Stephen Kwamena Aikins
Tamara Dimitrijevska-Markoski *Editors*

Artificial Intelligence and Government

Examining the Roles and Uses of AI in Enhancing Government Operations

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ISBN 978-3-032-12343-5 ISBN 978-3-032-12344-2 (eBook)
https://doi.org/10.1007/978-3-032-12344-2

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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From Theory to Practice: Constructing AI Principles for Effective Public Service

3

Rodrigo Sandoval-Almazan

1 Introduction

Artificial intelligence (AI) applications in the public sector trace back to early innovations such as MYCIN,[1] an expert system for medical diagnosis (Buchanan & Shortliffe, 1984). Another notable project, DENDRAL, a collaborative effort between NASA and Stanford, sought to automate the analysis of organic compounds in soil samples for NASA's space program. This demonstrated the potential for AI to support government-led scientific initiatives (Lindsay et al., 1993). However, the first "AI winter" of the 1970s halted significant progress in the field until renewed interest in the twenty-first century. The emergence of the internet in the 1980s, rapid advancements in microchip technology, and the widespread adoption of personal computers in the 1990s, coupled with the expansion of the information technology (IT) industry, created a fertile environment for a resurgence in AI development.

In recent years, applications such as the Metaverse in the public sector (Kshetri et al., 2024) and generative AI tools like ChatGPT have faced considerable challenges. Davenport and Ronanki (2018) emphasized that one of the primary barriers to successful AI initiatives is the difficulty of integrating AI projects into existing organizational processes and systems. Similarly, Mikalef et al. (2019) highlighted that ineffective integration of systems and data, along with poor data quality,

[1] The name "MYCIN" was chosen as a **reference to antibiotics**, many of which end in **"-mycin"** (like **erythromycin**, **streptomycin**, **gentamicin**, etc.), which are used to treat **bacterial infections** (Buchanan & Shortliffe, 1984).

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S. K. Aikins and T. Dimitrijevska-Markoski (eds.), *Artificial Intelligence and Government*, https://doi.org/10.1007/978-3-032-12344-2_3

hampers AI progress. Further, Wirtz et al. (2020) examined the breadth of AI applications in the public sector and underscored the accompanying implementation challenges.

The post-2022 era marked a significant shift in AI's integration within the public sector, particularly with the public release of ChatGPT. This milestone has prompted systematic analysis of the benefits and challenges related to the design, management, adoption, and implementation of AI in government contexts, building on earlier research focused on risk and benefit mapping (Medaglia & Tangi, 2022).

Generative AI presents distinctive challenges for the public sector. Although empirical documentation of AI implementation in governmental bureaucracies remains limited, significant cases have emerged. These include applications within the U.S. Postal Service (Bracken, 2023), educational institutions in the United Kingdom (Tobin, 2023; Weston, 2023), and survey data on public administrators in Mexico (Criado et al., 2021). Microsoft has developed specialized AI systems for U.S. intelligence agencies, including the CIA, under the designation "Project Guardian" (Chappell, 2024). Additionally, a new e-government model utilizing ChatGPT technologies, known as ChatGPT Gov, has been introduced (APAC, 2025).

Research by Bright et al. (2025) examining GenAI usage among UK public administrators surveyed more than 900 participants, revealing that 45% incorporate this technology into their daily operations. Despite the limited availability of comprehensive research, the evidence indicates that public administrators, officials, and bureaucrats globally are adopting generative AI for various personal and professional applications, often without adequate preparation or cautionary guidance. The central question guiding this research is: To what extent can evidence-based practical principles be developed to guide public servants in the implementation and operational governance of generative AI technologies, given the current state of technological development and public sector constraints?

This chapter intends to answer this question on the strategic introduction of GenAI in the public sector. Adopting a socio-technical framework, it proposes several guiding principles for the effective implementation of generative AI in government operations.

The chapter is structured into four sections. Following this introduction, the second section presents a literature review, outlining socio-technical theory and AI concepts, along with case studies of current AI applications and the proposed ten principles framework. The third section introduces proposed principles for AI use in bureaucratic contexts as an implementation example. Finally, the conclusion discusses future research directions and offers practical insights for public sector practitioners.

2 Literature Review

This section is divided into fourth main subsections. The first addresses the theoretical background and key concepts of sociotechnology; second section gathers recent research on GenAI in different government areas and countries. While the third section reviews similar frameworks on principles for AI in the public sector. The fourth section proposes the principles for GenAI in public managers with their theoretical support.

