

# Artificial Intelligence and Decision-Making in Government

## Functions: Opportunities, Challenges and Future Research

### Abstract

**Purpose:** Artificial Intelligence (AI) has received much attention due to its promethean-like powers to transform the management and delivery of public sector services. Due to the proliferation of research articles in this context, research to date is fragmented into research streams based on different types of AI technologies or a specific government function of the public sector (e.g., health, education). Our goal is to synthesize this literature, identify challenges and opportunities, and offer a research agenda that guides future inquiry.

**Design/methodology/approach:** We aggregate this fragmented body of knowledge by conducting a systematic literature review of AI research in public sector organisations in the Chartered Association of Business Schools (CABS) ranked journals between 2012 and 2023.

**Findings:** The search strategy resulted in the retrieval of 2,870 papers, of which 61 were identified as primary papers relevant to this research. These primary papers are mapped to the 10 classifications of the functions of government as classified by the OECD, and the reported challenges and benefits aggregated.

**Originality:** The study advances knowledge by (i) providing a state-of-the-art of AI research based the OECD classifications of government functions, (ii) reporting of claimed benefits and challenges, and (iii) providing a research agenda for future research.

**Keywords:** AI; artificial intelligence; public sector; decision-making

### 1. Introduction

AI has significantly broadened the potential for government applications, as it enhances the capabilities of the public sector to address economic, social, and political challenges (Ruvalcaba-Gomez, 2023). The utilisation of AI in governmental operations has extended its reach to critical domains of governmental functions (Sharma et al., 2021) such as health (Kumar et al., 2021) and education (Hannan & Liu, 2021).

In the existing literature, several review studies focus on the application of AI in the public sector, covering various areas such as AI in public governance (Zuiderwijk et al., 2021) and public healthcare (Khan et al., 2021). Some papers also address reported AI applications and associated challenges (e.g., Madan & Ashok, 2022; Wirtz et al., 2019). However, few, if any, papers discuss the challenges and benefits of AI in governmental decision-making. Despite the centrality of decision-making to AI, there is a notable lack of review studies focusing on this aspect. As such, there is a consensus among authors of other review papers that additional research and enhanced reviews on AI's application in the public sector are necessary (Langer

& Fenner, 2021). Despite the noticeable increase in research on AI in the public sector, there are still gaps regarding government capacities to address the challenges posed by AI, resulting in a fragmented body of knowledge.

To address this gap, this study presents a comprehensive and detailed analysis of AI applications within the governmental environment. It stands out by examining the challenges and benefits of AI in decision-making in public sector organizations. The results are presented in a structured manner, using governmental functions as a framework. In a nutshell, to address this gap, this study focuses on advancing the understanding of AI in the public sector by investigating the following research questions:

RQ1. What is the current state of AI in public sector research between 2012-2023?

RQ2. How AI has been applied across public sector functions to support decision-making?

RQ3. What are the reported challenges and benefits of integrating AI into public sector organisations?

We undertake a systematic literature review (SLR) focusing on AI in public sector research between 2012 and 2023 to explore how AI has been applied in government functions and how AI is used to support decision-making. We outline the challenges, benefits, and roles of AI in decision-making within public sector organisations. An in-depth comparative analysis of our study with other literature reviews is also conducted.

The paper is organised as follows. Background to AI and its applications across the functions of the public sector is presented. Next, the research methodology is outlined. Then the research findings and analysis are presented. Then a discussion, implications and research agenda. The study ends with a conclusion.

## **2. Background**

### **2.1 AI in the public sector**

AI is a multifaceted concept that encompasses computer systems or machines that emulate human intelligence, engaging in tasks such as learning, pattern recognition, decision-making, and problem-solving, utilising methods like machine learning, natural language processing, computer vision, and robotics (Russell & Norvig, 2016). AI offers the public sector a diverse array of opportunities, driven by its transformative analytical capabilities, such as better problem-solving abilities, and enhanced task performance (Medaglia et al., 2023). For example, the use of AI in the public sector has the potential to improve decision-making

processes and enabling civil servants to focus on the most critical aspects of their work (Choroszewicz & Mäihäniemi, 2020) and to provide better services to citizens. However, there are also challenges associated with using AI in the public sector, such as the potential for bias and discrimination (Ruvalcaba-Gomez & Cifuentes-Faura, 2023). The exploration of AI's application in public sector organisations and governments has a longstanding history, demonstrating its enduring relevance and potential impact (Valle-Cruz et al., 2020). The initial study on the use of AI in public administration can be traced back to 1989, underscoring the importance of expert systems in enhancing the effectiveness of public agencies (Hadden, 1989). Although AI has gained significant importance in the public sector and administrative decision-making processes, concerns have been raised about the impact of negative perceptions about its adoption and implementation in the public sector (Ahn & Chen, 2022).

## **2.2 AI in government functions**

Governments are leveraging AI systems to position themselves as innovative leaders, enhancing efficiency and transforming governance and public services (Yigitcanlar et al., 2021). Recently, there has been a growing focus on the significance of AI in contributing to the attainment of the United Nations' Agenda 2030 sustainable development goals (Medaglia et al., 2021). The development of varied approaches to AI in government is expected as different countries and regions around the world embark on this journey (Medaglia et al., 2023). Governments can adopt a new technological solution in several domains, which not only increases the efficiency of the government in its activities of it but also help the citizens to get what they want from the service of the government (Ahn & Chen, 2022).

Despite the proliferation of various initiatives in different governmental sectors across multiple countries, a comprehensive grasp of the rationales, procedures, results, and effects of AI implementations in the public sector continues to lack a systematic understanding in academic research (Ku & Leroy, 2014). To bridge this gap, we employed the conventional notion of government functions as defined by the OECD<sup>1</sup> (2011). The '*classification of the functions of government (COFOG)*' is a standardised classification system developed by the United Nations (van den Berg, 2019). This serves as a comprehensive tool to categorise and organise the diverse functions undertaken by governments in various countries. Its primary objective is to ensure a consistent and uniform approach for grouping government expenditures and activities into broader functional categories. COFOG is widely utilised by international organisations,

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<sup>1</sup>Source: Second level, 2021, <https://www.oecd.org/gov/48250728.pdf>

national governments, and researchers, enabling them to analyse government spending and activities in a standardised and comparable manner. By adopting this classification system, a better understanding and comparison of public sector priorities and resource allocation across different countries is obtained (see Table 3 for a list of the functions).

