

SUSTAINABLE AND RESPONSIBLE AI ADOPTION:
THE ROLE OF LOCAL GOVERNANCE

by

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Sustainable and responsible AI adoption: The role of local governance

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Abstract

This study examines the governance and regulatory challenges of adopting Artificial Intelligence (AI) technologies in the public sector. First, it reviews the literature on AI policy and governance frameworks specific to the public sector. Second, guided by the theoretical frameworks proposed by Wirtz et al., it explores the challenges public organizations face when implementing AI, providing practical insights into their AI adoption, policy development, and governance efforts. In the absence of an AI regulatory framework in the United States, this study aims to develop policy recommendations and governance strategies that promote responsible AI adoption in public administration. A systematic literature review of 26 multidisciplinary peer-reviewed articles published between 2020 and 2024 reveals a gap between conceptual AI governance frameworks and empirical AI applications in the public sector.

Keywords: artificial intelligence, government, public sector, policy, AI governance

Introduction

Challenged by the global reach of Artificial Intelligence (AI), its highly disruptive nature, and competing jurisdiction and regulatory agencies, the international community, individual countries, and regional governments are developing data governance frameworks to address the legal vacuum and delayed policy activity to promote the responsible and sustainable adoption of AI technologies (Erdélyi & Goldsmith, 2022). Data governance models emerge in a complex and multifaceted environment involving the competitive struggles of different actors and dominated by the private sector, raising concerns from scholars and policymakers who advocate for a change in the current landscape (Micheli et al., 2020). Organizations at all levels of government play a critical role in data governance, redistributing the value to their citizens and enhancing the benefits derived from their data for the public good (Bolton et al., 2021).

While the literature on Big Data Algorithmic Systems (BADs), machine learning, and other forms of AI applications implemented by government agencies is expanding (Wanckel, 2022), research in data governance and regulatory structures in the public sector remains fragmented. Concerned with dependency on private actors and the asymmetries involving data protection and transparency efforts (Bolton et al., 2021; Micheli et al., 2020), multidisciplinary research underscores the importance of a quality market-structuring regulatory environment to yield societal benefits from AI technologies (Erdélyi & Goldsmith, 2022). However, uncertainty, inadequate policy measures, and regulatory interventions can hinder innovation and exacerbate power struggles among competing actors.

Problem statement

Local governments are increasingly adopting AI technologies to enhance service delivery, optimize operations, and engage with citizens. However, studies addressing the implementation and governance of AI in local government remain limited (Floridi et al., 2018; Gasser & Almeida, 2017). The variability in resources, capabilities, and priorities in local governments further complicates the application of generalized AI policies and frameworks, highlighting the critical need for AI governance and policy

strategies tailored to address the specific challenges of our local community, social implications, and to increase value and benefits to our constituents (Bolton et al., 2021; Micheli et al., 2020; van Dijk et al., 2021; Wanckel, 2022).

Purpose of the study

This paper aims to examine the literature on AI policy and governance frameworks specific to the public sector, evaluating how these models can be applied to a local government agency in California.

Research question

RQ: What are the governance and regulatory challenges and best practices of adopting AI technologies in a local government context?

Research objectives

The findings of this research will provide insights into emerging themes of existing AI policies and governance frameworks in the public sector, evaluate these frameworks, and provide recommendations on how a city in California can adopt sustainable and responsible AI technologies in this complex regulatory environment.

Research organization

This research paper is structured around the following sections. First, a literature review examines public organizations and governments' challenges in adopting and governing AI technologies. It explores existing research and proposed AI governance frameworks specific to the public sector. Finally, it provides an overview of risk-oriented guidelines to address AI governance and regulation challenges in the public sector, followed by a description of the methodology that includes the procedure and data analysis.

Review of the literature

Evidence-based decision-making plays a critical role in addressing public issues. While the benefits are substantial, using effective analytics enhanced by AI technologies in governments and public organizations remains in its infancy (Charles et al., 2022). The literature indicates an increasing interest in AI research in the public sector, with most studies concentrating on the technological aspects of AI adoption. However, there is a pressing need for more empirical studies addressing the implementation and governance of AI in public organizations, as the current research in this area remains limited (Floridi et al., 2018; Gasser & Almeida, 2017). This gap underscores the urgency for more theoretical and multidisciplinary empirical studies that can assist governments in creating public value by supporting decision-making and improving governance using AI-enabled services.