2.1 Sociotechnology and AI

The sociotechnology theoretical framework encompasses diverse approaches and interpretations (Trist & Bamforth, 1951). Coined by Mario Bunge, sociotechnology emerged in the 1950s and 1960s as a response to the limitations of purely technological or social paradigms in explaining technological advancements and organizational transformation. Researchers at the Tavistock Institute in the UK further refined the theory. Central to this framework is the concept of sociotechnical systems, which posits that technologies and organizations are inherently linked, with social and technical components requiring integration to design effective systems holistically (Trist & Bamforth, 1951). Technology is built in collaboration with society.

The sociotechnical framework, first established by Trist and Bamforth (1951) in their seminal study of coal mining operations, demonstrates that technological implementations must consider social dynamics to achieve optimal outcomes. This theoretical foundation proves particularly relevant for AI integration in public administration.

Another foundational principle related to this research is joint optimization, emphasizing that social and technical systems should be co-designed to achieve optimal outcomes (Trist, 1981). This idea aligns with the concept of participatory design, which involves engaging end-users and workers in implementing new technologies and organizational systems (Mumford, 1983). Furthermore, the contingency approach asserts that the optimal design of sociotechnical systems depends on the organization's specific context and requirements, rejecting a one-size-fits-all solution (Lawrence & Lorsch, 1967).

In sum, the key sociotechnical concepts that integrates this investigation are: (a) sociotechnical systems; (b) Joint optimization; (c) Contingency approach and, (d) monitoring and cognitive capital.

Incorporating these concepts into Artificial Intelligence (AI) research has spurred new developments. For instance, Makarius et al. (2020) emphasize that successful integration of AI requires fostering cognitive, relational, and structural capital to ensure effective collaboration and value creation. Asatiani et al. (2021) argue that AI systems can become inscrutable unless organizations establish interaction boundaries, curate training data, and manage input/output processes. These

measures are essential for balancing the potential benefits of AI, such as generative AI, while ensuring accountability in deployment.

A complementary perspective is the Collective Human–Machine Intelligence (COHUMAIN) approach, which promotes human-AI collaboration. Gupta et al. (2023) integrate instance-based learning theories to design AI agents that collaborate effectively with humans. In another direction, Weidinger et al. (2023) utilize sociotechnology to evaluate safety regulations for AI systems. Gabriel (2021) further extends these principles, arguing that AI systems must protect citizens' rights and adhere to public justification standards that prioritize disadvantaged members of society.

These studies highlight the interplay between AI systems and sociotechnological principles. However, more research is required to fully understand the evolving relationship between humans and technology in this domain.

2.2 Generative AI on Government

The emerging role of Generative AI in government has gained significant traction worldwide, particularly in smart city initiatives where it helps manage medical emergencies in urban environments (Sowmitha et al., 2022). In the Republic of China, Li et al. (2023) document how local governance has leveraged technological infrastructure to enhance service delivery, dramatically improving the agility of public service provision. Complementing this research, Lin (2023) examines the nuanced differences between large language models and chatbots in Chinese local government applications, revealing distinct implementation patterns and outcomes. Meanwhile, recent analysis of the Global Partnership on Artificial Intelligence (GPAI) by Keith (2024) identifies several concerning barriers to equitable participation—notably imbalanced global representation, overly restrictive membership processes, and limited translation services—that particularly disadvantage Southeast Asian stakeholders.

These developments collectively illustrate both the transformative potential and persistent challenges in governmental AI adoption across different regions.

2.3 Frameworks for AI Principles

The formulation of guiding principles has long been a cornerstone within public administration and the evolution of e-government initiatives. Historical frameworks, such as those proposed by Sandoval-Almazán et al. (2017) for e-government, the OECD's guidelines on public sector digitalization (2022), and principles of public governance as elaborated by Manoharan et al. (2023), have provided structured paths to manage technological transitions within governmental contexts. Recently, however, the advent of Generative AI (GenAI) has prompted a shift towards crafting principles specifically attuned to the distinct opportunities and challenges of these technologies.

Among contemporary frameworks, the UK government's Generative AI Framework for Public Managers (Gov.UK, 2024) outlines ten foundational principles, intended to foster responsible and effective adoption. Central to this approach is a balanced emphasis on understanding the technology's capabilities and limitations, ethical and lawful utilization, security assurance, human oversight, and the full lifecycle management of AI tools. Additionally, it encourages appropriate tool selection, openness, early engagement with private-sector partners, skills development, and integration with existing organizational policies. While commendable for promoting constructive engagement and cross-sector collaboration, three critical points emerge upon analysis: first, the framework tends to presume a uniform capacity across governmental agencies, which overlooks disparities in resources and expertise; second, it underestimates the potential complexities arising from rapid technological advancements that can quickly render guidelines obsolete; and third, it lacks specificity on how precisely ethical oversight and human involvement are operationalized within diverse governmental contexts.