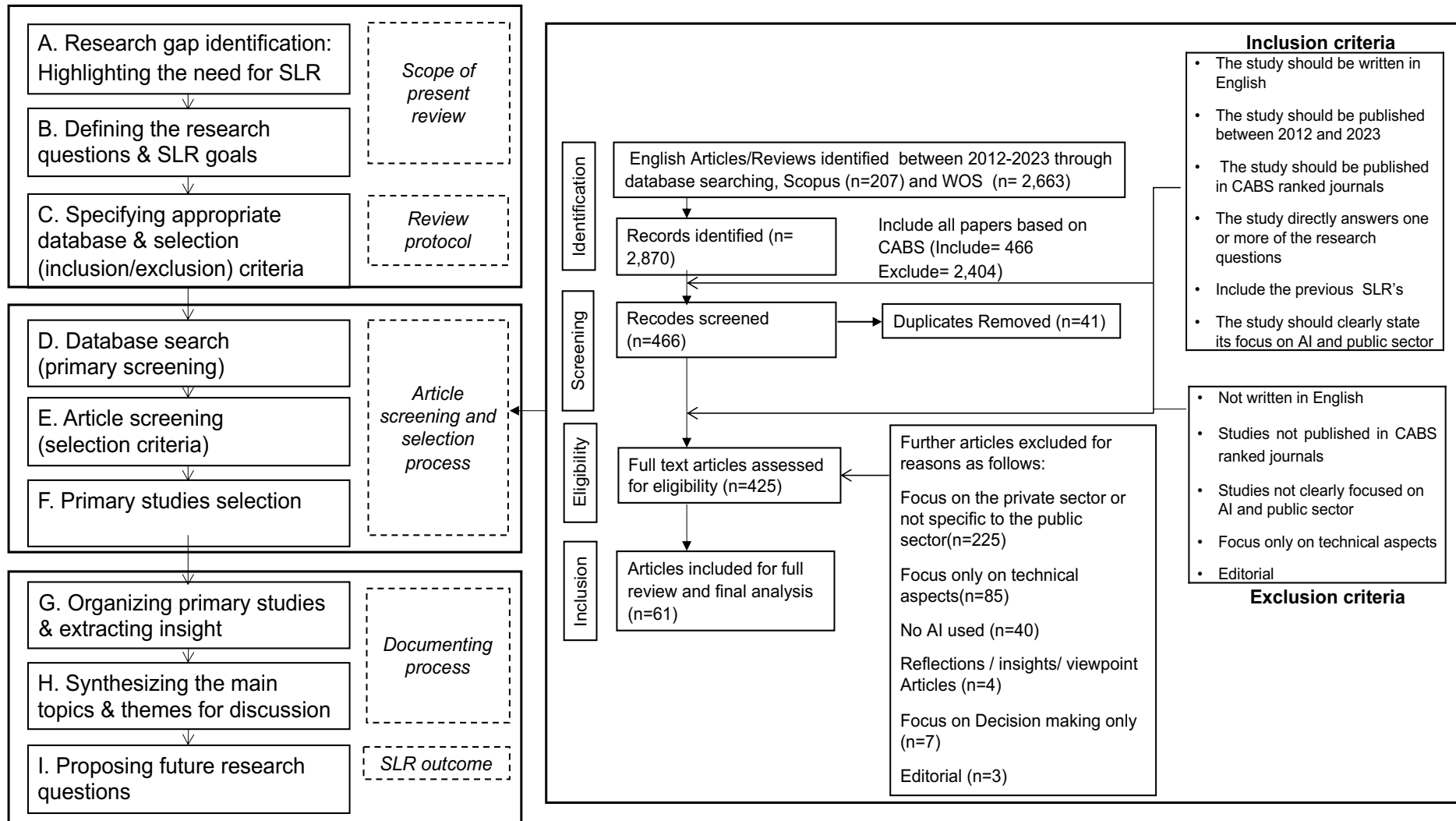
### **3. Research methodology**

Here we present the SLR process adopted to identify, evaluate, and interpret existing research relevant to our specific research questions. To guide our review, we adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Moher et al., 2009) as it is a widely accepted methodology for conducting SLRs (e.g., Madan & Ashok, 2022; de Sousa et al., 2019).

Scopus and World of Science were used as the selected databases. The search string included keywords regarding i) AI (i.e., artificial intelligence, business analytics, data analytics, expert systems, speech recognition, automation, machine learning, natural language processing, machine vision) and ii) public sector (i.e., public management, public sector, public administration); decision-making (i.e., decision-making, decision automation, decision support). The keywords utilised in the search were derived from an examination of prior SLRs in this field that employed similar keywords (e.g., Damascene et al., 2019; Valle-Cruz et al., 2020).

Figure 1 summarises the review protocol. In short, from the initial yielded 2,870 papers in total, after removing 41 duplicates, 466 studies were selected for screening. By applying our exclusion criteria to the titles and abstracts, 425 studies remained qualified for a full-text review. After examining the full texts and considering only articles that met the inclusion criteria, 364 were excluded. Finally, 61 papers were selected for the final analysis of the studies (See Appendix A). The findings are presented in the next sections. As recommended by PRISMA, only the primary papers are used to synthesize the findings, including challenges and benefits (Page et al., 2021).

