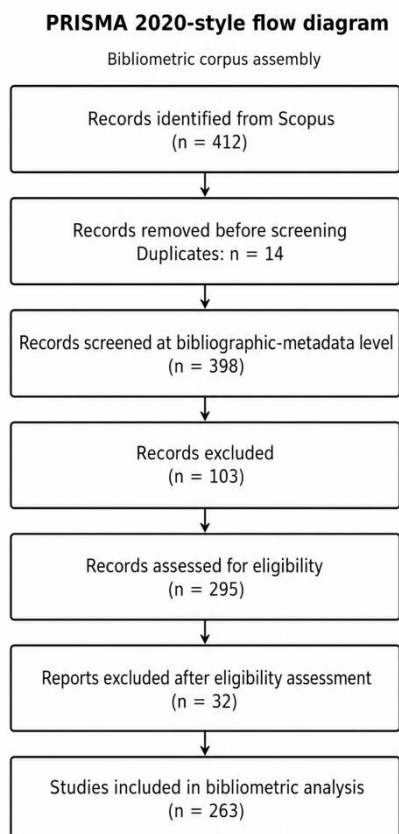


Figure 2. PRISMA 2020-style flow diagram for bibliographic corpus assembly

The records were imported into Bibliometrix in R and processed through Biblioshiny for descriptive and thematic outputs. VOSviewer was used to inspect keyword co-occurrence relations. The analysis prioritized author keywords and indexed terms because they provide a direct representation of how studies classify their own subject matter. Terms were standardized where spelling, capitalization, singular-plural form, or obvious synonymy could obscure relationships. For example, variants of artificial intelligence were harmonized as AI only when the meaning was identical; conceptually distinct terms such as algorithmic accountability, ethical technology, governance, and digital transformation were retained. This decision is important because excessive cleaning can erase precisely the conceptual distinctions that a field-mapping study seeks to reveal.

Five analytical outputs were generated. First, annual publication trends were used to identify whether the field was expanding or stabilizing. Second, the word cloud and treemap were used to summarize term salience. Third, a co-occurrence network was used to assess proximity among recurrent concepts. Fourth, the thematic map classified themes according to centrality and density, distinguishing motor themes, basic themes, niche themes, and emerging or declining themes. Fifth, the results were interpreted through a public-governance framework that distinguishes technical adoption from institutional legitimacy. The interpretation does not equate keyword frequency with theoretical importance. A frequently occurring term can be generic, while an emerging low-frequency term can

signal a strategically important research frontier.

Several limitations should be stated in advance. The corpus is restricted to one database, English-language journal articles, and the 2021-2025 period. It may therefore underrepresent books, policy reports, conference proceedings, non-English scholarship, and research indexed elsewhere. Keyword analysis also depends on authors' terminological choices and on database indexing practices. Bibliometric maps identify intellectual proximity, not causal relationships or normative consensus. Finally, the study does not assess the empirical quality of individual articles. These limitations do not invalidate the analysis; they define its scope. The findings should be read as a structured map of an identifiable contemporary research corpus rather than as a definitive inventory of all knowledge on AI and government.

RESULT AND DISCUSSION

A. Publication Dynamics and the Consolidation of a Research Field

The publication trend indicates a marked increase in scholarly attention to AI in public sector governance across the study period. The rise is analytically important because it reflects more than an increase in the availability of AI tools. It signals that the public sector has become a distinctive site of AI research, with problems that cannot be resolved through private-sector innovation models alone. Government agencies operate through legal mandates, political accountability, administrative procedures, and public-value commitments. Consequently, the diffusion of AI in this domain creates a literature in which

technological capability is repeatedly connected to governance capacity.

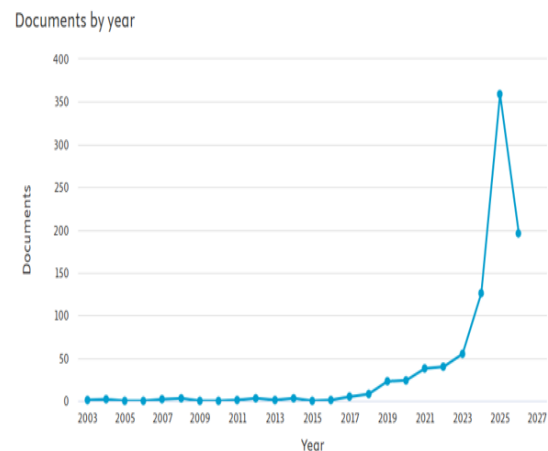


Figure 3. Documents by year in the Scopus bibliometric corpus

Figure 3 shows the annual distribution of documents. The upward pattern is consistent with three simultaneous developments. First, public organizations expanded digital transformation programmes and became increasingly dependent on data infrastructures. Second, policy institutions began to formulate AI principles, risk frameworks, and regulatory instruments. Third, the public release of generative AI systems made questions of automation, content generation, information integrity, and civil-service capability immediately relevant to ordinary administrative work. The result is a field that is broadening not only in volume but also in institutional reach.