Complementing this practical guidance, Richter's (2024) report for the IBM Center for the Business of Government takes a more structural perspective, highlighting key challenges such as a lack of cohesive AI strategy, insufficient literacy among public managers, inadequate foundational data sets, ethical and compliance issues, communication difficulties, cultural resistance, and pervasive trust deficits. In response, Richter proposes strategic pathways that include principles such as: enhanced public engagement, stronger ethical oversight, improved data management infrastructure, and workforce development to foster innovation. While the report effectively underscores systemic challenges often ignored by more operational guidelines, it nonetheless exhibits critical limitations: firstly, it inadequately addresses how to practically overcome cultural resistance within entrenched bureaucracies; secondly, it places insufficient emphasis on the urgent necessity for adaptability and flexibility within organizational structures; and thirdly, it fails to provide concrete mechanisms for fostering long-term trust among stakeholders and the public at large. And most important it does not propose how to foster literacy on public managers using these technologies.

Another proposal of GenAI principles is the OECD-G7 Toolkit for Artificial Intelligence (AI) in the Public Sector (OECD/UNESCO, 2024) outlines several core principles and guidelines aimed at ensuring the ethical, safe, secure, and trustworthy deployment of AI systems. Among these principles, emphasis is placed on service improvement, transparency and accountability, inclusivity, privacy and security, and skills development. Specifically, the toolkit underscores the importance of employing AI to automate repetitive tasks to enhance public services, advocating for transparency to enable informed decision-making, and emphasizing inclusivity to prevent discrimination. It further insists on rigorous privacy and security standards and promotes continuous skills development within public administrations to effectively manage AI technologies. Moreover, the proposal suggests the necessity for comprehensive standards and sustainability considerations to minimize environmental impacts associated with AI systems.

Lastly, the AGI principles proposed by Morris et al. (2023), although initially targeted at Artificial General Intelligence rather than specifically at GenAI, offer a compelling conceptual foundation relevant to the current discourse. This framework emphasizes the importance of evaluating capabilities over processes, prioritizing generality and performance, focusing on cognitive and metacognitive abilities, assessing potential rather than deployed instances, ensuring ecological validity of evaluation metrics, and understanding AGI as a progressive development path. While offering valuable insights into assessing complex AI systems, critical reflection reveals two primary shortcomings: firstly, the principles' abstraction makes them challenging to operationalize concretely within specific government functions; secondly, the framework does not sufficiently account for the socio-political dynamics unique to public sector decision-making, potentially limiting its immediate applicability within government contexts.

These principles represent a significant contribution to this research on generative artificial intelligence by providing a structured framework for evaluating and classifying AI systems' progress toward GenAI. The authors argue that this principled approach enables more nuanced discussions about AI capabilities, risks, and development trajectories while avoiding some of the limitations of previous definitions that focused on single criteria or end states. The idea of these principles provides some inputs for developing the principles for public managers.

The principles for GenAI use in government organizations represent a critical step toward leveraging this transformative technology responsibly. By focusing on awareness, collaboration, and ethical oversight, these frameworks provide a roadmap for public managers.

These four theoretical models demonstrate how public administrators are seeking ways to utilize generative AI. The four cases share common ground in their pursuit of cybersecurity policies to appropriately use GenAI technologies, as well as in their similar quest to develop capabilities and skills to better leverage the technology. Where they differ is in how they use the technology with others; for example, the British case lacks a proposal for external interaction; the IBM case (Richter, 2024) focuses heavily on internal development: skills and strengths, data and infrastructure improvement, without emphasizing outcomes for citizens or stakeholders from other government agencies. The OECD-G7 Toolkit stands out for its use of tools that improve public service, but its principles remain very general and insufficiently specific for application. These lessons enable the development of the principled approach proposed by this research.

2.4 Proposed GenAI Principles for Public Managers

The overlap of sociotechnological theory and government functions which uses AI are show on Fig. 1. Description of any principle will be done in the following paragraphs.