**Figure 1.** The SLR protocol (Source: Created by author)





## 4. Findings and Analysis

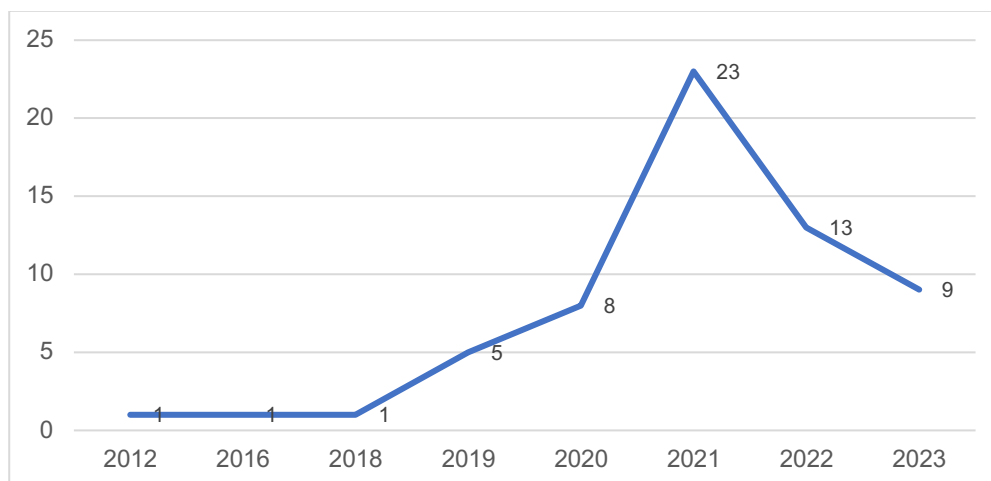
Following, we present an analysis of the current state of AI in public sector organizations. First, we focus on several key factors, including (i) the distribution of publications by year and their methodological design, (ii) the quality of studies and the type of journals in which the studies were published, (iii) previous SLRs, and (iv) how decision making is applied per government function.

### 4.1 State of AI in the public sector

#### 4.1.1 Publication of studies between 2012 - 2023 and methodological design

Figure 2 shows that there has been an increasing trend in publications on the use of AI in the public sector over the past decade. Most methodologies reported in the primary studies were empirical (38 out of 61), of which 17 used quantitative methods and 21 used qualitative methods. Six studies used mixed methods, 5 were conceptual studies, and 12 were review studies.

**Figure 2.** Publication period (Source: Created by author)



#### 4.1.2 Quality Evaluation

This section explains how we conducted a quality evaluation to ensure the accuracy and impartiality of the study results using adapted quality criteria. We undertook a formal quality evaluation process to ensure the rigour of results and impartiality (Ouhbi et al., 2015). We used the Quality Evaluation (QE) criteria suggested by Behera et al (2019) and adjusted them (see Table 1) to fit our research purpose as suggested by Tandon et al., (2020). Table 1. Clarifies the QE criteria used in this study based on these, the quality of each article was calculated accordingly.

**Table 1.** Quality Evaluation (QE) criteria (Source: Created by author)

QE	Criterion
QE1	If paper thoroughly discusses how AI is used in decision-making across public sector (+2.0); if it mentions the use but lacks depth or clarity (+1.0); if there is no evidence (+0).
QE2	The search of the advantages and challenges related to the current subject of interest is rated as “yes (+2)”; or “partially (+1.5)”; or “no (+0)”.
QE3	Do the discussed outcomes align with and validate the employed methodology and the topic of interest? “yes (+2)”; or “partially (+1.5)”; or “no (+0)”.
QE4	Source reliability and peer recognition: (+2) citations and H Index > 100; (+1.5) citations and H Index between 50 and 99; (+1.0) citations and H Index between 1 and 49; (+0) citations and H Index is 0.
QE5	Comparability of the utilized method(s) with methods popularly used in prior studies: “yes (+1)”; or “no (+0)”

Table 2. below presents the average quality scores and the number of studies per journal. This list can guide researchers in selecting the most appropriate journal for publishing their articles.

**Table 2.** Quality Evaluation (QE) criteria (Source: Created by author)

Journal	Average of QE Score (max 9)	No. studies
Government Information Quarterly	8.10	20
<b>Transforming Government: People, Process and Policy</b>	<b>7.40</b>	<b>5</b>
Public Management Review	7.20	5
International Journal of Public Administration	8.07	3
Technological Forecasting and Social Change	8.13	3
Expert Systems with Applications	8.00	2
Information, Communication & Society	7.50	2
Public Administration Review	7.50	2
Science and Public Policy	7.25	2
Public Policy and Administration	7.15	2
Information Systems Frontiers	6.50	2
Accounting Horizons	7.50	1
Accounting, Auditing and Accountability Journal	7.50	1
Information and Management	8.00	1
International Review of Administrative	7.50	1
Management Decision	7.50	1
Journal of Public Administration Research and Theory	7.00	1
Telecommunications Policy	7.00	1
Computers in Human Behaviour	6.50	1
Strategic Change	6.00	1



Competitiveness Review	5.50	1
International Journal of Information Management	5.50	1
Policy Sciences	5.50	1
Journal of Emerging Technologies in Accounting	5.00	1
<b>Total</b>	<b>7.50</b>	<b>61</b>

### 4.1.3 Previous systematic literature reviews

In this section, we overview and compare previous SLRs, highlighting trends, gaps, and how our SLR differs examining an area not extensively covered before. Among the 61 primary studies, there were 12 systematic literature reviews (Table 3). Although decision-making is central to AI and is a primary focus of our paper, it is important to note that only one review study focuses on this this topic (i.e., P48); still this study is limited to business intelligence and analytics. Regarding the use of COFOG '*classification of the functions of government*', three studies (i.e., P38, P33 and P35) made a reference to it; however, there was a considerable gap between these studies and our research, since there was a lack of discussion about exploring AI in the public sector and the specific potential for decision-making. A deeper analysis of the previous SLRs identified that 6 of these studies focus on general public service function and they varied in their scope and subject matter. However, none of these reviews discussed AI for decision-making and the COFOG.

**Table 3.** Comparison of previous SLRs per COFOG (Source: Created by author)

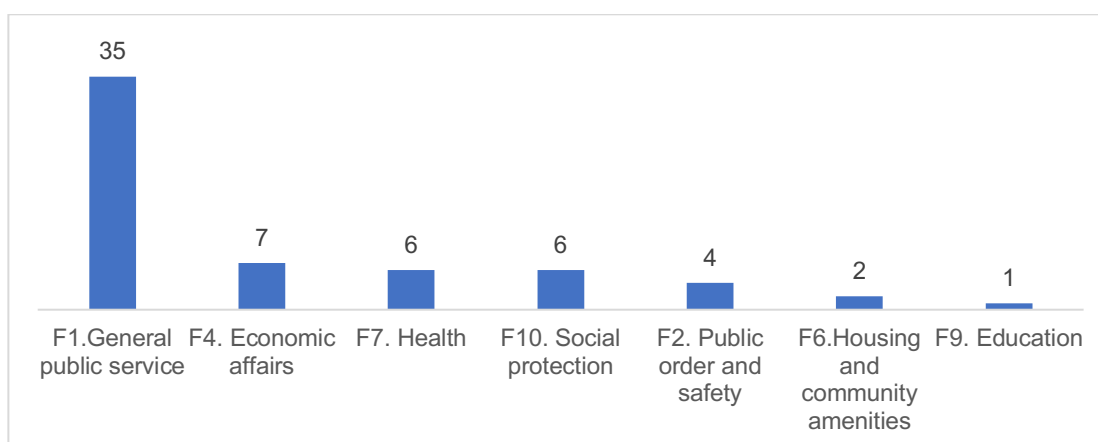
Function	Study ID	Timeline	Decision-making	Scope
F1. General public service	P29	2010-2022	N/A	Focus on public value management. It is limited to two specific AI technologies (ML, NLP)
	P32	2019-2020	N/A	Focus on examining the ramifications of utilising AI in public governance.
	P33	N/A	N/A	Focus on the AI in public sector in general.
	P35	NA	N/A	A conceptual approach to evaluate AI applications and challenges.
	P38	2000 -2018	N/A	A research framework on the implementation of AI solutions in the public sector.
	P48	2007 -2021	Partially	How analytics can enhance decision-making in public sector.
F4. Economic affairs	P34	2012	N/A	Focus on AI systems in auditing.