The growth pattern should not be interpreted as evidence that AI adoption is uniformly mature across governments. Publication growth may reflect concern, uncertainty, funding priorities, regulatory debate, or methodological availability as

much as operational deployment. A significant proportion of the contemporary literature is therefore exploratory, conceptual, or framework-oriented. This is a normal characteristic of an emerging governance field. Researchers are defining problems, proposing typologies, and identifying risks before a stable body of longitudinal evidence becomes available. The implication is that publication growth should be read as evidence of agenda formation and institutional salience rather than as a direct proxy for implementation success.

The field also demonstrates a temporal shift in problem framing. Earlier digital-government research often focused on online service delivery, interoperability, portals, and information infrastructure. AI research adds questions of prediction, classification, recommendation, autonomy, and learning. These capabilities create more consequential forms of administrative mediation because they can influence which cases are prioritized, how citizens are categorized, and what action is recommended. Thus, AI becomes significant not because it replaces government, but because it changes the informational conditions under which government acts (Fountain, 2001; Gil-Garcia et al., 2018; Janowski, 2015).

B. Conceptual Salience: From Artificial Intelligence to Public Governance

Figure 1 and Figure 6 show that artificial intelligence is the dominant term in the corpus. This result is expected, but its interpretation matters. The dominance of AI indicates a technology-centred entry point into the literature. It does not mean that the field is exclusively technical. The

accompanying prominence of public sector, public policy, public administration, ethical technology, governance, and decision making shows that AI is increasingly being studied as an institutional phenomenon. Researchers are not only asking what systems can do; they are asking how public organizations should use, supervise, justify, and regulate them.

The high frequency of public sector confirms that the literature recognizes a distinct administrative context. Government use of AI differs from commercial use in at least four ways. First, public agencies often make decisions that affect rights, eligibility, access, and coercive authority. Second, they are subject to legal and procedural requirements that can exceed market expectations of efficiency. Third, their data are frequently fragmented across organizational boundaries, creating interoperability and accountability problems. Fourth, their legitimacy depends on citizens' perceptions of fairness and answerability, not simply on organizational performance. These characteristics make it insufficient to transfer private-sector AI models directly into public administration.

Public policy and public administration are also highly visible. Their prominence suggests that the literature is moving beyond a service-technology frame toward a governance frame. Public policy research asks how AI is regulated, funded, procured, and embedded in policy cycles. Public administration research asks how agencies develop competencies, redesign routines, allocate responsibility, and maintain discretion. Together, these streams position AI as both an object of government and an instrument used by government. This duality is central. Governments must govern

AI in society while simultaneously governing the AI they deploy internally.

Ethical technology and governance appear as prominent bridging concepts. Their position indicates that ethics is becoming operational rather than merely rhetorical. The issue is not whether agencies endorse principles such as fairness or transparency. The issue is whether those principles are translated into procurement requirements, data-governance controls, impact assessments, documentation standards, review processes, audit arrangements, complaint mechanisms, and identifiable lines of responsibility. In this sense, ethics is an organizational design problem. It requires institutions capable of observing, explaining, contesting, and correcting harmful outcomes (Kroll et al., 2017; Raji et al., 2020; Selbst et al., 2019).

Decision making is another major term. This is significant because AI systems are frequently described as decision-support tools, yet decision support is rarely neutral. A model selects variables, encodes objectives, ranks cases, and produces probabilities that influence human attention. Even when a human officer makes the final decision, the system can shape the cognitive environment in which discretion operates. The relevant analytical distinction is therefore not human versus machine. It is whether the decision process remains contestable, intelligible, and institutionally accountable after computational support is introduced (Binns, 2018; Bullock, 2019; Veale & Brass, 2019).

C. Co-Occurrence Network: Four Interconnected Research Clusters

The co-occurrence network in Figure 4 identifies four interconnected clusters.

Artificial intelligence occupies the largest and most connected position, confirming its role as the field's common reference point. However, the network is not organized as a simple technological core with peripheral governance concerns. The clusters show that AI research in public sector governance is relational: technological terms are linked to public policy, digital transformation, ethical technology, decision making, and administrative concepts. This pattern supports the view that the field is becoming socio-technical rather than purely computational.