As AI adoption and deployment become more prevalent in the public sector, the role of Big Data Algorithmic Systems (BADs) becomes increasingly significant, requiring data from multiple sources, including outside the organization, increasing the reliance on vendors and other actors (Charles et al., 2022; Tangi et al., 2023). This dependency underscores the critical importance of robust public sector data governance in mitigating the risks surrounding data quality and ensuring compliance with ethical, legal, and regulatory standards (Bolton et al., 2021; Erdélyi & Goldsmith, 2022; Micheli et al., 2020). Organizations at all levels of government play a crucial role in data governance, ensuring the security and compliance of their citizens' data and enhancing the benefits derived from their data for the public good (Bolton et al., 2021).

This literature review first examines the challenges public organizations and governments face in adopting and governing AI technologies. It then explores existing research and proposed AI governance frameworks specific to the public sector. Finally, it provides an overview of risk-oriented guidelines to address AI governance and regulation challenges in the public sector.

AI governance challenges in the public sector

With benefits ranging from improving public service delivery and internal efficiency to policymaking, AI adoption in the public sector faces specific challenges, remaining fragmented and behind the private sector (Charles et al., 2022; Straub et al., 2023; Tangi et al., 2023). While public organizations have successfully piloted AI technologies, they struggle to scale and leverage AI across the organization (Tangi et al., 2023). Government capacity-building strategies depend on long-established institutional structures, practices, and roles, requiring analysis of these three levels simultaneously (Wanckel, 2022). Studies on AI in the public sector are primarily theoretical, focusing on principles, challenges, and potential risks, providing few insights into the practical aspects of AI deployment (Tangi et al., 2023).

Erdélyi and Goldsmith (2022) emphasize the challenges in designing regulatory frameworks, including agency problems, regulation misconceptions, and AI's global reach. They suggest establishing an international AI governance framework to form a consistent regulatory environment for responsible AI adoption, addressing communication challenges, and requiring a fundamental shift in regulation paradigms. Gasser and Almeida (2017) propose a three-layer governance framework to address the “black boxes” in AI applications, which are responsible for massive information asymmetries between AI developers, consumers, and policymakers. Additionally, the variability in resources, capabilities, and priorities in local governments further complicates the application of generalized AI policies and frameworks, highlighting the critical need for AI governance and policy strategies tailored to address the specific challenges of the local community, social implications, and to increase value and benefits to civic society (Bolton et al., 2021; Micheli et al., 2020; van Dijk et al., 2021; Wanckel, 2022).

In an environment dominated by a few corporate actors, public entities are crucial in addressing data governance asymmetries and redistributing value produced through data to civic society. The negative impact of privacy violation, algorithmic biases, nudging, and manipulation brought awareness to scholars and policymakers, with the General Data Protection Regulation (GDPR) in the European Union (EU) viewed by supporters as a step in the right direction (Micheli et al., 2020). Alternatively, governing bodies have pursued soft law (e.g., standards, certifications, codes of conduct, principles, and guidelines programs) to supplement and inform stakeholders prior to the development of regulation or hard law (Gutierrez, 2023), such as in the case of the EU AI Act, published on 12 July 2024 (European Union, 2024).

Public sector AI governance frameworks

In 2019, Wirtz et al. presented the first comprehensive framework focusing on AI-related challenges tailored explicitly to the public sector. This framework refers to the four main challenges AI presents to the public sector: regulatory, technological, societal, and ethical, gaining relevance in the literature due to its flexible applicability and detailed examination of potential challenges in diverse contexts (Tangi et al., 2023). In an in-depth case study, Tangi et al. (2023) apply the framework proposed by Wirtz et al. (2019), verify its practical application, and add a fifth challenge, AI organizational and cultural change. The study highlights that the relevance of each challenge is context-specific and that public organizations struggle to identify and select the proper structures, processes, and tasks for adopting AI technologies.