Public managers must balance innovation with responsibility as they integrate Generative AI (GenAI) into government operations. This framework elaborates on

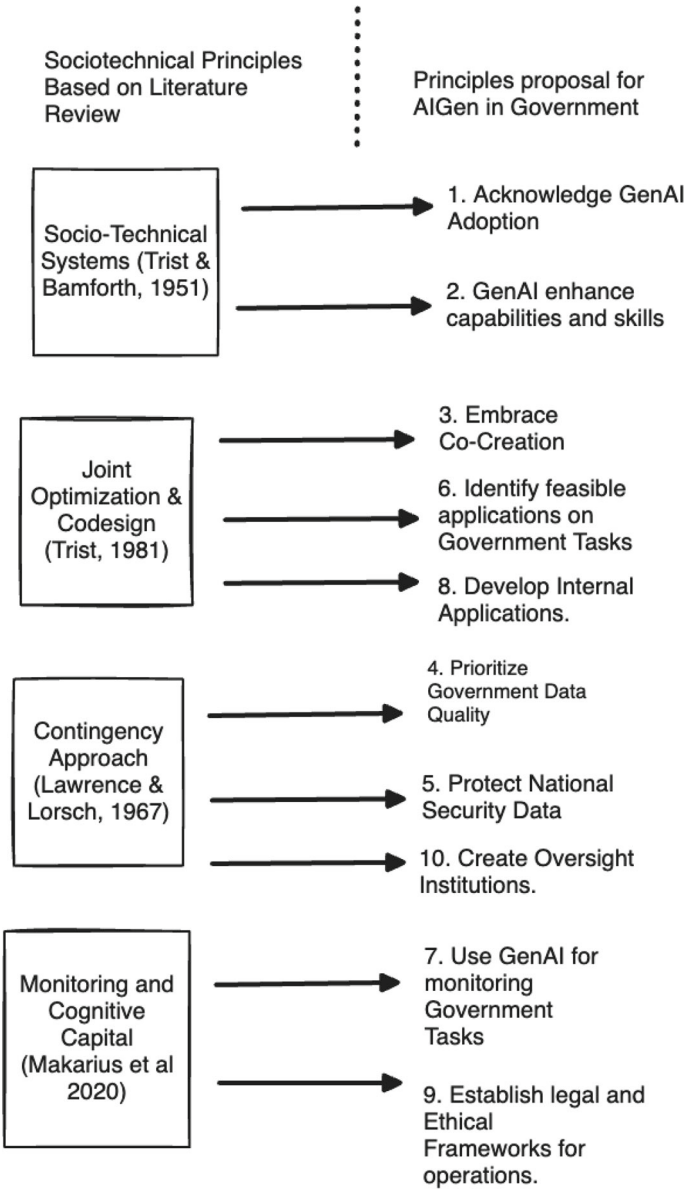

Fig. 1 Sociotechnological key concepts and proposed framework. *Source* Author own elaboration

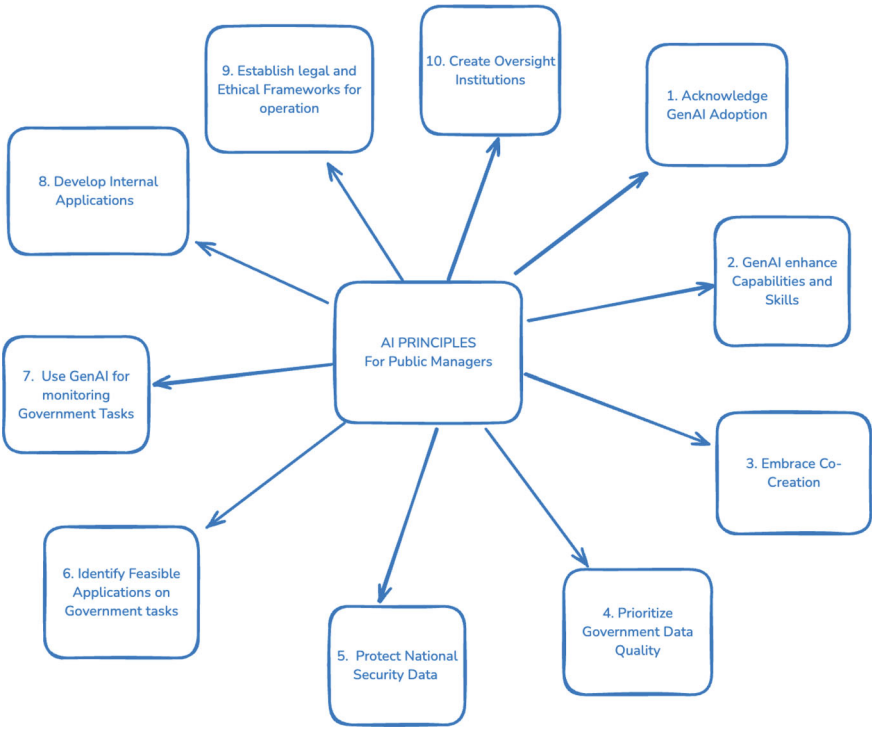

Fig. 2 Principles for GenAI and public managers. *Source* Author own elaboration

the key principles that guide the adoption and application of GenAI in the public sector, (see Fig. 2):