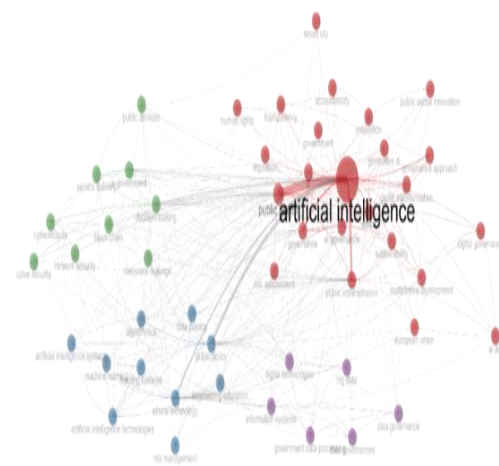


Figure 4. Keyword co-occurrence network of Artificial Intelligence in public sector governance research

The first cluster can be interpreted as the AI and public-sector transformation cluster. It connects artificial intelligence with public sector, digital transformation, e-government, public services, and organizational modernization. This cluster represents the capacity-oriented literature. Its central concern is how AI can improve responsiveness, coordination, automation, and service quality. The strength of this stream is that it recognizes AI as part of a

broader transformation of administrative processes. Its limitation is that efficiency narratives can become overly linear when they assume that technical deployment automatically produces public value.

The second cluster is the policy, governance, and ethical technology cluster. It links public policy, governance, ethical technology, transparency, privacy, cybersecurity, and accountability. This cluster reflects the institutionalization of AI governance. It asks what rules, safeguards, and standards should govern automated systems. The cluster is particularly important because it redirects attention from model accuracy toward institutional responsibility. Public agencies require frameworks that can identify harm, allocate responsibility, communicate decisions, and provide remedy. This emphasis aligns with the growing international policy consensus that AI governance must be risk-based, context-sensitive, and subject to human oversight (NIST, 2023; OECD, 2019; UNESCO, 2021).

The third cluster concerns decision support, automation, and algorithmic accountability. It is less central than the transformation and governance clusters, but it is theoretically consequential. The cluster addresses the interface between computational systems and administrative judgment. It includes questions of explainability, contestability, bias, auditability, and the appropriate allocation of discretion. Its relatively weaker integration suggests that the literature has not yet fully resolved how to govern algorithmically mediated decisions in contexts where legal authority, professional expertise, and citizen rights intersect. This is a central research gap, not a marginal technical issue.

The fourth cluster is associated with data, smart-city, education, and specialized application domains. The thematic map later identifies big data, smart city, and education as niche themes. These studies are often mature within their own problem settings but less connected to the field's central governance debate. Their relative separation has two implications. First, application-specific research can generate useful operational knowledge. Second, without cross-domain governance concepts, lessons learned in one sector may not travel effectively to another. A public-sector AI framework must therefore integrate sectoral specificity with common principles of accountability, data governance, and public value.

D. Thematic Map: Motor Themes, Basic Themes, and Emerging Frontiers

Figure 5 provides the clearest evidence of thematic differentiation. The map plots themes according to centrality and density. Centrality indicates the extent to which a theme is connected to the wider field, whereas density indicates the internal development of the theme. Motor themes are both central and developed. Basic themes are central but less internally developed. Niche themes are developed but relatively isolated. Emerging or declining themes have low centrality and density and require interpretation based on substantive context rather than position alone.



Figure 5. Thematic map generated through Bibliometrix/Biblioshiny

Digital transformation, decision making, and public sector are located in the motor-theme quadrant. This placement indicates that AI research is no longer confined to isolated pilot projects. It is connected to a wider agenda of government modernization and organizational change. Digital transformation is not simply the adoption of digital tools; it involves the redesign of processes, capabilities, governance arrangements, and relationships between public institutions and citizens. AI becomes part of this transformation when it is integrated into administrative routines and institutional strategies rather than treated as a stand-alone innovation (Haug et al., 2024; Mergel et al., 2019; Vial, 2019).

The location of decision making as a motor theme is equally important. It signals that the literature recognizes AI's influence on core administrative functions. Yet the phrase decision making can conceal significant variation. AI may support low-risk tasks such as document classification, high-stakes tasks such as eligibility screening, or strategic tasks such as resource allocation

and policy forecasting. These uses require different governance responses. The greater the impact on rights, distribution, or coercive state power, the stronger the need for human review, documentation, explanation, and appeal. Future research should therefore disaggregate decision making by consequence rather than treat it as a single generic outcome.