AI technologies' potential and broad application present unprecedented opportunities for governments and public organizations to improve performance and public service delivery and support governmental decision-making (Wirtz et al., 2022). However, these opportunities bring risks and potential adverse

outcomes in sensitive areas, such as manipulation of public opinion, illegal AI-based surveillance, and algorithm biases that lead to further discrimination (Feldstein, 2019; Reed, 2018, as cited in Wirtz et al., 2022). Despite the significant risks and potentially harmful effects on governments, public organizations, and society, effective regulatory and guiding governance frameworks remain underdeveloped, raising concerns from scholars and policymakers who advocate for a change in the current landscape (Micheli et al., 2020).

AI risks and guidelines

Effective AI governance requires a risk-oriented multi-stakeholder approach. Wirtz et al. (2022) proposed an AI governance framework identifying and integrating AI risks and corresponding guidelines into six categories: (1) technological, data, and analytical; (2) informational and communicational; (3) economic; (4) social; (5) ethical, and (6) legal and regulatory. Unlike other AI governance frameworks specific to the public sector, Wirtz et al.'s integrated framework, detailed in Figure 1, provides practical guidelines for public organizations' growing challenges in adopting and governing AI (Wilson & Van der Velden, 2022).

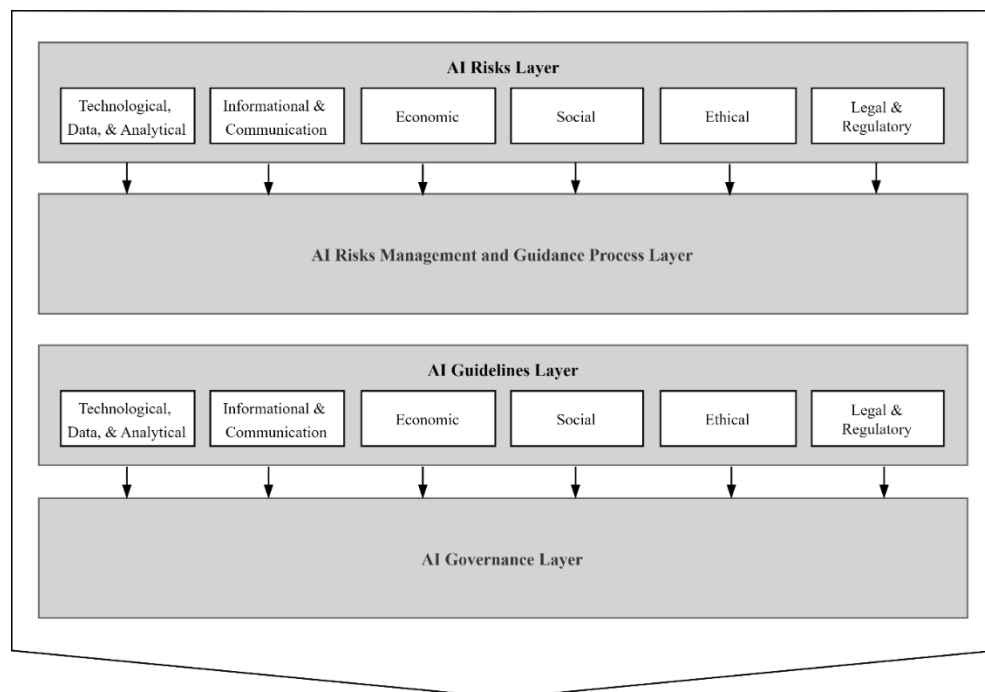


Figure 1: Integrated AI governance framework for public administration adapted from Wirtz et al. (2022)

Maintaining control of AI systems at the implementation and operational levels, thus mitigating the risks of autonomous decision-making, emerges as the primary technological, data, and analytical challenge (Wirtz et al., 2022). Informational and communicational risks require detecting and curbing computational propaganda and disinformation. Social and ethical guidelines are closely connected, including adopting an ethical code of conduct and fostering citizen participation, cyber and data security awareness initiatives, and occupational reintegration programs to address AI-based unemployment in public and government organizations. Legal and regulatory AI guidelines include addressing the risks associated with the existing legal vacuum, forming a supervisory authority, and establishing the general principles for AI regulation. To overcome the complexity and obstacles of regulating emerging AI technologies, Wirtz et al. (2022) suggest leveraging the expertise of Big Tech organizations to enhance governmental capabilities in coping with AI risks and regulatory requirements.

