USES OF ARTIFICIAL INTELLIGENCE IN THE PUBLIC SECTOR: A READING IN LEADING INTERNATIONAL EXPERIENCES

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Abstract
The aim of this article is to analyze the most prominent international applications of artificial intelligence in the public sector, as a tool to improve the management structure and improve public services in light of the growing global interest in this technology. The study used a comparative analytical method, and investigated the policies and programs in ten countries (Finland, Estonia, the United Kingdom, the United States, Singapore, Japan, Canada, Australia, Qatar and Saudi Arabia). The results showed that different countries have used different roads and talked about using artificial intelligence in the public sector. For example, Finland and Estonia focused on active services, Canada and Australia, focusing on regulator and governance structure, Japan and Singapore focused on long -term national vision, Qatar and Saudi Arabia rely on major investments and international collaborations, and the UK and the United States focused on the combination of the combination of practitioners. The study indicates the need to achieve an optimal balance between new technologies and moral regulations, at the same time improves long -term strategic plans. This method encourages countries to collaborate and share what they know to speed up digital changes and share the public sector more efficient and long -lasting.
Keywords: Artificial intelligence, Public sector, Public services, Digital governance, Public policies.
DOI: https://doi.org/10.24818/beman/2025.S.I.5-13

1. INTRODUCTION

Artificial intelligence (AI) is no longer a technology used in software and robotics. In the digital age we live today, there is a motivating force in many important areas, such as drug, education, production, security, economics, administration and more. Artificial intelligence has become an important strategic tool that

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helps people change the way people work in new ways to improve institutional performance and operational efficiency. It also helps management to make better and quick decisions by using real large data analysis, which protects time and effort and uses resources better. Therefore, the increasing importance of artificial intelligence in management is reflecting its increasing role as an important factor in increasing competition between institutions and synergy with the needs of the digital economy.

Governments in different countries around the world have demanded to use artificial intelligence in areas such as public health management, education, transport, security and administrative services to increase the quality of public services, improve efficiency and ensure access to all areas of society. Leading international experiences—such as those of Finland, Estonia, the United Kingdom, Japan, the United States of America, Qatar, Australia, Canada, Saudi Arabia, and Singapore—represent diverse models of adopting artificial intelligence in the public sector, combining legislative frameworks, digital infrastructure, and the development of human capacities.

Accordingly, this study aims to analyze the use of artificial intelligence in the public sector by reviewing leading international experiences, drawing lessons learned, and outlining future directions that can support countries seeking to modernize their public administration and enhance their ability to respond to the challenges of the digital age.

2. STUDY METHODOLOGY

This study employed a descriptive approach, as it is most suitable for examining modern phenomena that are still in the process of development and formation, such as the use of artificial intelligence in the public sector. This approach involves collecting information and theoretical data from multiple sources, then analyzing them critically and comparatively to reach scientific conclusions that contribute to a deeper understanding of the subject.

To achieve the research objectives, secondary data were used, derived from previous studies, official reports, and websites that addressed the subject of artificial intelligence and public administration. Practices of leading countries in the field of using artificial intelligence in the public sector were identified. The study also employed a theoretical analysis and comparative induction method, providing a comprehensive approach that enables an understanding of the dynamics of using artificial intelligence in public administration and draws lessons from leading international experiences.

The study was organized according to interconnected steps:

- First, constructing a theoretical framework that clarifies the basic concepts of artificial intelligence and its importance in the administrative context.

- Second, reviewing the possible uses of artificial intelligence in the public sector from a theoretical perspective, with a focus on areas of high added value such as health, education, transportation, and government services.
- Third, analyzing leading international experiences through a cross-comparative method, which allows highlighting similarities and differences between the policies and strategies adopted in the studied countries.
- Finally, formulating practical conclusions and findings that can contribute to enriching the discussion on how to employ artificial intelligence in modernizing the public sector in developing countries.

3. ARTIFICIAL INTELLIGENCE: CONCEPT AND IMPORTANCE

Artificial intelligence (AI) today constitutes a strategic lever in both public and private administration, as it enables process automation, the extraction of insights from big data, and the enhancement of decision quality and speed. Research discourse has shifted from the question "What is artificial intelligence?" to "How does it generate value for businesses and organizations?" through usage patterns that include automation, augmentation/enhancement of employees, decision support, and innovation. This shift has been reflected in the literature on management, information systems, and strategy, where definitions are no longer limited to the technical dimension but explicitly link it to improving performance, competitiveness, and governance mechanisms within organizations.