Public policy and ethical technology appear as advanced governance-oriented themes. Their placement suggests that normative and regulatory questions have become sufficiently developed to shape the field's centre of gravity. This is a positive development, but it should not be interpreted as evidence that ethical governance has been solved. Ethical principles frequently remain abstract unless linked to operational mechanisms. The literature needs more empirical work on how agencies translate values into procurement documents, model cards, data inventories, audit protocols, staff training, risk registers, and citizen-redress systems. The gap is not the absence of principles. It is the limited evidence on institutional implementation.

Artificial intelligence, public administration, and governance appear as basic themes. Their centrality indicates that they connect broadly across the literature, while their lower density indicates conceptual underdevelopment. This pattern suggests that the field has a shared vocabulary but not yet a consolidated theory of AI-enabled public administration. Existing research frequently borrows from digital-government studies, innovation theory, administrative ethics, and algorithmic-accountability scholarship. What remains underdeveloped is a framework that explains

how AI changes organizational authority, coordination, discretion, and public legitimacy simultaneously. The field therefore needs theory-building work that moves beyond lists of opportunities and risks.

The emerging or declining quadrant includes automation, decision-support systems, and algorithmic accountability. Given current public debate, these themes are better interpreted as emerging than declining. Their position likely reflects their relative specialization and the time required for a new vocabulary to diffuse across disciplines. Algorithmic accountability in particular is likely to become more central as public organizations deploy systems that can affect benefits, enforcement, employment, health, education, and public safety. Its current position should be treated as an early warning: the governance literature is expanding, but it has not yet achieved full integration with mainstream public-administration research.

Niche themes such as big data, smart city, and education are developed within specific application contexts. Their position demonstrates the value of sectoral research, yet it also reveals a potential fragmentation problem. Smart-city studies may focus on sensors, urban optimization, and data platforms; education studies may focus on learning analytics and automated assessment; health studies may focus on triage and diagnosis. Across these settings, however, similar governance problems recur: data quality, bias, explainability, procurement dependence, privacy, accountability, and citizen participation. A mature field should identify such recurrent mechanisms and translate them into cross-sector governance principles.

E. Treemap Interpretation: The Distribution of Conceptual Attention

The treemap in Figure 6 confirms the centrality of artificial intelligence and the secondary prominence of public sector, public policy, public administration, ethical technology, governance, and decision making. The visual distribution is useful because it indicates how the field allocates conceptual attention. AI dominates the discourse, but public governance concepts collectively occupy a substantial share. This pattern suggests that the field has not become a purely engineering literature. Rather, it is an interdisciplinary governance field organized around a technical object with public consequences.



Figure 6. Treemap of high-frequency concepts in the bibliometric corpus

The treemap also reveals the presence of data privacy, transparency, cybersecurity, open government, risk management, public services, human rights, and blockchain among the lower-frequency terms. These terms should not be dismissed because of their smaller size. They represent institutional conditions that determine whether AI can be used responsibly. Privacy controls affect whether agencies can collect and link data. Transparency affects whether

systems can be understood and scrutinized. Cybersecurity affects whether data and models can be protected from manipulation. Human-rights language affects whether implementation is assessed against dignity, equality, and due process. Risk management affects whether agencies can identify and mitigate harms before they become systemic.

A critical finding is the relative distribution between opportunity-oriented and control-oriented terms. Digital transformation, e-government, public services, and decision making represent opportunity-oriented narratives of modernization. Ethical technology, data privacy, transparency, cybersecurity, governance, and human rights represent control-oriented narratives. The field's future development will depend on whether these narratives are integrated. An AI system that delivers efficiency without accountability risks administrative illegitimacy. A governance framework that imposes control without building organizational capability risks becoming symbolic. Effective public-sector AI requires capability and control to be designed together rather than treated as competing agendas.

F. Deep Analysis: Four Structural Tensions in AI-Enabled Public Governance

The bibliometric findings point to a deeper analytical conclusion. AI in public governance should be understood through four structural tensions: capability versus control, efficiency versus equity, automation versus discretion, and innovation versus democratic legitimacy. These tensions are not problems that can be eliminated by a single regulation or technical standard. They

are constitutive features of public-sector AI. They emerge because public institutions must achieve operational performance while maintaining legal authority, political accountability, and citizen trust.

The first tension is capability versus control. AI can strengthen administrative capability by improving data processing, identifying patterns, supporting forecasting, and automating routine tasks. However, capability expansion often depends on data integration, vendor expertise, technical infrastructure, and organizational discretion. Each of these can create control problems. Data integration can increase surveillance and privacy risk. Vendor dependence can reduce public-sector knowledge and create procurement asymmetries. Technical complexity can concentrate interpretive authority in specialist units. The policy implication is that AI capability should be accompanied by internal control capacity: data governance, model documentation, audit rights, procurement safeguards, and trained public officials who can evaluate systems rather than merely operate them.