Methodology

This qualitative study adopted a systematic literature review (SLR), which is appropriate for understanding and analyzing the current state of the literature and answering open-ended questions on the under-researched implications of empirical AI adoption in the public sector in a replicable, transparent, and evidence-based manner (Creswell & Poth, 2017; Lame, 2019; Zuiderwijk et al., 2021). Extended from a principal methodology from the health sciences, the exploratory approach of SLRs has been expanded and tailored to meet the needs of diverse research fields, such as Information Systems (IS) and public policy (Lame, 2019; Okoli, 2015).

The researcher's background in information systems, data management, and public service influenced the selection of a systematic literature review to combine the methodological needs of IS and public policy research to gain insights into the regulatory complexities and challenges of AI policy and governance unique to the public sector (Okoli, 2015; Snyder, 2019). An SRL is a methodology adequate for synthesizing and evaluating emerging technologies and identifying how existing theoretical AI policy and governance frameworks specific to the public sector can be applied to a local context in California (Okoli, 2015; Saura et al., 2022; Snyder, 2019).

This paper follows Okoli (2015) steps for conducting scientifically rigorous SLRs, divided into four phases: planning, selection, extraction, and execution.

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram in Figure 2 improves transparency and documents the selection phase (Moher et al., 2009).

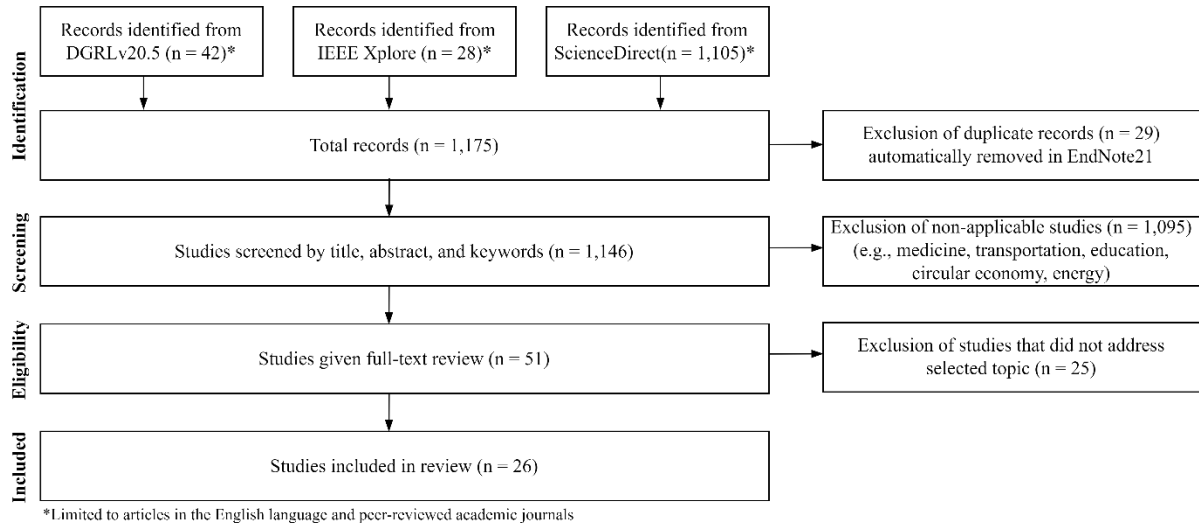


Figure 2: PRISMA flow reporting systematic reviews (Moher et al., 2009)

Data collection

Consistent with qualitative research, the author collected data from multiple sources (Creswell & Creswell, 2018). First, the researcher examined the existing literature's proposed AI policy frameworks for public governance. Then, the Digital Government Reference Library (DGRL) version 20.5, IEEE Xplore, and the ScienceDirect databases identified studies closely related to the research topic. The title, abstract, and keyword searches included the terms “AI policy,” “AI governance,” and “data governance” in combination with “public sector,” “government,” and “local government.” For quality and scientific rigor, the researcher limited the results to peer-reviewed journal articles published in English between 2020 and 2024 (Okoli,

2015). After identifying and eliminating duplicate records, the researcher selected articles, screening the titles, abstracts, and keywords based on exclusion and inclusion criteria. Finally, the remaining articles were retrieved and subjected to a full-text review, excluding those without AI adoption and governance in the public sector as the principal thematic focus.