1. Acknowledge GenAI Adoption.
2. GenAI enhance Capabilities and Skills
3. Embrace Co-Creation
4. Prioritize Government Data Quality
5. Protect National Security Data
6. Identify Feasible Applications on Government tasks
7. Use GenAI for monitoring Government Tasks
8. Develop Internal Applications
9. Establish legal and Ethical Frameworks for government operation
10. Create Oversight Institutions

By elaborating on these principles, public managers can gain a deeper understanding of how to navigate the complexities of GenAI integration. This approach

ensures that they are not only leveraging the technology's benefits but also maintaining public trust, safeguarding sensitive information, and aligning AI usage with the broader goals of public service.

1. Acknowledge GenAI Adoption

Public managers are already experimenting with and integrating Generative AI (GenAI) in various capacities—ranging from personal use to testing its potential for public service tasks. This early, informal adoption underscores the importance of recognizing GenAI as a growing influence in public administration. Sociotechnological is implicit on this principle because a key statement of this theory is to consider innovation as a social process (Rogers, 2003), to build technology in integrated perspective (Trist, 1981).

2. GenAI enhance Capabilities and Skills

GenAI can amplify government efficiency by automating repetitive tasks, analyzing large datasets, and generating insights that might be missed by traditional methods. For instance, it can support drafting reports, improving citizen services, and predicting policy outcomes. Public managers must foster a culture of continuous learning to enhance the workforce's ability to collaborate effectively with AI systems, thus creating a synergy between human expertise and machine intelligence. This principal statement comes from the idea of user-design centered, as a participatory design from sociotechnological theoretical framework (Mumford, 1983). Also relates to the principle of Focus on Capabilities, not Processes from Morris et al. (2023).

3. Embrace Co-Creation

GenAI is a work-in-progress, and its integration into government systems will require iterative development. Public managers should actively engage in co-creating solutions alongside AI developers, stakeholders, and end-users. By remaining flexible and adaptive, managers can tailor GenAI applications to address specific public needs while learning how to improve it. This idea of co-creation is supported by sociotechnological concepts such as building technical skill with social (Pinch & Bijker, 1984), and innovation as part of a social process (Rogers, 2003).

4. Prioritize Government Data Quality

The effectiveness of GenAI depends heavily on the quality of the data it processes. Public managers must ensure that government data is accurate, complete, and free from biases. Establishing stringent data governance practices, conducting regular audits, and implementing data-cleaning protocols are essential steps to maintain the integrity of AI-generated outcomes. Data quality is related with the

technological impact of the AI technology (Coates, 1976), both are interrelated as input and output of the process.

5. Protect National Security Data

Not all data is suitable for use in GenAI systems. National security information and other highly sensitive datasets must remain isolated from AI tools to prevent potential vulnerabilities. Public managers should develop clear policies and safeguards, such as data encryption, access controls, and strict compliance standards, to ensure that sensitive information is protected. A researcher from the sociotechnological, Feenberg (2017) argues that technology is a factor of power, key data as national security must be considered like that.

6. Identify Feasible Applications on Government tasks

Not all government tasks are equally suitable for GenAI integration. Public managers should focus on areas where AI can deliver measurable benefits with minimal risk, such as automating administrative workflows, streamlining public service delivery, or enhancing communication with citizens. Conducting a comprehensive risk assessment and feasibility study is critical to identifying appropriate use cases while avoiding tasks where the risks outweigh the benefits. Government tasks relate with society and this to become interdependent on technology uses, this idea also from sociotechnological (Bijker, 1997) supports this principle to interact along with GenAI. Also complementary from Morris et al. (2023) principle of Focus on Cognitive and Metacognitive Tasks.

7. Use GenAI for monitoring Government Tasks

Government tasks are multidimensional, with many variables, contexts and levels of applications. The correct use of GenAI to analyze, diagnose and monitor tasks will provide and extra value for decision making and provide alternatives for wicked problems, this principle is supported by the idea of relationship with society and technology (Bijker, 1997), and the impact of the use of technology as a factor power (Feenberg, 2017).

8. Develop Internal GenAI Applications

Governments should prioritize the development of proprietary GenAI applications tailored to their specific needs and challenges. Building in-house tools ensures data sovereignty and minimizes dependence on external vendors, thereby mitigating potential security and privacy risks. Moreover, internal applications can be designed to align with core public sector values such as transparency, equity, and accountability. This approach aligns with the concept of citizen-centered

design (Mumford, 1983) and the sociotechnical framework emphasizing the co-construction of knowledge and technology through user-centered design (Trist, 1981).