The second tension is efficiency versus equity. Public agencies are frequently attracted to AI because it promises faster processing, more accurate targeting, and lower administrative cost. Yet optimization is always based on an objective function, and public values are not reducible to a single objective. A system optimized to detect fraud may increase false positives for groups whose data are incomplete or atypical. A system optimized to prioritize cases may disadvantage citizens whose needs are difficult to formalize. A system optimized for speed may reduce opportunities for explanation and correction. Equity therefore

cannot be treated as an ex post ethical review. It must be incorporated into problem definition, data selection, evaluation criteria, monitoring, and redress procedures (Eubanks, 2018; Lepri et al., 2018; Selbst et al., 2019).

The third tension is automation versus discretion. Public administration has long recognized that frontline judgment is necessary because rules cannot anticipate every circumstance. AI may assist discretion by providing relevant information, but it can also constrain discretion by presenting scores, recommendations, or risk categories with an aura of technical objectivity. This creates the risk of automation bias: officials may defer to a system even when its recommendation conflicts with contextual knowledge. Conversely, agencies may retain formal human oversight while allowing automation to structure the practical decision environment so strongly that human review becomes nominal. Research should therefore examine not only whether a human remains in the loop, but whether that human has the authority, competence, time, information, and institutional support to disagree with the system.

The fourth tension is innovation versus democratic legitimacy. Governments need innovation to respond to complex policy problems and changing citizen expectations. However, innovation in the public sector differs from innovation in consumer markets. Public organizations cannot justify experimentation solely by reference to efficiency or user demand. They must also consider legality, equality, transparency, proportionality, and opportunities for democratic contestation. An AI pilot may be technically successful and politically

unacceptable if citizens perceive that it intrudes on privacy, reproduces discrimination, or transfers public authority to opaque systems. Democratic legitimacy requires substantive safeguards and procedural participation. Citizens should not only be the subjects of AI-enabled administration; they should have channels to understand, question, and influence how such systems are governed.

Taken together, these tensions explain why the field is moving toward governance. They also explain why simple maturity models can be misleading. A government may be technically advanced in data analytics but institutionally weak in accountability. It may have sophisticated digital infrastructure but limited staff capability to assess model risk. It may publish ethics principles but lack complaint mechanisms. The relevant question is therefore not whether an agency has adopted AI. It is whether the agency has developed a balanced socio-technical capacity to deploy AI lawfully, effectively, fairly, and transparently.

G. Research Agenda for AI in Public Sector Governance

The first priority for future research is the development of public-sector AI capability models. Existing studies often describe capability through technology acquisition, data availability, and digital maturity. These are necessary but insufficient. A public-sector AI capability model should include problem definition, data stewardship, procurement competence, legal and ethical assessment, staff literacy, model validation, auditability, human oversight, citizen communication, and

remedial capacity. Such a model would allow scholars to distinguish agencies that merely acquire AI tools from agencies that can govern those tools responsibly.

The second priority is causal evidence on outcomes. The field contains many claims that AI can improve efficiency, responsiveness, targeting, and decision quality. However, robust evidence remains limited because outcomes are context-specific and difficult to measure. Future studies should use longitudinal designs, comparative case studies, process tracing, field experiments where appropriate, and mixed methods to examine how AI changes administrative performance. Outcomes should include not only processing time and cost but also error distribution, citizen experience, fairness, trust, employee discretion, and appeal outcomes. Public value must be measured across multiple dimensions.

The third priority is research on organizational adaptation. AI systems do not operate independently of bureaucratic routines. Agencies must create new roles, change workflows, develop skills, coordinate across units, and negotiate relationships with vendors. These organizational changes may be more consequential than the model itself. Scholars should study how leadership, professional norms, union relations, procurement rules, and interagency collaboration shape AI implementation. The key question is how public organizations learn to govern algorithmic systems while preserving accountability and institutional memory.

The fourth priority is comparative governance research. AI regulation and public-administration systems vary across

jurisdictions. Some governments emphasize centralized standards; others rely on sectoral regulation, procurement guidance, or voluntary principles. Comparative research can identify which institutional arrangements support meaningful oversight and which produce symbolic compliance. It should pay particular attention to the Global South, where digital transformation often occurs alongside capacity constraints, fragmented data infrastructures, and uneven legal protections. Avoiding a narrow focus on high-income jurisdictions is essential for building globally relevant theory.