The researcher adopted an iterative hybrid approach using backward snowballing from manual search to identify other potentially relevant articles and conference proceedings (Mourão et al., 2020). Followed by examining international, regional, and local regulations published on government websites. These documents were used to gain additional insights into AI policy and governance efforts and are not included in the SLR.

Data analysis

The researcher utilized an iterative approach and applied a multi-phased method to extract, analyze, and report findings (Bandara et al., 2015; Creswell & Creswell, 2018). The process included data familiarization with concurrent rounds of data collection, applying open, axial, and selective coding to identify and extract themes (Okoli, 2015). After reaching saturation, the compiled coding themes in Table 1 were compared and assigned to the six AI risks categories on the framework presented by Wirtz et al. (2022) in Figure 1. This theoretical framework differs from others in the literature as it identifies the risks and integrates guidelines for the challenges associated with AI adoption in the public sector (Wilson & Van der Velden, 2022). The qualitative data-analysis tool MAXQDA assisted in cross-checking and complex coding intersection, supporting data reliability, validity, and reporting (Bandara et al., 2015).

Table 1: AI risks' themes and code assignments

Theme	Coding		
Risks: Legal and Regulatory	• Regulatory/Regulation	• Autonomous Algorithm	• Law
Risks: Ethical	• Unfairness/Fairness • Discrimination	• Diversity • Equity	• Inclusive
Risks: Social	• Citizens/Society • Privacy	• Job Displacement • Employee Resistance	• Harm • Safety
Risks: Economic	• Workforce	• Labor Market	• Economy
Risks: Informational and Communicational	• Disinformation	• Democracy	• Freedom
Risks: Technological, Data, and Analytical	• Oversight/Scrutiny • Skills	• Explainable • Transparency • Opacity	• Data Quality • Knowledge Gap • Bias
Guidelines	• Recommendations • Standards	• Strategy	• Best Practices

Results

This section presents the results of the SLR in two parts. First, it describes the articles included in the study. Then, through a thematic analysis of the literature, it follows the integrated AI governance framework proposed by Wirtz et al. (2022), identifying the six risk-based guidelines to address the challenges of AI adoption in the public sector.

Descriptive analysis

The automatic search yielded a total of 1,175 journal articles. After excluding 29 duplicates, 1,146 articles were screened, excluding 1,120 sources based on predetermined criteria. Following the selection process detailed in the PRISMA flow in Figure 2, 51 articles were submitted for a full-text review and eligibility, excluding 25 articles that did not meet the inclusion criteria. Ultimately, the review included the 26 articles detailed in Table 2. Most articles, a total of 12, were published in the *Government Information Quarterly*, a journal focusing on information science in the public sector. Other journals appeared twice (e.g., *Technology in Society*, *Computers*), with all remaining journals appearing once, reflecting the research's multidisciplinary approach.