F6. Housing and community amenities	P40	NA	N/A	Identifies “AI-fiction” trends in construction.
F7. Health sector	P8	NA	N/A	AI adoption challenges in the healthcare sector.
	P30	NA	N/A	AI applications in pandemic.
	P31	1977- 2020	N/A	Investigates the relationship between AI and digital health, in the healthcare sector.
F9. Education	P39	NA	N/A	Application of AI in higher education.

### 4.3 Decision-making across public sector functions

Analysis of the primary studies shows that the most common government function that uses AI is F1 (Figure 3). The majority (93%) of the papers focused on one specific function. Functions F3, F6, and F8 were not mentioned in our primary studies. This suggests that governments may demonstrate a tendency to give higher priority to the application of AI in sectors like defence, culture and environment.

**Figure 3.** Number of studies per government function (Source: Created by author)



*F1 General public service:* The primary themes focus on AI adoption (P33, P38, P29) and investigating factors contributing to the successful implementation of AI in the public sector (P2, P10, P23, P35, P37, P43, P46, P42, P53). Additionally, studies examine how AI assists in decision-making and ensures that government services are accessible and understandable to all citizens (P60), addressing challenges like bias (P20), the limitations of AI (P44), and the effectiveness of combining human and AI decision-making in the public sector (P45, P48, P20). These studies also explore using big data (P48) and smart technologies (P26) to enhance decision-making.

The potential of AI in decision-making and value creation is central to several studies. These include general applications (P16, P26, P28, P32, P55), enhancing citizen involvement in political participation (P11), and specific topics like government regulation of AI (P13), providing high-quality public services (P9), and increasing citizen satisfaction and trust in AI (P22, P52). Chatbots and virtual assistants are common tools in our primary studies. These studies discuss chatbots and trust (P6), improving communication between government and citizens (P24), enhancing customer service and administrative processes (P41), and the benefits citizens gain from interacting with virtual assistants (P47). Furthermore, they address the creation of public value through robotic process automation in municipal governance (P50) and the ethical deployment of AI in local public services (P59).

The relationship between automated decision-making and principles of good administration is discussed from the perspective of government insiders (P57), along with the decision-making processes and potential implications of adopting AI-supported automation in public agencies (P54).

*F2. Public order and safety:* Four studies refer to this function, with one focusing on how AI-enabled risk assessment tools in criminal justice impact decision-making (P21). (P5) discusses trust and safety concerns with autonomous vehicles, directly impacting public safety and regulatory measures. (P51) examines the implications for decision-making and safety, particularly where AI tools increasingly aid human decision-makers; and (P49) discusses AI's role in enhancing public safety and regulatory measures through improved decision-making and fraud prevention in bureaucratic functions.

*F4. Economic Affairs:* The studies explore AI and robotic automation's transformative effects across various economic sectors, focusing on efficiency, productivity, and decision-making enhancements. In public accounting, (P17, P25) shows how Robotic Process Automation and AI streamline tasks, reduce manual workloads, and reshape job roles. In the financial sector, studies (P1, P36) highlight the importance of AI implementation, especially in India's public manufacturing sector. AI's role in policymaking during economic crises (P14) demonstrates its potential to enhance public policy effectiveness and efficiency. The integration of AI into auditing (P34) significantly improves efficiency and accuracy. In agriculture, AI applications (P58) boost productivity, efficiency, and sustainability in vertical farming.

*F6. Housing and community amenities:* Only two studies exist under this function. One emphasises responsible AI integration in construction, addressing risk management (data quality and privacy) and benefits in project monitoring, quality control, and design optimisation (P40). The other focuses on sustainable city planning using green AI to enhance urban infrastructure, traffic control, and resource management (P61).

*F7. Health:* AI is making significant strides in transforming healthcare. Building trust is crucial, especially with technologies like autonomous vehicles and medical assistance devices (P5). AI enhances decision-making by improving knowledge exchange between governments (P7) and supporting medical practitioners with intelligent diagnostic tools (P27). However, challenges such as bias and limitations remain (P8). Responsible AI practices create value by boosting market performance and engaging patients (P15). During COVID-19, AI proved essential in managing the crisis (P30). Responsible AI is key to advancing digital health, providing valuable insights and research directions (P31). AI-based systems streamline processes by providing timely access to relevant knowledge and information, enhancing decision-making (P7, P27) and addressing challenges like bias (P8, P15, P30).

*F9. Education:* Only one study (P39) highlights how AI enhances student learning, support, and enrolment management, making education more personalised and efficient.

*F10. Social protection:* Several studies delve into the role of digital technologies in welfare services, highlighting key themes of efficiency, equity, and accountability. P3 explores Denmark's digital welfare state, focusing on data management and privacy concerns. Meanwhile, P4 and P18 collectively discuss the challenges and ethical implications of automated public services, emphasising how these systems can create disparities among citizens. Additionally, P12 and P65 stress the necessity of human oversight in AI decision-making to maintain public trust, transparency, and fairness. Lastly, P19 investigates the growing trend of legal challenges mentioned in these studies.

## **5. AI challenges and benefits in public sector**

### **5.1. AI Challenges**

Below we present seven key challenges based on the analysis of the primary studies.