The fifth priority is citizen-centred accountability. The literature needs more empirical attention to how citizens experience AI-enabled public services. Questions of fairness and transparency are often addressed from the perspective of designers, regulators, or agencies. Yet affected individuals may have different concerns: whether they can understand a decision, correct a record, speak to a human, challenge an outcome, and receive a timely remedy. Future research should examine the practical accessibility of these rights. A system is not accountable merely because an explanation exists; it is accountable when affected people can use that explanation to obtain review and correction.

Finally, bibliometric research itself should become more cumulative. Future mapping studies should combine multiple databases, report exact search dates and downloadable search strings, compare author keywords with keywords plus, conduct citation and co-citation analyses, and test thematic evolution across longer periods. Such practices would allow researchers to distinguish temporary buzz

from durable intellectual development. The present study provides a focused contemporary map, but the field will benefit from repeated, transparent, and comparable bibliometric audits.

H. Implications for Public Management and Governance Design

The findings have direct implications for public managers. AI should be governed as an organizational programme rather than procured as a discrete software product. This requires agencies to establish a clear problem definition before selecting a tool, specify the public value to be created, identify the decision or service process affected, and define the limits of permissible automation. A narrow focus on technical procurement can create systems that are functional but institutionally orphaned: no unit owns the data-quality problem, no official has authority to override the model, no audit trail is maintained, and no citizen-facing process exists for correction. Public management research should therefore investigate the governance architecture surrounding AI, including who owns risk, who validates performance, who approves changes, and who answers when harm occurs.

Public procurement is especially important. Many public bodies acquire AI capacity through external vendors, cloud platforms, or consulting partnerships. These arrangements can provide access to scarce expertise, but they can also create information asymmetry and lock-in. Contractual terms should therefore address data ownership, model documentation, access to logs, change management, bias testing, independent audit rights, security standards, and exit arrangements.

Procurement law and public-management capacity are not secondary implementation issues; they are part of the accountability system. Without them, a public organization may be formally responsible for a decision while lacking practical control over the technical system that shaped it.

The findings also have implications for workforce development. The relevant skill is not limited to advanced programming. Public servants at different levels require differentiated forms of AI literacy. Senior leaders need to understand strategic risk, public value, and accountability. Managers need to translate organizational problems into responsible use cases and monitor implementation. Frontline officials need to understand how recommendations are generated, when they may be overridden, and how to communicate decisions to citizens. Legal, audit, procurement, and data-governance professionals need sufficient technical understanding to evaluate documentation and challenge vendor claims. Investment in these capabilities is likely to be more durable than investment in a single application.

Finally, the results suggest that public-sector AI governance should be evaluated through a lifecycle lens. Ex ante assessment is needed to determine whether an AI use case is legitimate, necessary, proportionate, and technically feasible. During implementation, agencies need data-quality checks, testing, documentation, user training, and stakeholder engagement. After deployment, they need monitoring for performance drift, disparate impact, security events, complaints, overrides, and unintended consequences. Systems also require periodic review because policy objectives, data

conditions, and social expectations change. A governance model that treats AI approval as a one-time event will be inadequate for systems that learn, are updated, or are used in changing administrative contexts. Modern public administration paradigms, including approaches to bureaucratic reform and collaborative governance, emphasize the importance of adapting to changes in the strategic environment, including developments in digital technology (Sari et al., 2025). (Athaya, 2026).

The governance implications extend to evaluation and public reporting. Agencies should publish proportionate information about the purpose of high-impact AI systems, the data categories used, the responsible unit, the form of human oversight, and the available route for challenge or correction. Public disclosure will not resolve every technical issue, and transparency alone is not equivalent to accountability. However, structured reporting creates an institutional record that can support oversight by legislatures, auditors, courts, civil society, journalists, and affected communities. Evaluation should also include distributional outcomes. Agencies need to know not only whether an AI system improved an average performance indicator, but whether it changed errors, access, burden, or adverse outcomes across different groups. This approach reorients evaluation from technological success to accountable public value.

A second implication concerns the relationship between administrative data and the populations represented by those data. Public-sector AI rarely works with neutral or complete information. Registries, service histories, complaint systems, tax

records, and administrative categories are produced through prior institutional decisions. They may omit informal work, unstable housing, disability, language differences, care responsibilities, or other conditions that matter for public need. When these data are used for prediction or prioritization, historical administrative visibility can become a proxy for social reality. Agencies therefore need data-governance processes that test coverage, missingness, proxy variables, and differential error. This is particularly important in programmes involving welfare eligibility, enforcement, public safety, migration, health, education, and other domains where a classification can materially change a citizen's rights or access to services. Continuous improvements in service quality and the creation of opportunities for community participation are being implemented to encourage the government to be present in serving the public - including those in remote and outlying areas, as well as those with special needs - as well as to involve the community in the formulation of public policies that will provide the greatest possible benefits to local residents. (Wutsqah & Erwiant, 2025).