Table 2: Summary of included literature

Author (Year)	Title / Journal
Attard-Frost et al. (2024)	The governance of artificial intelligence in Canada: Findings and opportunities from a review of 84 AI governance initiatives
Carlsson and Rönnblom (2022)	From politics to ethics: Transformations in EU policies on digital technology
Chesterman et al. (2024)	The evolution of AI governance
David et al. (2024)	Understanding local government responsible AI strategy: An international municipal policy document analysis
Delfos et al. (2024)	Integral system safety for machine learning in the public sector: An empirical
Dor and Coglianese (2021)	Procurement as AI governance
Erdélyi and Goldsmith (2022)	Regulating artificial intelligence: Proposal for a global solution
Gutierrez (2023)	Uncovering incentives for implementing AI governance programs: Evidence from the field
Kinder et al. (2023)	Local public services and the ethical deployment of artificial intelligence
Kshetri (2024)	Economics of artificial intelligence governance
Kuziemski and Misuraca (2020)	AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings
Madan and Ashok (2023)	AI adoption and diffusion in public administration: A systematic literature review and future research agenda
Maragno et al. (2023)	Exploring the factors, affordances and constraints outlining the implementation of artificial intelligence in public sector organizations
Medaglia et al. (2023)	Artificial intelligence in government: Taking stock and moving forward
Robles and Mallinson (2023)	Catching up with AI: Pushing toward a cohesive governance framework
Ruscheimer and Hondrich (2024)	Automation bias in public administration – an interdisciplinary perspective from law and psychology
Saura et al. (2022)	Assessing behavioral data science privacy issues in government artificial intelligence deployment
Stahl et al. (2022)	A European agency for artificial intelligence: Protecting fundamental rights and ethical values
Straub et al. (2023)	Artificial intelligence in government: Concepts, standards, and a unified framework
Svard et al. (2024)	Local regulations for the use of artificial intelligence in the management of public records - a literature review
van Noordt and Misuraca (2022)	Artificial intelligence for the public sector: results of landscaping the use of AI in government across the European Union
van Noordt and Tangi (2023)	The dynamics of AI capability and its influence on public value creation of AI within public administration
Wanckel (2022)	An ounce of prevention is worth a pound of cure – Building capacities for the use of big data algorithm systems (BDAS) in early crisis detection

Author (Year)	Title / Journal
Wang et al. (2024)	Developing an ethical regulatory framework for artificial intelligence: Integrating systematic review, thematic analysis, and multidisciplinary theories
Wilson and Van der Velden (2022)	Sustainable AI: An integrated model to guide public sector decision-making
Zuiderwijk et al. (2021)	Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda

AI risk-based guidelines

Technological, data, and analytical guidelines primarily concern mitigating the risks of autonomous algorithm decision-making and maintaining oversight of AI applications at the implementation and operational levels (Wirtz et al., 2022). Due to government dependency on private actors, Dor and Coglianese (2021) suggest contracting as a soft law strategy to ensure vendors adhere to disclosure requests and provide adequate information on AI algorithms, allowing transparency and oversight. Other guidelines involve the implementation of monitoring and auditing tools (Madan & Ashok, 2023; Wang et al., 2024; Wirtz & Müller, 2019). On a macro level, the government of Japan has issued guidelines for organizations adopting AI (Kshetri, 2024), requiring the disclosure of AI algorithms and training data.

Informational and communicational AI guidelines involve mechanisms for preventing the manipulation of information, targeting computational propaganda, and the dissemination of disinformation by AI systems (Wirtz et al., 2022). The AI risks connected to this theme are described by Medaglia et al. (2023) as threats to democracy; however, the studies included in the SLR do not address guidelines to prevent these risks.

Economic AI guidelines require a multi-level approach to ensure transparency in all AI processes (Wirtz et al., 2022). These guidelines should mitigate the impacts of AI on labor markets and workforce substitution (Attard-Frost et al., 2024; Zuiderwijk et al., 2021).

Social AI guidelines refer to the government's role in mitigating privacy, safety, and financial harm caused by AI systems (Wirtz et al., 2022). Saura et al. (2022) discuss the need for regulation to protect citizens' privacy and society from massive behavior modification.

Ethical AI guidelines are broadly discussed in the literature, focusing on the protection of human rights through the development of a binding code of conduct and regulatory frameworks (Stahl et al., 2022; Wang et al., 2024; Wirtz et al., 2022). Stahl et al. (2022) suggest the creation of a new EU AI regulatory agency while Svard et al. (2024) for a national-level AI strategy focused on ethical principles.

Legal and regulatory AI guidelines appear in all 26 articles. The absence of a unifying AI regulatory framework emerges as a primary concern, as verified by Wirtz et al. (2022). Dor and Coglianese (2021), Gutierrez (2023), and Wang et al. (2024) propose the use of soft law to fill regulatory gaps.