### ***Challenge 1: Ethical and legal concerns***

The literature extensively discusses ethical dilemmas surrounding AI utilisation in the public sector, a central focus in our primary papers. Common challenges highlighted include data privacy and security risks (P23, P28, P30, P46, P58, P60, P61) and issues related to AI and data governance (P2, P3, P23, P29, P31, P33, P43, P45, P55) particularly in Automated Decision Making (ADM) system (P56, P57). AI algorithms raise concerns about public sector accountability and ethical governance (P45), while other ethical challenges include privacy, data security, responsibility for algorithms, and governance of autonomous systems (P28).

Several papers point to specific challenges: potential unemployment due to human labour replacement (P41, P54), de-humanisation and inequality (P43), lack of transparency (P18, P3), and discrimination (P3, P38, P46, P59). Additional concerns include biases and transparency issues in AI decision-making (P58), leading to amplified gender and racial inequalities, job displacement, income inequality, erosion of discretionary power, biases against marginalized communities, and unclear impacts on democratic processes (P40-P44). Human engagement in decision-making and thoughtful deliberation in process automation are also emphasised (P54). Paper (P55) stresses the challenges of automating complex social services like public health, policing, and correctional services, considering the feasibility and ethical implications of excluding human involvement in decision-making.

This challenge also presents several data-related issues critical to effectively managing AI tensions. These include data transfer across legal jurisdictions (P17), governance of data (P29), limited availability of industry-specific data (P23), lack of standardised datasets (P30), and concerns about data quality (P37). In health AI applications in particular, privacy protection for personal data is a significant concern (P5, P15), mainly regarding the lack of comparable safeguards for healthcare professionals against technology vendors (P15) and the potential for biased data leading to discriminatory decision-making (P28). In education, there is a need to balance personalised student support with privacy concerns surrounding data handling. The use of third-party AI platforms raises worries about data storage and access (P39). In the construction sector (P36), trust and privacy issues with AI are highlighted as ethical concerns, with individuals often disclosing information without understanding its purpose.

### ***Challenge 2: Limited or ineffective administrative support***

Several administrative issues were identified, predominantly focusing on ineffective AI implementation management within public sector organisations (P32, P37, P52). Another key

challenge is the scarcity of professionals possessing necessary AI expertise and skills for hire and successful AI development/application (P8, P31, P35). Besides the lack of AI developers, insufficient AI managers and management techniques hinder understanding of AI applications, leading to resistance towards AI system implementation (P9, P8, P36, P41). This results in fragmented perceptions among senior-level managers regarding AI value and employees' capabilities to develop AI (P1). Transparency within organisations is also lacking, affecting understanding of AI operations and integration in processes, as well as AI-related information flows (P18, P57). The need for supportive regulatory frameworks is also another challenge facing AI integration (P59).

### ***Challenge 3: Restrictive government policies***

Government policies can often hinder the adoption and effectiveness of AI in the public sector. Higher governmental mandates can both drive and restrict AI adoption, depending on their nature (P10). In digital health, restrictive policies limit AI's implementation (P31, P61), while in public governance, such policies prevent innovative use of AI (P32, P35). Historical governance failures (e.g., Robodebt 2 case) highlight the negative impact of restrictive policies on AI applications (P56). In addition, some public authorities struggle to apply AI within existing legal frameworks, further emphasising these constraints (P57) and supportive policies are necessary to facilitate innovation and implementation in the agricultural sector (P58).

### ***Challenge 4: Changing societal and organisational culture***

The use of AI in daily life is reshaping human behaviours and posing societal challenges. Social unawareness of AI hinders its implementation in the public sector (P43). Cultural and socio-economic variations impact AI policy implementation (P31, P23, P41), shaping regulations on data privacy and use. Unrealistic expectations of AI and a lack of understanding of its benefits by employees present significant challenges (P8, P17). Cultivating an organizational culture that promotes innovation is difficult in the public sector (P10, P37, P58). A major issue is the fear of job losses from AI, rooted in the belief that AI will replace human workers, leading to unemployment (P35, P29, P33, P43, P36, P28, P41). This fear highlights obstacles such as human replacement, organizational challenges, and cultural resistance (P31). In the public sector, fear of failure contributes to AI resistance; limited citizen interaction with AI raises doubts about institutional capability (P52). Resistance, a recurring theme in primary studies, stems from job security concerns or reluctance to change among medical practitioners (P27). Past negative experiences with new technologies can lead to a risk-averse attitude and a lack

of willingness to experiment (P13). Lastly, digital AI-enabled government applications can amplify social inequalities by imposing digital access barriers (P4).

#### ***Challenge 5: Technological challenges***

AI implementation requires a robust infrastructure for managing data storage, processing, and analysis. Technological challenges like limited data availability and linguistic differences hinder the use of language processing tools in specific public sectors (P2). Concerns include flawed algorithms and system malfunctions stemming from AI complexities (P9, P20, P58, P59, P60). Implementing Green AI involves complexities, such as ensuring reliable AI performance and integrating it with existing infrastructure (P61). Biases in AI can harm marginalized populations, leading to unfair outcomes (P51, P56). Challenges also include limited expert intervention for underperforming AIs, highlighting the need for human oversight, particularly when chatbots or automated assistants encounter limitations (P26). This can lead to questioning algorithmic decisions, limited feedback, and constrained expert intervention for underperforming models. Many AI models lack cross-validation techniques, impacting the generalization of results (P30). Additionally, there is a shortage of skilled professionals to understand and maintain AI systems, which can lead to failures in support and evaluation (P13, P23, P33, P43, P50).

#### ***Challenge 6: Limited financial support***

A robust foundation is crucial for AI deployment, yet concerns persist about the required infrastructure (P2, P37). When it comes to financial considerations, it should be noted that citizen-led initiatives may still need a budget to get off the ground and expand (P43). This funding is necessary to purchase necessary technologies and licenses, as well as to enable citizens, to focus on designing and managing these initiatives. Therefore, ensuring financial stability is crucial for the success of these initiatives (P11, P43, P25). A significant challenge is that certain technologies like Robotic Process Automation (RPA) have high upfront costs for technology and training, impacting their implementation in public accounting (P17). Financial constraints may similarly hinder AI adoption due to the expenses associated with innovation, experimentation, and testing (P36, P58). These challenges are also apparent in AI applications in healthcare, where high treatment costs for patients pose significant financial hurdles (P8).