9. Establish Legal and Ethical Frameworks for Government Operation

Comprehensive legal frameworks are essential to safeguard personal data, address algorithmic biases, and ensure accountability in GenAI system deployment. Public managers should implement oversight mechanisms, including review boards or independent audits, to monitor AI system performance and assess their societal impact. This includes detecting unintended consequences, ensuring compliance with legal and ethical standards, and updating policies to address emerging risks. This principle aligns with Feenberg's (2017) notion of technology as a factor of power and Makarius et al.'s (2020) assertion that AI reshapes organizational structures.

10. Create Oversight Institutions

Establishing dedicated institutions to oversee GenAI applications is critical for ensuring transparency, accountability, and regulatory compliance. These bodies should monitor the algorithms, outcomes, and impacts of GenAI systems while fostering collaboration between technical experts and social stakeholders. This principle is supported by Pinch and Bijker's (1984) emphasis on aligning technical systems with societal needs and Feenberg's (2017) insights into the distribution of power through technology.

3 Discussion. Applications of GenAI Principles for Public Managers

The purpose of this section is twofold. On one side to provide some examples of the AI principles in the public sector. On the other side, to present a discussion about some key points of GenAI and the present debate. The first part describes the examples in the same order of the principles.

1. Acknowledge GenAI Adoption

The United Kingdom's public sector has seen widespread adoption of GenAI tools, with a survey revealing that 45% of public service professionals are aware of GenAI usage in their work areas, and 22% actively use these systems (Bright et al. (2024). This is also supported by Criado et al. (2021) survey of Mexico's CIOs perception about AI, and Ruvalcaba-Gómez and Cifuentes-Faura (2023). These examples demonstrate the informal and growing integration of GenAI in public administration, underscoring the necessity to recognize its expanding influence.

More research is needed to show the presence on government operations and data management using this technology.

2. Enhance Capabilities and Skills

The U.S. Department of Homeland Security (DHS) is piloting AI to train officers reviewing refugee applications, aiming to simulate various applicant scenarios and improve interviewing skills. This initiative exemplifies how GenAI can augment government efficiency by automating training processes and enhancing workforce capabilities (Spetalnick (2024). Another example of this principle is the CIA AI-powered chatbot capable of simulating interactions with foreign leaders, marking a significant advancement in the use of Artificial intelligence for strategic decision-making and Intelligence analysis (Barnes, 2025).

3. Embrace Co-Creation with GenAI

The main objective of this principle is to promote collaboration, co-production as an activity of human co-creation along different agencies, government levels to produce better systems of GenAI, correct mistakes, and iterate for developing better platforms. The most recent example is the Tokyo Metropolitan Government collaborated with AI developers and stakeholders to implement GenAI tools for urban planning and disaster response, ensuring solutions are tailored to specific public needs. This case highlights the importance of iterative development and active collaboration in integrating GenAI into government systems (Apolitical (2024).

4. Prioritize Government Data Quality

The aim of this principle is to foster data quality on government agencies to produce good outcomes from GenAI. The example of the Brazilian government partnered with OpenAI to process and analyze numerous lawsuits, emphasizing the need for accurate and comprehensive data to ensure effective AI-generated outcomes. This partnership underscores the critical role of high-quality data in the successful application of GenAI in public administration, specially because it is referred to the judiciary system on Brazil (Ayres & Caram, 2024); data quality is crucial to produce high quality outputs.

5. Protect National Security Data

There are different purposes on this principle: to select datasets, create policies to safeguard highly sensitive data before use for GenAI and put at risk some decision-making or information. A preliminary example is the U.S. intelligence community is cautiously integrating GenAI, focusing on unclassified data to avoid compromising sensitive information, and implementing robust safeguards (Bajak, 2024). Another example is the Guardian Project, from the CIA was building its

own internal ChatGPT-style tool to sift through public data for clues (Mauran, 2024). Also Meta is letting the US military and defense contractors use its Llama AI model for national security purposes (Roth, 2024). These examples support the necessity to separate government data and create isolated platforms for different purposes. Not all GenAI is for all government agencies.

6. Identify Feasible Applications in Government Tasks

The aim of this principle is that public managers should find areas for GenAI deliver benefits. An example of automating administrative workflows is the One-Service Chatbot from the Municipal Services Office (MSO) from streamlining public service delivery or enhancing communication with citizens (GovTech Singapore, 2021). This initiative demonstrates a strategic focus on applying GenAI to tasks with measurable benefits and minimal risk.