Discussion

Summary of findings and implications

Effective governance frameworks are essential to mitigate risks and responsibly harness AI's benefits (Erdélyi & Goldsmith, 2022; Gasser & Almeida, 2017; Micheli et al., 2020; Straub et al., 2023), requiring a multi-stakeholder, risk-oriented approach (Wirtz et al., 2022). Essential technological guidelines emphasize maintaining control over AI systems to mitigate risks from autonomous decision-making. Informational risks focus on combating computational propaganda and disinformation, while social and

ethical guidelines highlight the importance of ethical conduct, citizen participation, and initiatives to address AI-induced unemployment. Legal and regulatory guidelines call for addressing existing legal gaps, forming supervisory authorities, and establishing general AI regulatory principles.

Through a thematic analysis, the study followed the framework proposed by Wirtz et al. (2022), providing insights and recommendations to address the main challenges of AI adoption and governance in the public sector. The study's findings reveal the absence of a unifying AI regulatory framework as a primary concern in all 26 studies, with suggestions on the use of soft law to fill regulatory gaps (Dor & Coglianese, 2021; Gutierrez, 2023; Wang et al., 2024). Ethical guidelines are broadly discussed in the literature and focus on the protection of human rights through the development of a binding code of conduct and regulatory frameworks (Stahl et al., 2022; Wang et al., 2024; Wirtz et al., 2022), with calls for a national-level AI strategy based on ethical principles (Svard et al., 2024). Technical guidelines revolve primarily around mitigating the risks of autonomous algorithms and allowing transparency and oversight. Due to government dependency on private actors, Dor and Coglianese (2021) suggest procurement as a soft law strategy to ensure vendors adhere to disclosure requests and provide adequate information on AI algorithms and the implementation of monitoring and auditing tools (Madan & Ashok, 2023; Wang et al., 2024); and the issuance of guidelines requiring the disclosure of AI algorithms and training data for organizations adopting AI at a national level (Kshetri, 2024). Saura et al. (2022) call for regulation to protect citizens' privacy and society from behavior modification. Guidelines to mitigate the impacts of AI on labor markets and workforce substitution are merely conceptual, while risks connected to the manipulation of information and threats to democracy appear only once, without addressing guidelines to prevent these risks (Attard-Frost et al., 2024; Zuiderwijk et al., 2021).

Contribution and limitations

Theoretical and practical implications

Responsible adoption and governance are essential for AI use in public administration (Kinder et al., 2023). This systematic literature review contributes to a comprehensive overview of existing AI governance frameworks specific to the public sector. The study expands on Wirtz et al.'s (2022) governance framework by coding and classifying AI risks and provides practical contributions by drawing insights into AI risk-based guidelines. Further, it may serve as a reference point bridging the gap between conceptual frameworks and practical guidelines to the challenges of AI governance in the public sector.

Limitations

This study is not exempt from limitations. First, this review synthesizes theoretical and empirical literature to provide insights and practical guidelines, relying solely on secondary sources. Second, the study covers an extensive range of literature on the evolving topic of AI governance in the public sector, with the search confined to peer-reviewed articles published in English between 2020 and 2024 in three databases, DGRL, IEEE Xplore, and ScienceDirect. Accordingly, other non-peer-reviewed sources and relevant articles published after 2024, or indexed in other databases, were excluded from the study. Third, given the strictly qualitative and limited number of empirical studies in the literature, the insights on AI risk-based guidelines can be subjective and need further validation from future research.

Conclusion and future research

AI governance emerges in a complex environment, and its implementation requires multiple, blended approaches to manage the risks and ensure ethical and legal compliance (Gasser & Almeida, 2017), ranging from market-oriented guidelines to those applied at national, regional, and international levels. Despite its potential to transform public service delivery and decision-making, the adoption of AI technologies in

public organizations remains uneven, with a substantial need for more empirical studies focusing on process scalability and AI governance (Charles et al., 2022; Floridi et al., 2018; Gasser & Almeida, 2017). The recent publication of the EU AI Act may serve as a foundation for developing other national, regional, and local regulatory efforts and emerges as an opportunity for multidisciplinary research on the impacts of a unified regulatory framework on AI adoption in all levels of government.

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