#### ***Challenge 7: Lack of trust***

Trust in AI technology, alongside transparency and accountability in decision-making, are critical concerns for effective AI utilization in the public sector (P28, P35, P43, P55, P20). This

includes discussions around accountability in algorithmic decision-making, where assigning responsibility can be challenging due to algorithm opacity (P56). Additionally, trust influences the adoption of clinical decision support systems (P27). Citizens encounter challenges with virtual agents, such as communication difficulties and doubts about their capabilities (P47). For instance, there is a low level of trust in chatbots providing parenting support (P6), arising from doubts about their empathy and decision-making abilities in unique situations. Similarly, trust issues exist in chatbots for care planning (P12) due to concerns about empathy and decision-making. In the agriculture sector, building trust in AI systems among farmers and consumers is crucial for successful implementation and acceptance (P58).

## **5.2 Benefits of AI**

This section synthesizes the reported benefits of AI in public sector organizations. We acknowledge that a study may report one or more of these benefits.

### ***Benefit 1: Citizen engagement***

Enhancing public services and improving citizen engagement through personalised recommendations are key benefits of AI (P42, P55, P60). AI facilitates citizen participation in policy development and service co-production, adding value to citizens (P16, P29). Its integration increases efficiency, transparency, trust, equity, flexibility, and results increased citizen participation (P43) as it can provide accessible and interactive platforms for public feedback (P61). AI positively impacts citizen satisfaction by enhancing operational and strategic aspects (P9), as well as improving government-citizen communication (P24). AI enhances citizens' quality of life by transforming government roles and improving engagement (P32). AI-based self-service technologies provide personalised experiences and timely task completion, boosting satisfaction (P22). AI utilisation increases citizen satisfaction and trust in governance (P13), while virtual assistants offer functional and social value by addressing queries and providing companionship (P47). Responsible AI implementation ensures long-term value through improved accountability, cost reduction (P53), and prioritisation of citizen needs across sectors (P18).

### ***Benefit 2: Social value***

AI benefits society by amplifying value generation within the public sector and advancing applications across various domains like transportation, public health, social welfare and energy efficiency (P32, P35, P38, P59). It enhances productivity and service quality, transforming governmental operations and facilitating proactive public service models (P13).



Implementing AI in the public sector brings increased efficiency, better decision-making, improved service quality, and reduced costs (P32, P46, P54). Moreover, AI offers tangible benefits like cost reduction and innovative solutions, as well as intangible benefits such as improved collaboration with industry peers (P29). It also promotes sustainability by optimising resource use, reducing waste, and enhancing decision-making, thereby increasing social value (P32) and improving the quality of life for residents (P61). In the agriculture sector, the potential for AI to contribute to sustainability and improve food security is highlighted, offering significant social value (P58).

### ***Benefit 3: Economic value***

The benefits discussed here primarily focus on financial gains. AI technologies have demonstrated significant improvements in the financial sector; tools like chatbots and virtual assistants enhance technical efficiency by automating tasks (P1). Similarly, AI applications in various sectors contribute to efficiency gains and cost savings through process automation, resource allocation, and reduced waiting times (P35). In auditing, expert systems improve task comprehension, enhance knowledge, and facilitate knowledge transfer (P34). Robotic Process Automation in public accounting firms allows employees to focus on value-added tasks and expand their skill sets, enhancing client satisfaction and reducing manual labour costs (P17). AI algorithms aid in developing public policies to mitigate economic crises' impacts on firms, improving understanding of affected firms' characteristics (P14). Additionally, AI drives economic growth in smart cities, enhancing e-government services and systems to boost productivity and the overall economy (P32) and in the agricultural sector specifically (P58).

### ***Benefit 4: Organisational efficiency***

AI technologies automate, improve, and streamline the internal management operations of public administration, enhancing the efficiency, effectiveness, and quality of services delivered to businesses and citizens (P42, P59). The relationship between workers and smart technologies creates a mutually beneficial learning environment, streamlining communication processes for more efficient public service (P60). Workers learn to collect data that enables useful analysis, while the technology learns from the data collected by workers (P26). Also, AI is supporting professionals in performing routine tasks (P26). Essentially, AI has the potential to improve the quality and efficiency of employees and organisations, as its use has significantly impacted the roles and responsibilities of employees, particularly at higher levels, by reducing administrative burdens, automating tedious tasks, and allowing staff to focus on

higher-risk operations (P25, P35), and improve service quality and effectiveness (P44) Closing, AI facilitates the sharing of intelligence and insights among professionals and agencies in the public sector, aiding in crisis prevention through comprehensive assessments of service users' needs and support strategies (P26).

### ***Benefit 5: Enhanced government services***

AI significantly enhances the quality of government services, including healthcare and education. It aids in solving COVID-19-related issues, improving early detection and treatment accuracy (P7, P30). Predictive analytics in health enable remote patient monitoring, enhancing prevention and care (P15). In criminal justice, AI-driven risk assessment tools influence probation decisions (P21). In education, AI supports pandemic challenges, streamlines admissions, and provides student support services, including financial aid inquiries and academic guidance (P39). AI improves public services by enhancing policymaking (P42) reducing repetitive tasks and increasing employee satisfaction (P44). It contributes to transparency, accountability, and democratic legitimacy in governance (P50, P51), addressing resource limitations, and service standardisation (P32). Properly regulated ADM systems can improve government efficiency (P56), food production and quality (P58). AI optimizes government operations, reduces costs, reduces costs, enhances service quality, and improves delivery efficiency (P53, P54, P61), making government services more accessible (P60).

## **6. Discussion**

This review was motivated by the need to synthesize the prior research on AI in the public sector. We contribute to the research in the area by providing insights into current knowledge and perspectives regarding the use of AI in decision-making processes within the public sector. In doing so, the findings from our review are relevant to various stakeholders, such as public sector providers, managers, and policymakers.

First, our review's findings underscore a need for greater precision and accuracy in using AI concepts and terminology. To ensure accuracy, AI-related terminology should be used judiciously, with a sufficient understanding and consideration of their meaning and implications. In addition, our review's findings call for caution when including AI-related terminology in paper titles and abstracts. While these terms can boost the paper's visibility and generate interest, the risks related to misuse and ambiguity in titles and keywords must also be considered.