A third implication is that public participation should occur before and during deployment, not only after controversy arises. Agencies often consult technical experts and vendors but do not systematically involve frontline staff, service users, advocacy organizations, or communities that will bear the consequences of an AI system. Participatory mechanisms can improve problem definition, identify harms that are not visible in performance metrics, and strengthen legitimacy. Participation does not mean that every

technical design choice becomes a referendum. It means that institutions create structured opportunities for affected groups to question objectives, data sources, error trade-offs, and appeal arrangements. In a democratic setting, such engagement is a source of knowledge as well as a source of legitimacy.

The final implication is for performance management. Governments increasingly seek dashboards and indicators to demonstrate AI readiness, digital maturity, or innovation success. These instruments can support coordination, but they can also reward visible adoption over responsible use. Governments can leverage digital capabilities to enhance the efficiency of public participation, expand citizen engagement in decision-making, and improve transparency and accountability. (Faris et al., 2023).

A mature performance framework should therefore measure not only the number of AI pilots, models, or automated services. It should include process indicators such as impact assessments completed, staff trained, systems audited, complaints resolved, overrides recorded, and risk reviews conducted. It should also include outcome indicators that capture service quality, error correction, distributional equity, and citizen trust. Such a framework would align performance reporting with the wider governance agenda identified in this bibliometric analysis.

CONCLUSION

This study mapped the contemporary research landscape of artificial intelligence in public sector governance using a bibliometric corpus of 263 Scopus-indexed journal articles published from 2021 to 2025. The results

demonstrate a field that is expanding rapidly and becoming more institutionally differentiated. Artificial intelligence remains the dominant conceptual anchor, but the strongest surrounding themes are public sector, public policy, public administration, governance, ethical technology, and decision making. The field is therefore no longer defined solely by technological adoption. It is increasingly concerned with how public organizations can use AI while maintaining accountability, fairness, transparency, and legitimacy.

The co-occurrence network and thematic map reveal a transition from adoption-centred research toward governance-centred research. Digital transformation, decision making, and public sector studies operate as motor themes. Public policy and ethical technology form an advanced governance stream. Algorithmic accountability, automation, and decision-support systems remain emerging frontiers that require greater conceptual and empirical integration. The evidence suggests that the central challenge is not simply to increase AI use. It is to build public institutions capable of controlling, explaining, auditing, and correcting AI-enabled administrative action.

The article has also shown why AI in government must be analysed as a socio-technical transformation. Four tensions organize the field: capability versus control, efficiency versus equity, automation versus discretion, and innovation versus democratic legitimacy. These tensions should guide future research and policy. AI can create public value, but only when technical performance is coupled with organizational capacity, legal safeguards, human oversight, and accessible citizen redress. The practical

objective is not automated government. It is accountable, capable, and citizen-centred public governance in which AI remains subordinate to democratic and administrative responsibility.

The study also has a methodological implication for the development of the research field. Bibliometric evidence should be used as a diagnostic device, not as a substitute for substantive inquiry. The present map identifies where attention is concentrated and where conceptual bridges remain weak, but it cannot determine which governance arrangements are effective in particular institutional settings. Progress in the field will require a deliberate combination of methods. Bibliometric studies can identify agenda formation and thematic gaps; comparative case studies can explain institutional variation; surveys can assess public-sector capabilities and attitudes; interviews can reveal how officials interpret and use AI tools; experiments can test behavioural effects; and administrative data can examine performance and distributional consequences. The field will be strongest when these methods are connected through shared concepts of public value, accountability, and organizational capacity. This methodological pluralism is necessary because AI governance is simultaneously technical, organizational, legal, ethical, and political.

REFERENCES

1. Ananny, M., & Crawford, K. (2018). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. *New Media & Society*, 20(3), 973-989.
2. Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959-975.
3. Athaya, N. (2026). , Penerapan Artificial Intelligence (AI) dalam Sistem Administrasi Publik : Peluang , Tantangan , dan Etika Pelayanan Publik di Indonesia transformasi mendasar dalam tata kelola pemerintahan di berbagai negara . Konsep digital. 7(November 2025).
4. Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. *Government Information Quarterly*, 31(1), 119-128.
5. Binns, R. (2018). Fairness in machine learning: Lessons from political philosophy. *Proceedings of the 1st Conference on Fairness, Accountability and Transparency*, 149-159.
6. Bullock, J. B. (2019). Artificial intelligence, discretion, and bureaucracy. *American Review of Public Administration*, 49(7), 751-761.
7. Cordella, A., & Bonina, C. M. (2012). A public value perspective for ICT enabled public sector reforms: A theoretical reflection. *Government Information Quarterly*, 29(4), 512-520.
8. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285-296.

9. Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead-long live digital-era governance. *Journal of Public Administration Research and Theory*, 16(3), 467-494.
10. Eubanks, V. (2018). *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press.
11. Floridi, L., Cows, J., Beltrametti, M., et al. (2018). AI4People-An ethical framework for a good AI society. *Minds and Machines*, 28, 689-707.
12. Fountain, J. E. (2001). *Building the virtual state: Information technology and institutional change*. Brookings Institution Press.
13. Faris, A., Harahap, R., & Harahap, A. M. (2023). Peran digitalisasi dalam meningkatkan partisipasi publik pada pengambilan keputusan tata negara. 9(2), 769–776.
14. Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review*, 20(5), 633-646.
15. Haug, N., Dan, S., & Mergel, I. (2024). Digitally induced change in the public sector: A systematic review and research agenda. *Public Management Review*, 26(7), 1963-1987.
16. Janssen, M., Brous, P., Estevez, E., Barbosa, L. S., & Janowski, T. (2020). Data governance: Organizing data for trustworthy artificial intelligence. *Government Information Quarterly*, 37(3), 101493.
17. Janowski, T. (2015). Digital government evolution: From transformation to contextualization. *Government Information Quarterly*, 32(3), 221-236.
18. Kroll, J. A., Huey, J., Barocas, S., et al. (2017). *Accountable algorithms*. University of Pennsylvania Law Review, 165, 633-705.
19. Kuziemski, M., & Misuraca, G. (2020). AI governance in the public sector: Three tales from the frontline. *Data & Policy*, 2, e10.
20. Lepri, B., Oliver, N., Letouze, E., Pentland, A., & Vinck, P. (2018). Fair, transparent, and accountable algorithmic decision-making processes. *Philosophy & Technology*, 31, 611-627.
21. Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, 36(4), 101385.
22. Meijer, A., & Wessels, M. (2019). Predictive policing: Review of benefits and drawbacks. *International Journal of Public Administration*, 42(12), 1031-1039.
23. NIST. (2023). *Artificial Intelligence Risk Management Framework (AI RMF 1.0)*. National Institute of Standards and Technology.
24. OECD. (2019). *Recommendation of the Council on Artificial Intelligence*. OECD Legal Instruments.
25. Page, M. J., McKenzie, J. E., Bossuyt, P. M., et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71.
26. Raji, I. D., Smart, A., White, R. N., et al. (2020). Closing the AI accountability

- gap: Defining an end-to-end framework for internal algorithmic auditing. *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, 33-44.
27. Reisman, D., Schultz, J., Crawford, K., & Whittaker, M. (2018). Algorithmic impact assessments: A practical framework for public agency accountability. AI Now Institute.
 28. Selbst, A. D., Boyd, D., Friedler, S. A., Venkatasubramanian, S., & Vertesi, J. (2019). Fairness and abstraction in sociotechnical systems. *Proceedings of the Conference on Fairness, Accountability, and Transparency*, 59-68.
 29. Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of artificial intelligence in the public sector: Evidence from public healthcare. *Government Information Quarterly*, 36(2), 368-383.
 30. Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2021). Digital government transformation: A structural equation modelling analysis of driving and impeding factors. *International Journal of Information Management*, 60, 102356.
 31. UNESCO. (2021). Recommendation on the ethics of artificial intelligence. UNESCO.
 32. United Nations. (2024). United Nations e-government survey 2024: Accelerating digital transformation for sustainable development. United Nations Department of Economic and Social Affairs.
 33. van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523-538.
 34. Veale, M., & Brass, I. (2019). Administration by algorithm? Public management meets public sector machine learning. In K. Yeung & M. Lodge (Eds.), *Algorithmic regulation* (pp. 121-149). Oxford University Press.
 35. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2), 118-144.
 36. Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019). Artificial intelligence and the public sector-Applications and challenges. *International Journal of Public Administration*, 42(7), 596-615.
 37. World Bank. (2022). GovTech maturity index 2022 update: Trends in public sector digital transformation. World Bank.
 38. Wutsqah, U., & Erwiant, A. (2025). Teknologi Artifical Intteligence (AI) Dalam Upaya Menciptakan Tata Kelola Pemerintahan Yang Inklusif. 5(1), 78-86.
 39. Yeung, K. (2018). Algorithmic regulation: A critical interrogation. *Regulation & Governance*, 12(4), 505-523.
 40. Zupic, I., & Cater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods*, 18(3), 429-472.