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Artificial Intelligence and Innovative Technology Applications in Public Administration

Cem Angın [1]

Abstract

Innovative technologies in public administration refer to current tools and modern methods used to provide higher-quality services to citizens, make public policies more efficient, and optimize management processes. From the perspective of public administration, artificial intelligence and other innovative technologies are not limited solely to the automation of administrative processes but also represent a comprehensive transformation and impact within the managerial ecosystem, including efficiency, effectiveness, transparency, oversight, citizen satisfaction, personalization of services, and participation in decision-making processes. Therefore, artificial intelligence and other innovative technologies are rapidly spreading globally within public administration in line with the goal of a management approach that is consistent with the requirements of the age, able to meet individual demands, citizen-oriented, comprehensive, and effective.

The aim of the study is to reveal, through theoretical and practical dimensions, the transformation brought about by the digital age in public administration and the artificial intelligence and other innovative technologies at the center of this transformation. In the study, methodologically, a literature review was utilized in the theoretical dimension, while the comparative method was employed in examining application examples of innovative technologies. The study concluded that artificial intelligence, in particular, along with other innovative technologies, has begun to assume an increasingly decisive role for a sustainable, inclusive, and citizen-oriented understanding of public administration and public service. It is anticipated that the study will contribute to the literature by presenting a broad evaluation framework through concrete examples that demonstrate the effects and contributions of artificial intelligence and innovative technologies on public administration.

Keywords: Artificial Intelligence, Digital Age, Innovative Technologies, Public Service, Public Administration

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Kamu Yönetiminde Yapay Zekâ ve Yenilikçi Teknoloji Uygulamaları

Cem Angın [1]

Öz

Kamu yönetiminde yenilikçi teknolojiler, vatandaşlara daha kaliteli hizmetler sunmak, kamu politikalarını daha verimli hale getirmek ve yönetim süreçlerini optimize etmek için kullanılan güncel araçlar ve modern yöntemleri ifade etmektedir. Kamu yönetimi açısından yapay zekâ ve diğer yenilikçi teknolojiler sadece idari süreçlerin otomasyonu ile sınırlı olmayıp aynı zamanda verimlilik, etkinlik, şeffaflık, denetim, vatandaş memnuniyeti, hizmetlerin kişiselleştirilmesi, karar alma süreçlerine katılım gibi yönetsel ekosistemde kapsamlı bir dönüşümü ve etkiyi ifade etmektedir. Bu nedenle yapay zekâ ve diğer yenilikçi teknolojiler çağın gerekliliklerine uygun, bireylerin taleplerini karşılayabilen, vatandaş odaklı, kapsamlı ve etkili bir yönetim anlayışı hedefi doğrultusunda kamu yönetimi içerisinde küresel ölçekte hızla yaygınlaşmaktadır.

Çalışmanın amacı dijital çağın kamu yönetimi gerçekleştirdiği dönüşümü ve bu dönüşümün merkezindeki yapay zekâ ve diğer yenilikçi teknolojileri teori ve pratik boyutlarıyla ortaya koymaktadır. Yöntemsel açıdan teorik boyutta literatür taraması, uygulama boyutunda ise karşılaştırmalı vaka analizinden yararlanılmıştır. Çalışmada başta yapay zekâ olmak üzere diğer yenilikçi teknolojilerin sürdürülebilir, kapsayıcı ve vatandaş odaklı bir kamu yönetimi ve kamu hizmeti anlayışı için giderek daha belirleyici bir role sahip olmaya başladığı sonucuna varılmıştır. Çalışmanın yapay zekâ ve yenilikçi teknolojilerin kamu yönetimine olan etki ve katkılarının somut örnekler üzerinden ortaya koyarak geniş bir değerlendirme çerçevesi sunması yönüyle literatüre katkı sağlaması öngörülmektedir.

Anahtar Kelimeler: Yapay Zekâ, Dijital Çağ, Yenilikçi Teknolojiler, Kamu Hizmeti, Kamu Yönetimi

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Introduction

The digital age we live in, and the artificial intelligence and innovative technologies that have developed within this age, have brought significant transformations to the field of public administration, as in every other area. Artificial intelligence and innovative technologies have reshaped processes such as the design, delivery, and monitoring of public services within the structure and functioning of public administration, in line with speed, transparency, and inclusiveness. On the one hand, these technologies provide individuals with many opportunities such as accessing, supervising, tracking, and evaluating public services, while on the other hand they contribute to the emergence of a more active understanding of citizenship in the public sphere. This situation forces states and, more specifically, public administration to undergo a transformation toward a more transparent and citizen-oriented management approach.

In addition to the increasingly widespread artificial intelligence today, many innovative technologies such as blockchain, the Internet of Things (IoT), cloud computing, and big data have been developed. From the perspective of public administration, artificial intelligence and innovative technologies can be defined as current tools and methods that allow administrative processes to be improved in line with the needs and demands of citizens, enable the delivery of fast and high-quality services, and put public policies into effect more effectively. These technologies, which are integral parts of both daily life and institutional operating processes, have become an important driving force in the modernization of public administration. For public administration, this modernization process has become not a choice but a necessity in order to provide better services, meet individuals' demands, and ensure a management approach that is compatible with the requirements of the age, rapid, efficient, and effective.