The definitions of artificial intelligence presented by various researchers and specialists are numerous. (Haenlein & Kaplan, 2019) defined it as "a system's ability to accurately interpret external data, learn from it, and employ what it learns to achieve specific goals through flexible adaptation," a definition that directly ties the technology to the achievement of operational and strategic objectives.

On the other hand, it is defined from a scientific and administrative perspective (Russell & Norvig, 2010) as "the study of intelligent agents that receive inputs from the environment and produce actions that maximize their chances of success," a comprehensive definition used as a methodological foundation for studying applications of artificial intelligence in administrative decision-making.

In another context, Davenport & Ronanki (2018) view artificial intelligence as "the application of cognitive technologies to automate processes, augment human capabilities, and support decision-making," making it a practical tool for redesigning business models and improving institutional efficiency.

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Jordan & Mitchell (2015) further explain that artificial intelligence is a research field "aimed at building systems capable of automatically improving their performance over time through learning from data," a definition that highlights its developmental dimension in management and organization.

Meanwhile, Shrestha, Ben-Menahem, and von Krogh (2019) point out that artificial intelligence "encompasses a system of analytical and predictive tools that reshape decision-making structures within organizations," which introduces new dimensions to governance and change management.

Taken together, these definitions reveal the richness of the concept and the multiplicity of its dimensions, ranging from the technical to the functional and strategic, reflecting the importance of artificial intelligence as a tool for transforming both the public and private sectors.

It is worth noting that there are many applications of artificial intelligence, often referred to as the "AI family," which include a spectrum of innovations spanning various scientific and theoretical fields. Despite this diversity, most researchers and specialists agree that the fundamental pillars of this field consist of four main applications: expert systems, artificial neural networks, fuzzy logic systems, and genetic algorithms (Bentayeb, Khoualed, & Bouerb, 2024).

Since the world today is witnessing an accelerating digital revolution that has made artificial intelligence (AI) one of the most prominent driving forces of transformation in various sectors, it has come to be seen as a strategic tool for reshaping economic, social, and organizational systems by providing innovative solutions that enhance efficiency and productivity. Brynjolfsson & McAfee (2017) affirm that artificial intelligence represents an extension of the digital industrial revolution, as it enables institutions to process big data with capabilities beyond human capacity, thereby improving strategic decisions and supporting innovation.

Moreover, artificial intelligence plays a pivotal role in developing institutions' ability to respond to new environmental and technological challenges. Davenport & Ronanki (2018) pointed out that AI applications are not limited to routine automation, but also extend to supporting complex decisions, analyzing hidden patterns in data, and enhancing human capabilities through intelligent collaborative systems, which reshape the features of business management and public services.

From a social perspective, artificial intelligence contributes to improving the quality of life through its applications in vital sectors, including health, education, and public services. Topol (2019) explains that reliance on deep learning technologies and artificial neural networks has led to a radical transformation in medical diagnosis and targeted treatment, opening the door to more precise and effective healthcare systems. The importance of artificial intelligence in education is also evident in the design of personalized educational content that meets learners' individual needs and learning styles.

In addition, the importance of artificial intelligence is manifested in its strategic dimension, as it has become a central axis in innovation and sustainable development policies. According to Cockburn,

Henderson, & Stern (2018), investment in artificial intelligence creates sustainable competitive advantages for countries and institutions, as it strengthens national innovation capacities and increases leadership opportunities in the global knowledge-based economy.

4. THE NATURE OF ARTIFICIAL INTELLIGENCE USES IN THE PUBLIC SECTOR

The digital revolution has caused major changes in the public sector over the past twenty years. One of the most important tools that governments have used to make their services better and more efficient is artificial intelligence (AI). So, investing in AI has become a strategic necessity in public management, not only to cut costs but also to make things more open and build trust in government institutions (Wirtz, Weyerer, & Geyer, 2019). It is important to note that AI has become an important tool for governments to make data-driven public policies and bring about big changes in how they run things.