Second, our review also revealed a pattern in the research on government decision-making, indicating a predominant focus on general public service, and relatively limited emphasis on specific domains of the public sector. Thus, there is a need for increased attention to domain-

specific issues, for example, in education, public order and safety, recreation, culture, religion, defence, and environmental protection.

Third, based on our review's findings, it seems plausible to interpret that effective collaboration between public sector organizations and governments plays a key role in achieving the benefits of AI. This collaboration can enhance the quality and effectiveness of public services and potentially yield better services for citizens, greater efficiency, and cost savings.

Fourth, we underscore the importance of adopting a strategic approach when implementing AI within an organizational context. This involves conducting systematic evaluations of the potential advantages and drawbacks associated with implementing and operating AI-based systems.

In particular, reaping the societal benefits while mitigating the risks related to, for example, systemic unwanted biases calls for implementing governance mechanisms for AI systems (Mäntymäki et al., 2022). According to Mäntymäki et al., (2022), organizational AI governance can be understood as “a system of rules, practices, processes and technological tools that are employed to ensure an organization's use of AI technologies aligns with the organization's strategies, objectives, and values; fulfils legal requirements; and meets principles of ethical AI followed by the organization”.

In practice, AI governance can entail, for instance, auditing AI systems (Laine et al., 2024) to evaluate their performance against predefined criteria. Moreover, from an AI governance perspective, it is critical to provide the different stakeholder groups of AI systems (Birkstedt et al., 2023) with an appropriate degree of transparency and explainability to algorithmic decision-making processes (Laato et al., 2022). AI systems in general, but particularly when used in the public sector, have diverse stakeholder groups, ranging from technical experts to the people affected by the systems. The different stakeholder groups often have varying levels of technical skills and AI literacy. This, in turn, calls for tailored explainability mechanisms to meet the stakeholders' heterogeneous needs.

The limitations in our study provide immediate directions for future research. First, our analysis focused solely on articles published in CABS-ranked journals, excluding non-ranked journal articles, conference proceedings, and non-peer-reviewed articles. Second, our review aimed to assess the extent of AI research in the broader public sector without a specific focus on any area or government function. Future research could explore the specific implementation of AI within distinct domains or functions. Table 4 outlines future research opportunities to address the challenges reported in this literature review on AI in public sector organizations.

**Table 4.** Future research opportunities (Source: Created by author)

<b>Challenge</b>	<b>Research Questions</b>
<b>Ethical and legal</b>	<ul style="list-style-type: none"> <li>○ How can data privacy, security risks, and ethical challenges in AI, such as biases and lack of transparency, be addressed in the public sector to ensure citizens' rights and fair outcomes? What governance standards are needed for responsible AI use?</li> <li>○ How can AI decision-making systems be made transparent and accountable to prevent negative impacts like inequality and job displacement?</li> <li>○ What are the best practices for safeguarding sensitive data in healthcare, education, and corporations, and how can AI systems process data ethically and securely?</li> <li>○ How can we overcome limited access to industry-specific data for AI development, and balance personalized support with privacy concerns in education using third-party AI platforms?</li> </ul>
<b>Administrative</b>	<ul style="list-style-type: none"> <li>○ How can public sector managers be better prepared for the implementation of AI in their organisations?</li> <li>○ What are the barriers to effective management of AI implementation in public sector organisations?</li> <li>○ What are the strategies for developing an AI capability throughout the organisation, with top-down synchronisation and planning?</li> <li>○ How can the scarcity of professionals with the necessary AI skills be addressed in the public sector?</li> <li>○ What are the best practices for balancing transparency and discretion when introducing smart technology to government organisations?</li> </ul>
<b>Governmental</b>	<ul style="list-style-type: none"> <li>○ How do governmental guidelines affect the development of AI capabilities in municipalities, and how can these guidelines be improved to provide a more supportive framework?</li> <li>○ How can governments ensure that AI is used in a way that is beneficial for society and does not have any negative consequences?</li> </ul>
<b>Social challenges</b>	<ul style="list-style-type: none"> <li>○ What are the social and cultural challenges facing the implementation of AI in the public sector, and how can these challenges be addressed?</li> <li>○ How can policymakers effectively communicate the benefits and values of AI technology to the public, and how can unrealistic expectations towards AI be managed?</li> <li>○ How can tensions with linguistics and national culture be addressed to enable the successful implementation of AI in the public sector?</li> <li>○ What organisational culture is necessary to promote innovation and the adoption of new ideas for successful AI implementation in municipalities, and how can such a culture be developed?</li> <li>○ What is the extent of the fear of job losses from AI in the public sector, and how can this fear be mitigated?</li> </ul>
<b>Technological</b>	<ul style="list-style-type: none"> <li>○ What are the potential risks associated with autonomous systems in public sector and how can we mitigate these risks?</li> </ul>

	<ul style="list-style-type: none"> <li>○ What techniques can we use to diagnose and address algorithmic biases, algorithmic complexity, and malfunctioning in AI systems?</li> <li>○ What is the feasibility of implementing a tool such as RPA in different policy areas, and what are the technical and policy-related challenges associated with this implementation?</li> <li>○ How can public sectors ensure the quality and availability of data needed for AI systems to function effectively, and what are the potential solutions to address these challenges?</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>○ How can public sectors determine the appropriate level of investment in resources and infrastructure for implementing AI systems, and what are the potential benefits and drawbacks of different investment levels?</li> <li>○ What are the financial costs associated with implementing AI in the public sector, and how can public entities ensure adequate funding for these initiatives, particularly in developing countries with limited resources?</li> <li>○ How can citizen-led initiatives be funded to ensure the successful deployment of AI in the public sector, and what are the key success factors in securing funding for these initiatives?</li> </ul>
<b>Trust in AI technology</b>	<ul style="list-style-type: none"> <li>○ How can public trust in AI be improved, particularly in areas such as chatbots and virtual agents, where trust is currently low?</li> <li>○ What are the factors that contribute to the trustworthiness of AI systems, and how can these factors be effectively communicated to the public?</li> <li>○ How can the lack of empathy and decision-making abilities of AI systems be addressed, especially in complex situations such as care planning, to increase public trust in these systems?</li> </ul>

## 8. Conclusion

This study was motivated to advance understanding about AI for the public sector. The results reveal the social value of AI has been limited due to a hypo-emphasis on *general public services*, with no studies reporting on housing and community amenities function, and recreation, culture, and religion function of government. AI could revolutionize government social housing initiatives by improving service delivery, and enhance the overall tenant experience, as well as use AI to create personalised recommendations for services, amenities, and community events to both citizens and visitors to a region. The results have implications for policy and practice as an orchestrated effort within and between government functions is necessary to identify use cases of AI. Research on the use of AI in government functions is embryonic and requires collaboration between governments, research centres, and the private sector.