The impact and transformational potential that artificial intelligence and innovative technologies—becoming more functional each day for individuals and states and rapidly spreading on a global scale—have created on public administration is a subject worthy of examination and research. Public administration, after all, is the structure that brings together the mutual demands and expectations of individuals and the state: on one hand, it protects citizens' rights by carrying their demands into policy processes, and on the other, it oversees the fair, efficient, and transparent use of public resources. While the digital age in which we live makes it inevitable to redesign these processes and relationships, artificial intelligence and innovative technologies offer significant opportunities for building an administrative ecosystem suited to this design. Hence, innovative technologies are not merely technical tools that provide efficiency and effectiveness; they also possess a functionality that renders public administration more inclusive and strengthens social trust and administrative legitimacy.

This study addresses artificial intelligence and other innovative technologies in public administration through examples implemented on a global scale. It is anticipated that the study will contribute to the literature by establishing an academic discussion ground on technological innovations and public administration; by revealing, in a concrete, systematic, comparative, and comprehensive manner, the effects of developing and diversifying innovative technologies on public administration across different countries and through current practices; and by drawing attention to the practical importance of innovative technologies in fields such as public administration and public policy.

At this point, the study has a certain originality in that it addresses the use of artificial intelligence and innovative technologies in public administration with a systematic and comparative perspective, and also analyzes both national and international examples within the same framework. In general, studies in the literature on artificial intelligence and innovative technologies focus either only on the technical dimension (Taddy, 2019, s. 61; Mühlroth & Grottke, 2022) or on the administrative dimension (Pszczyński, 2020). However, this study, on the one hand, addresses the technical and administrative dimensions together, and on the other hand, examines national and international application examples in an integrated manner through comparative analysis, thus differentiating itself in this respect.

In the study, some fundamental concepts (such as public administration, innovative technology, and artificial intelligence) were first clarified. Then, the changing structure of administration from the traditional understanding of public administration to the digital public administration approach was addressed. Finally, the reflections of innovative technologies on public administration in practice and global experiences were included, and their effects on management processes were examined.

1. Purpose, Scope, Method, Findings and Results of the Study

1.1. Purpose

The study aims to examine innovative technologies and artificial intelligence (AI) applications in public administration through global practices. In other words, the main objective of the study is to reveal the transformation created by AI and other innovative technologies (such as IoT, blockchain, and big data) in public administration based on different country experiences.

1.2. Scope

The study focuses on contemporary public administration practices in terms of AI and other innovative technologies. Within this scope, public administration is addressed on various dimensions: 1) Technological dimension (AI, big data, IoT, blockchain etc.), 2) Managerial-institutional dimension (transformation from classical public administration to digital public administration, restructuring…), and 3) Service dimension (health, education, transportation, taxes etc.). Country examples (Estonia, Singapore, Türkiye, India, China, and the USA) were selected by considering geographical distribution and diversity of applications; the focus was on national-level regulations and platforms. Also, the countries included in the study were chosen because they represent different administrative traditions in terms of innovative technology applications and offer a comparable diversity among their levels of digital transformation.

1.3. Method

In the study, methodologically, a literature review at the theoretical level has been utilized, while a comparative analysis has been employed in presenting application examples concerning innovative technologies. While official documents, and academic studies were utilized in the literature section, the comparison section subjected innovative technologies to a comparative analysis through different selected country cases.

1.4. Findings and Results

AI and innovative technologies:

- Provides managerial efficiency (in terms of cost and decision-making speed).
- It increases the inclusiveness of public services.
- It contributes to the development of a transparent and accountable understanding of governance (traceable records through blockchain, transparency through open public data ecosystems).
- It makes public services personalize, that is, it contributes to citizen-focused public administration (through tools such as AI-supported chatbots and mobile participation applications).

The study concludes that innovative technologies contribute to improving service quality in public administration, developing institutional capacity, using public resources more effectively, and forming a citizen-oriented service approach. In this respect, it is observed that AI and innovative technologies have become not merely tools that facilitate administrative processes in public administration but indeed one of the fundamental components of public administration itself.