One of the most common ways that AI is used in the public sector is to analyze data and make decisions. Because government departments are producing so much data, machine learning and deep neural networks have become important tools for finding accurate patterns that help decision-makers make policies that are more realistic and useful. Sun and Medaglia (2019) found that AI systems in e-governance helped governments better predict what people needed, which improved how resources were used and made it easier to create proactive programs to solve social problems.

AI is also very important for providing new public services. A lot of governments have started using AI-powered chatbots to make it easier for people to talk to government departments. This speeds up responses to questions and complaints and makes civil servants' jobs easier. In this context, Liu and Yuan (2015) affirm that intelligent automation in public services mitigates bureaucracy and fosters transparency, simultaneously elevating citizen satisfaction.

AI has become a useful tool in the security field for making people safer and more secure through facial recognition technologies, video analysis, and crime prediction. Some governments have started using AI systems to look at crime data and guess where crime might happen in the future. This helps with preventive action and lowers crime rates (Brayne, 2020). Even though there is a lot of debate about the ethical and privacy issues, these apps have made it easier for security agencies to take risks before they happen.

AI has been shown a useful strategic tool for the public sector in the management of national health systems in the health sector. Like the UK and Canada, some governments have begun using AI-based systems to find diseases and monitor outbreaks. Esteva, Robicquet, & Ramsundar (2019) say that adding

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AI technologies to public health systems leads to rapid medical diagnosis, costs low and provides people better access to high quality health care, which helps everyone to achieve social justice.

AI is also very important for the management of the environment and planning of cities. Governments have used AI to see how people use energy, monitor the level of pollution and improve smart transport networks. Khan, Yaqoob, & Hashem (2020) suggest that these apps have strengthened the idea of "smart cities". In these cities, AI helps to make cities more durable and effective, which corresponds to permanent growth goals.

AI has also shown that it can help fight corruption and make things more open. Some governments now use advanced algorithms to monitor unusual economic and administrative transactions, which helps them find cases of fraud before it occurs. Mikalef, Krogstie, Pappas, & Pavlou (2020) say that by adding AI to state surveillance systems, people may have more confidence in the government by encouraging the policy that is more honest and responsible.

But using AI in the public sector causes some problems. There is concern for data privacy, algorithm transparency and the possibility of existing bias in social and political systems. Cath, Wachter, Mittelstadt, Taddeo, & Floridi (2018) say that the cautious use of AI in the public sector requires a clear regulatory structure and the establishment of the village.

5. ANALYSIS OF LEADING INTERNATIONAL EXPERIENCES IN THE USE OF ARTIFICIAL INTELLIGENCE IN THE PUBLIC SECTOR

Many large countries around the world have used artificial intelligence in the public sector and have seen how it affects public administration. We will try to analyze the six main cases of these experiences, which are the most important.

5.1 Finland

Finland started the AuroraAI program as part of its plan to change how public services work by using life events. From September 2018 to February 2019, work began with an exploratory phase in which the framework was created. This was followed by the creation of an implementation plan for the years 2019–2023. The program is based on linking government agencies through an AI network that automatically meets the needs of citizens based on their life stages, such as birth, education, work, and retirement. This method makes it possible for services to work together and be in sync, instead of being broken up into separate transactions. This saves time and cuts down on red tape.

The project also includes governance and ethics tools integrated from the start to ensure responsible use (Ministry of Finance, Finland, 2019; OECD, 2022).

5.2 Estonia

Estonia developed the Bürokratt project as the national digital assistant, with implementation set to begin in 2021 under the country's national AI strategy. The project is based on a network of interconnected virtual assistants capable of interacting with citizens through various channels (text or voice conversation) and connecting them to government services such as taxes and document renewals. In 2022, Estonia began collaborating with partners, including Microsoft, to enhance the platform's capabilities. The project is notable for being built on open-source software, which enables transparency and facilitates cross-sector innovation. The ultimate goal is to achieve proactive and unified government services that reduce the administrative burden on citizens (European Commission, 2022; Information System Authority, 2022).

5.3 United Kingdom

In August 2019, the UK launched the AI Lab within the National Health Service (NHS) with an investment of £250 million, aiming to accelerate the adoption of AI solutions in medical diagnostics, resource management, and improving clinical workflows. In 2021, the government adopted the National AI Strategy, which outlines a ten-year vision to strengthen the UK's position in the field of AI. The strategy includes plans to develop talent, expand digital infrastructure, and increase the use of AI in the public sector. This connection between national policy and practical tools in a sensitive sector like healthcare highlights how the UK is building bridges between strategies and field needs (Department of Health and Social Care, 2019; HM Government, 2021).