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## Appendix A: List of primary studies

ID	Citation
P1	Mor, S., & Gupta, G. (2021). Artificial intelligence and technical efficiency: The case of Indian commercial banks. <i>Strategic Change</i> , 30(3), 235–245.
P2	Alshahrani, A., Dennehy, D., & Mäntymäki, M. (2021). An attention-based view of AI assimilation in public sector organizations: The case of Saudi Arabia. <i>Government Information Quarterly</i> , 39(4), 101617.
P3	Jørgensen, R. F. (2021). Data and rights in the digital welfare state: The case of Denmark. <i>Information, Communication &amp; Society</i> , 26(1), 123-138,
P4	Larsson, K. K. (2021). Digitization or equality: When government automation covers some, but not all citizens. <i>Government Information Quarterly</i> , 38(1), 101547.
P5	Hengstler, M., Enkel, E., & Duelli, S. (2016). Applied artificial intelligence and trust—The case of autonomous vehicles and medical assistance devices. <i>Technological Forecasting and Social Change</i> , 105, 105–120.
P6	Aoki, N. (2020). An experimental study of public trust in AI chatbots in the public sector. <i>Government Information Quarterly</i> , 37(4), 101490.
P7	Nasseef, O. A., Baabdullah, A. M., Alalwan, A. A., Lal, B., & Dwivedi, Y. K. (2021). Artificial intelligence-based public healthcare systems: G2G knowledge-based exchange to enhance the decision-making process. <i>Government Information Quarterly</i> , 39(4),101618.
P8	Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare. <i>Government Information Quarterly</i> , 36(2), 368–383.
P9	Chatterjee, S., Khorana, S., & Kizgin, H. (2021). Harnessing the Potential of Artificial Intelligence to Foster Citizens’ Satisfaction: An empirical study on India. <i>Government Information Quarterly</i> , 39(4), 101621.
P10	Mikalef, P., Lemmer, K., Schaefer, C., Ylinen, M., Fjørtoft, S. O., Torvatn, H. Y., ... Niehaves, B. (2021). Enabling AI capabilities in government agencies: A study of determinants for European municipalities. <i>Government Information Quarterly</i> , 39(4), 101596.
P11	Savaget, P., Chiarini, T., & Evans, S. (2019). Empowering political participation through artificial intelligence. <i>Science and Public Policy</i> , 46(3), 369–380.
P12	Aoki, N. (2021). The importance of the assurance that "humans are still in the decision loop" for public trust in artificial intelligence: Evidence from an online experiment. <i>Computers in Human Behavior</i> , 114(September 2020), 106572.
P13	Kuziemski, M., & Misuraca, G. (2020). AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings. <i>Telecommunications Policy</i> , 44(6), 101976.
P14	Loukis, E. N., Maragoudakis, M., & Kyriakou, N. (2020). Artificial intelligence-based public sector data analytics for economic crisis policymaking. <i>Transforming Government: People, Process and Policy</i> , 14(4), 639–662.
P15	Kumar, P., Dwivedi, Y. K., & Anand, A. (2021). Responsible Artificial Intelligence (AI) for Value Formation and Market Performance in Healthcare: The Mediating Role of Patient’s Cognitive Engagement. <i>Information Systems Frontiers</i> 25(2), 2197–2220.
P16	Wang, C., Teo, T. S. H., & Janssen, M. (2021). Public and private value creation using artificial intelligence: An empirical study of AI voice robot users in Chinese public sector. <i>International Journal of Information Management</i> , 61(4), 102401.

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P18	Ranerup, A., & Henriksen, H. Z. (2019). Value positions viewed through the lens of automated decision-making: The case of social services. <i>Government Information Quarterly</i> , 36(4), 101377.
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P20	Busuioc, M. (2021). Accountable Artificial Intelligence: Holding Algorithms to Account. <i>Public Administration Review</i> , 81(5), 825–836.
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P27	Prakash, A. V., & Das, S. (2021). Medical practitioner's adoption of intelligent clinical diagnostic decision support systems: A mixed-methods study. <i>Information and Management</i> , 58(7), 103524.
P28	Wirtz, B. W., Weyerer, J. C., & Sturm, B. J. (2020). The Dark Sides of Artificial Intelligence: An Integrated AI Governance Framework for Public Administration. <i>International Journal of Public Administration</i> , 43(9), 818–829.
P29	Madan, R., & Ashok, M. (2022). AI adoption and diffusion in public administration: A systematic literature review and future research agenda. <i>Government Information Quarterly</i> , 40(1), 101774.
P30	Khan, M., Mehran, M. T., Haq, Z. U., Ullah, Z., Naqvi, S. R., Ihsan, M., & Abbass, H. (2021). Applications of artificial intelligence in COVID-19 pandemic: A comprehensive review. <i>Expert Systems with Applications</i> , 185(March), 115695.
P31	Wamba, F.S., & Queiroz, M. M. (2021). Responsible Artificial Intelligence as a Secret Ingredient for Digital Health: Bibliometric Analysis, Insights, and Research Directions. <i>Information Systems Frontiers</i> 25, 2123–2138.
P32	Zuiderwijk, A., Chen, Y. C., & Salem, F. (2021). Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. <i>Government Information Quarterly</i> , 38(3), 101577.
P33	Langer, P. F., & Fenner, C. (2021). Artificial Intelligence in the Public Sector - a Research Agenda. <i>International Journal of Public Administration</i> , 44(13), 1103–1128.

P34	Omoteso, K. (2012). The application of artificial intelligence in auditing: Looking back to the future. <i>Expert Systems with Applications</i> , 39, 8490-8495.
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P37	Merhi, M. I. (2021). Evaluating the critical success factors of data intelligence implementation in the public sector using analytical hierarchy process. <i>Technological Forecasting and Social Change</i> , 173(September), 121180.
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P52	Gesk, T. S., & Leyer, M. (2022). Artificial intelligence in public services: When and why citizens accept its usage. <i>Government Information Quarterly</i> , 39(3), 101704.
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