7. Use GenAI for Monitoring Government Tasks.

The best example is in California, USA. four state departments will test generative AI: The Department of Tax and Fee Administration, the California Department of Transportation, the Department of Public Health, and the Health and Human Services Department, all of them monitor different government task in different levels (Nguyen, 2024) Most of these agencies does not allow access to the public this GenAI efforts are more for internal use.

8. Develop Internal GenAI Applications

Estonia's e-government system employs proprietary AI applications to automate services like registering births, ensuring greater control over sensitive data and reducing dependency on external vendors. In the Health sector, AI algorithms analyze patient data to identify trends, predict potential health issues, and recommend preventive measure. In transportation, the AI systems utilize data from sensors and cameras to analyze traffic patterns, adjust traffic signals in real-time, and provide timely information to commuters. Also, the introduction of AI chatbots to improve citizen engagement and streamline communication between citizens and government agencies (Hammer, 2024). Also de C.I.A. developed mentioned on principle 2, and ChatGPT Gov developed by OpenAI for the US government (APAC, 2025) are two clear examples of inside development for GenAI tools.

9. Establish Legal and Ethical Frameworks for Government Operations

A notable example of this principle is the Victorian Supreme Court in Australia, which issued guidelines requiring legal practitioners to disclose the use of AI in preparing legal arguments or drafting documents. This directive addresses concerns related to data privacy, algorithmic bias, and transparency. Lawyers and litigants involved in legal proceedings must inform the court and opposing parties about AI

tools used and the nature of their assistance (So, 2024). Self-represented litigants are also encouraged to disclose AI involvement in document preparation, enabling judicial officers to better interpret submissions (Supreme Court of Victoria, 2024).

The Victorian Supreme Court highlights the ethical implications of AI usage, emphasizing the need to mitigate algorithmic biases and ensure transparency in legal processes (Legal Find, 2024). Other examples are the European Commission (2024) is the most recent and authoritative legal resource for Europe. In the U.S. the Executive Order on the safe, secure, and trustworthy development and use of artificial intelligence, was published on 2023 (The White House, 2023). Other efforts like de OECD Recommendation of the Council on Artificial Intelligence (OECD, 2019) and UNESCO (2021). Recommendation on the ethics of artificial intelligence, support this efforts on the legal domain.

Australia's approach represents a pioneering effort to define the boundaries of GenAI applications within the legal domain. While legal frameworks may vary by country due to cultural and institutional contexts, establishing clear ethical and legal guidelines is essential to govern the integration of GenAI into public sector operations effectively.

10. Create Oversight Institutions

Several international examples demonstrate the application of this principle within federal governments. For instance, the U.S. Patent and Trademark Office (USPTO) has established policies to monitor and regulate the use of generative AI (GenAI) tools within the agency, promoting transparency and accountability (Wired, 2024). Similarly, Canada has implemented policies ensuring that GenAI use in decision-making complies with established directives for transparency, accountability, and fairness. The Canadian government has also published a guide on generative AI, addressing challenges, opportunities, and best practices for responsible implementation (Canada Government, 2024).

These initiatives illustrate the creation of dedicated oversight institutions aimed at aligning GenAI applications with societal needs and regulatory frameworks.

While these examples are not comprehensive, they provide a preliminary view of how these principles can be applied by public managers. Table 1 summarizes these examples, highlighting two key trends. First, GenAI implementation and reporting are more prevalent in North America and parts of Asia, with fewer documented cases in Europe and Latin America. This reflects an emerging but uneven global adoption. Second, most examples represent early-stage initiatives rather than fully mature systems, underscoring both the novelty of GenAI and the potential for countries to measure its impact and expand its use.

Table 1 Principles and examples of GenAI for public managers in 2024–2025

Principle	Example	Source	Country-Region
1. Acknowledge GenAI adoption	UK Survey reports 45% public managers use AI	Bright et al. (2024)	UK-Europe
2. Enhance capabilities and skills	U.S. Department of Homeland Security (DHS) train migration officers using AI and CIA chatbot	Spetalnick (2024), Barnes (2025)	U.S. North America
3. Embrace co-creation with GenAi	Tokyo Metropolitan Government for Emergency response	Apolitical (2024)	Japan, Asia
4. Prioritize government data quality	GenAI in the judiciary system on Brazil	Ayres and Caram (2024)	Brazil, Latin America
5. Protect national security data	U.S. Intelligence Community. "Guardian Project"	Bajak (2024), Mauran (2024)	U.S. North America
6. Identify feasible applications in government tasks	One Service Chat Bot	GovTech Singapore (2021)	Singapore, Asia
7. Use GenAI for monitoring government tasks	California, USA, four state departments	Nguyen (2024)	U.S. North America
8. Develop internal GenAI applications	Estonia's e-government system employs proprietary AI. ChatGPT Gov	Hammer, (2024) APAC (2025)	Estonia. Europe, US
9. Establish legal and ethical frameworks for government operation	Victorian Supreme Court in Australia issued guidelines requiring lawyers to disclose the use of AI	So (2024), Supreme Court of Victoria (2024), OECD (2019) European Commission (2024)	Australia European Commission UNESCO OECD U.S
10. Create oversight institutions	U.S. Patent and Trademark Office and Canada's Government	Wired (2024), Canada Government (2024)	U.S. & Canada North America