5.4 Singapore

Singapore launched its first National AI Strategy in 2019 to promote practical applications in education, healthcare, and transportation. In December 2023, it presented the second version, NAIS 2.0, which focuses on accelerating societal and economic transformation through the use of AI. The plan included three pillars: enabling systems (digital infrastructure and data), drivers (innovation and talent development), and measures to enhance transparency and governance. This strategy translates into tangible public services such as traffic congestion prediction systems, multilingual language assistance, and improved healthcare. Singapore represents a model of a city-state that used strict central planning to make a tangible impact on service quality (Government of Singapore, 2023; Smart Nation and Digital Government Office, 2019).

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5.5 United States

The United States sought to combine centralized governance with the practical use of AI in public services. At the strategic level, Executive Order 14110 was issued in October 2023, establishing a national framework for the safe and reliable use of AI and requiring federal agencies to appoint specialized officials. At the practical level, the Internal Revenue Service (IRS) began using smart chat and voice bots in 2022 to serve millions of citizens with inquiries, identity verification, and payment plan adjustments. In 2023, the program expanded to cover basic tax notifications, helping reduce waiting times and improve response rates. This integration of legal frameworks and practical experimentation embodies a comprehensive approach to strengthening public services (The White House, 2023; Internal Revenue Service, 2023).

5.6 Qatar

In February 2025, Qatar announced a five-year strategic partnership with Scale AI to develop over 50 AI applications targeting the government sector. The program targets the period 2025–2030 and covers areas such as data analysis, automation, citizen needs prediction, and improving administrative process efficiency. What distinguishes the Qatari experience is the utilization of a direct global partnership to accelerate AI adoption in public services, including healthcare, education, and transportation. The project also reflects the state's vision of building sustainable national capacities in data and AI by transferring technology and expertise and training local talent (Reuters, 2025; Scale AI, 2025).

5.7 Australia

Australia launched the National Policy for the Responsible Use of AI in Government in September 2024 (version 1.1). The policy required every government agency to appoint an AI officer by November 2024 and to issue transparency statements about the use of these technologies by February 2025. This policy serves as a comprehensive framework to ensure the responsible, transparent, and ethical use of AI in the public sector. It aims to improve the efficiency of delivering digital services to citizens while reducing risks associated with bias or misuse. The Australian experience is important because it not only encourages adoption but also sets clear mandatory governance rules, making it an example of blending innovation with responsibility (Australian Government, 2024a; Australian Government, 2024b).

5.8 Canada

In March 2025, Canada launched its first national strategy for employing AI within the federal public sector. The strategy focuses on four pillars: (1) establishing a center of expertise to unify government AI

capabilities, (2) promoting responsible and safe use, (3) building the digital skills and capacities of civil servants, and (4) enhancing public trust through transparency. This step aims to transform public services into a more efficient and innovative model, where AI tools will be utilized in document processing, enhance citizen communication, and predict social needs. This initiative indicates Canada's ambition to be among the first countries with an integrated federal AI policy in public administration (Treasury Board of Canada Secretariat, 2025; Government of Canada, 2025).

5.9 Japan

Since 2016, Japan has launched the vision of Society 5.0, a strategic concept that integrates cyberspace with the physical world to build a super-smart society, addressing challenges such as aging, congestion, and labor shortages. The vision was adopted in the Fifth Basic Science and Technology Plan (2016–2020) and reaffirmed in 2019 by Prime Minister Shinzo Abe. The core of the experience lies in employing AI, the Internet of Things, and robotics to develop more proactive public services such as precision medicine, smart cities, and intelligent transport systems. This initiative is not focused solely on the economic aspect but also seeks to achieve comprehensive social well-being, serving as an ambitious framework for building public services based on smart data (Cabinet Office, 2016; Cabinet Office, 2019).

5.10 Saudi Arabia

In August 2019, Saudi Arabia established the Saudi Data and Artificial Intelligence Authority (SDAIA) as the primary driver of the National Data and AI Strategy, which was approved in July 2020. The authority launched platforms such as Open Data, which contain thousands of datasets to support transparency and innovation. In May 2025, the Kingdom announced the establishment of HUMAIN under the Public Investment Fund with an investment exceeding $40 billion to develop multimodal Arabic language models and advanced data centers, in collaboration with global technology companies such as NVIDIA and AMD. The Saudi experience combines building strong infrastructure (data centers, national data platforms) with developing AI solutions directed toward the Arabic language and the local community, within the ambitious Vision 2030 framework (Saudi Data & AI Authority (SDAIA), 2020; Arab News, 2025).

Based on all the above, a simple comparison can be made between the various international experiences of the ten countries in the following table.

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TABLE 1. COMPARISON BETWEEN LEADING INTERNATIONAL EXPERIENCES IN EMPLOYING AI IN SERVING THE PUBLIC SECTOR

Country	Program / Strategy	Implementation Period	Key Domain	Main Features
Finland	AuroraAI	2018–2023	Life-event–based services (birth, education, employment…)	Linking institutions in an AI network that provides automatically customized services + ethical governance from the design stage
Estonia	Bürokratt	2021–2024	Government digital assistant	An open-source network of virtual assistants to unify government services and provide them proactively
United Kingdom	National AI Strategy + NHS Lab	2019–2021 and beyond	Health and public services	Investment in NHS Lab (£250 million) + comprehensive national strategy for a full decade
United States	EO 14110 + IRS bots	2022–2023	Governance + taxation	Executive order obligating agencies to responsible governance + IRS chatbots serving millions of citizens
Singapore	National AI Strategy 1.0 then 2.0	2019–2023 and beyond	Health, transport, language services	Strong centralized vision, expansion toward infrastructure, innovation, and transparent governance in version 2.0
Japan	Society 5.0	2016–present	Smart cities, healthcare, transport	National vision of a "super-smart society" integrating cyberspace and the physical world to solve social challenges
Canada	Federal Public Service AI Strategy	2025–	Federal public administration	Establishing a center of expertise, enhancing transparency, developing skills, and integrating AI into services
Qatar	Partnership with Scale AI	2025–2030	Government data, health, and education	Development of 50 AI applications through an international partnership, transfer of expertise, and training of national cadres
Australia	Responsible AI Use Policy in Government	2024–2025	Digital governance	Requirement to appoint an AI officer in every government entity + publication of transparency statements on AI uses
Saudi Arabia	SDAIA + HUMAIN + Open Data	2019–2025	Data and the Arabic language	National Data and AI Authority, massive investments ($40 billion) in HUMAIN + open data platform

Source: Prepared by the researchers.

From the above table, similarities and differences can be inferred between the experiences of the ten countries in the following summarized points:

- Estonia and Finland focused on proactive services and citizens' lives.
- The United Kingdom and the United States combined governance with practical applications.
- Singapore and Japan presented long-term national visions.
- Qatar and Saudi Arabia focused on partnerships and massive investments.
- Australia and Canada put in place modern central governance frameworks and policies.

The experiences of the ten countries illustrate a diversity of visions and priorities shaped by their respective national contexts: Estonia and Finland emphasized the proximity of services to citizens through proactive solutions that integrate services with daily life events, whereas the United Kingdom and the United States aimed to harmonize governance frameworks with direct practical applications in health and taxation. Singapore and Japan put forward long-term national plans to change society and infrastructure so that new ideas can last. On the other hand, Qatar and Saudi Arabia used international partnerships and big investments to speed up their digital transitions and improve their national capabilities. Lastly, Australia and Canada stood out because they used centralized policies and modern governance frameworks that included AI in public administration based on the ideas of accountability and openness.

6. CONCLUSION

After seeing the ten examples of how artificial intelligence has been used in the public sector, it is clear that it is no longer a technical alternative. Instead, there is a strategic direction that shows how countries see the future of governance and public services. Some countries wanted to change the relationship between citizens and institutions directly by providing new active services. On the other hand, others wanted to ensure that this technique was used on a responsible and permanent by creating strong laws and regulations. Some people decided to invest in long -term schemes to "create super smart communities". At the same time, other methods placed great emphasis on working with other countries and investing for local intervals and speeding up the change process. This type of experience suggests that artificial intelligence is not just one technical equipment, but a structure that shows how each country can add innovation, governance and resources in such a way that it fits on the path of its own national goals and development.

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