4 Conclusions

The objective of this chapter was to develop a strategic framework for implementing artificial intelligence in the public sector, addressing the research question: To what extent can evidence-based practical principles be developed to guide

public servants in the implementation and operational governance of generative AI technologies, given the current state of technological development and public sector constraints? The answer for this question is through the lens of sociotechnical theory, this research proposes ten principles for AI adoption in governmental contexts.

The first conclusion establishes that generative AI adoption for the public sector represents an inevitable reality that requires proactive engagement. Public organizations must create conducive conditions to support public managers in their administrative functions and address citizens' needs utilizing this technology. This aligns with the socio-technical systems framework, which informs two key principles: (1) acknowledging generative AI adoption and (2) recognizing how generative AI enhances capabilities and skills. These principles serve as mechanisms to facilitate social participation in the ongoing development of governmental AI initiatives.

The second conclusion posits that responsible AI implementation (whether generative AI or other forms) is optimally achieved through joint optimization processes. This iterative approach should integrate technological capabilities with human interaction to improve machine learning outcomes. Three principles of the framework support this position: (3) embracing co-creation methodologies; (6) identifying feasible applications for governmental tasks; and (8) developing internal applications. These principles require empirical testing within public administration contexts to generate evidence regarding their potential impact on public sector operations.

The third conclusion recognizes that artificial intelligence development must account for organizational context, background, and legacy systems. While large language models are trained on extensive datasets, the public sector consistently experiences learning curves that affect implementation. Therefore, the sociotechnical concept of contingency approach must accommodate changes, updates, and new conditions within the system. Three principles address this requirement: (4) prioritizing government data quality to mitigate bias and comprehension issues; (5) protecting national security data within contextual boundaries; and (10) creating oversight institutions to ensure accountability and continuous improvement independent of political fluctuations.

The fourth conclusion emphasizes that the ten principles for adopting generative AI in the public sector constitute an integrated toolkit. This holistic approach encompasses social awareness of technological applications, quality data inputs, task-specific implementations, safeguards for sensitive information, and ethical frameworks with oversight institutions that promote responsible technology use. The principles are designed as an integrated system rather than discrete or exclusive elements, allowing for simultaneous application across diverse contexts, scenarios, and management situations.

The fifth conclusion connects principles (7) using generative AI for monitoring governmental tasks, and (9) establishing legal and ethical frameworks for operations. These principles align with the sociotechnical approach of monitoring cognitive capital proposed by Makarius et al. (2020). Continuous assessment of AI

evolution is essential for establishing boundaries on governmental operations and restricting certain AI functionalities that may affect citizens. These principles are interdependent—the monitoring of governmental tasks must be governed by legal and ethical frameworks to ensure data protection, privacy, and legitimacy. Given AI's rapid evolution, these principles must facilitate ongoing adaptive processes.

The research agenda emerging from this analysis encompasses several critical domains. Primary among these is the empirical validation of individual principles through rigorous testing in public sector environments. This research stream should focus particularly on practical elements such as co-creation processes and AI capability development, examining their implementation efficacy and impact on public service delivery.

A second research avenue involves investigating GenAI's role in governmental decision-making processes and governance structures. While the current analysis focuses primarily on operational implementation, future research must address the strategic implications of AI integration in policy formation and executive decision-making processes. This investigation should examine how GenAI influences governmental oversight, regulatory frameworks, and institutional accountability mechanisms.

The third research direction should focus on developing practical frameworks for government technology leaders. Chief Information Officers (CIOs) and Chief Technology Officers (CTOs) require evidence-based guidelines for technology adoption, security protocol implementation, and regulatory compliance. This research stream should emphasize the development of actionable frameworks that facilitate informed decision-making while protecting governmental data integrity and citizen privacy.

This research aims to address one of the current gaps in how generative AI is used in the public sector. At the very least, it hopes to spark a conversation that encourages new ideas in this area—ideas that can help build a more effective government: one that makes fewer mistakes, works more efficiently, and stays closely connected to its citizens.

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