2. The Transforming Structure of Administration: From Traditional Public Administration to Digital Public Administration

The needs and demands brought about by social, political, and economic developments experienced throughout the historical process cause public administration to undergo significant changes and transformations. Today, the replacement of the traditional understanding of public administration by the digital public administration approach can be regarded as an extension of these transformation processes. The Weberian bureaucracy approach constitutes the essence of traditional public administration. Weber addresses bureaucracy as a form of organization and management. According to Weber, bureaucracy is a rational and effective form of organization and management found in both the public and private sectors; its basic characteristics are as follows (Kumar, 2016, pp. 213–214): Hierarchical structure, impersonality, legal authority, specialization and division of labor, record system, merit and career system…

Weber's theory of bureaucracy has exerted significant influence on both the theory and practice of public administration. The bureaucracy theory and the typology of legal-rational authority shaped the organizational architecture of the modern state and, particularly throughout the twentieth century, served as a fundamental reference point for the standardization of public services. For a long time, public administration was organized within the framework set by Weberian bureaucratic principles (such as impersonality, strict adherence to rules, having every transaction in writing, hierarchy, and centralization); accordingly, the personnel system was shaped on a merit- and career-based axis. However, the Weberian understanding has come under intense criticism over time for various reasons: the lack of initiative and creativity arising from excessive rule adherence, red tape created by the burden of documents, the exclusion of the human factor due to impersonality, centralization fueled by rigid hierarchy, and a bureaucratic culture resistant to change are among the chief criticisms.

These criticisms paved the way, from the 1970s to the 2000s, for the emergence of paradigms such as New Public Administration, (New) Public Management, New Public

Service, and Governance. Emphasizing principles such as flexibility, efficiency, accountability, citizen orientation, and market logic, these approaches offered alternative organizational forms to Weberian bureaucracy and the traditional understanding of public administration, thereby opening a new chapter in public management thinking.
Today, public administration has entered a comprehensive transformation process due to technological developments and the rapid increase in individuals' demands and expectations from public authorities that accompany these developments. At the focal point of this transformation are e-government, artificial intelligence, and other innovative technologies. E-government, which serves as a starting point in the development of the digital public administration approach, emerged in the late 1990s when the internet began to spread globally (Reddick, 2007, p. 151). E-government can be defined as the active and coordinated use of information and communication technologies in the production and delivery of public services (Haldenwang, 2004, p. 417). E-government has played a critical role as a catalyst in the digitization of public services, that is, their transfer to digital platforms. With the inclusion of artificial intelligence and other innovative technologies—each day more advanced and widespread—in these digitized public services, today's concept of digital public administration has come into being. In this sense, e-government, artificial intelligence, and other innovative technologies constitute the fundamental subcomponents of digital public administration.

In summary, digital public administration should be regarded as a reformist managerial paradigm that goes far beyond being a simple technical innovation, reshaping the organizational structure, functioning, service delivery methods of public administration, and the interaction between the individual and the state. This new management approach, centered on digitalization, has established a strong foundation for increasing efficiency and citizen satisfaction by redesigning both the production and delivery processes of public services through artificial intelligence and innovative technologies. The process extending from traditional hierarchical structures to digital public administration has radically reshaped both the administration's perception of citizens and citizens' expectations of the administration under the guidance of innovative technologies.

3. The Relationship Between Public Administration, Artificial Intelligence, and Innovative Technology

Under this heading, some fundamental concepts (such as public administration, artificial intelligence, and innovative technology) and the relationships among these concepts will be addressed. Clarifying the specific concepts frequently emphasized in the study—concepts that constitute its foundational pillars—and establishing their interrelationships is extremely important for making the study more understandable.

Public administration is a discipline composed of practice and theory aimed at understanding and improving public bureaucracy and its relationships with the public to whom it provides goods and services (Eryılmaz, 2019, p. 12). Public administration can be defined as the organization and management of personnel, tools, and equipment for the purpose of realizing the objectives of the state. In general, public administration has four aspects: "function/activity," "structure/organization," "academic discipline," and "profession" (Eryılmaz, 2019, p. 10).

Public administration consists of various components such as human beings (the segment receiving services, namely citizens, the public), organization (the institutional structure that enables the delivery of services), public policy (choices made to solve problems), the normative order (a series of rules), and financial resources (Parlak & Sobacı, 2005, pp. 11–12). Through these components, public administration endeavors to ensure the continuity of social order and welfare by delivering limited public resources and means as effective, efficient, equitable, and sustainable services. In doing so, it updates itself in line with the conditions and requirements of the period—that is, it follows a reformist course and undergoes transformation. At the center of the transformation currently taking place in public administration in the digital age we are experiencing lie artificial intelligence and innovative technologies. Because the classical understanding of public administration has difficulty responding to the current and dynamic requirements that arise with technological developments, public administration has adopted innovative technologies and embraced a contemporary management paradigm. In other words, the inadequacies of the classical understanding of public administration in the face of the conditions and demands created by the digital age have led to the formation of a different management approach (such as e-government, digital citizenship) through the adaptation of public administration to innovative technologies (such as artificial intelligence).

Among the innovative technologies, the most widespread and popular one is undoubtedly artificial intelligence. Artificial intelligence emerged as the product of the idea and effort to create a machine capable of imitating the cognitive abilities of the human mind (Natale & Ball, 2017, p. 3). Today, artificial intelligence is the field of technology and science that examines how we can have artificial systems (intelligent machines, computers) perform—at even higher levels of performance—every cognitive activity that natural systems can perform (for example, abilities specific to human intelligence) (Say, 2018, p. 83).

With its characteristics such as providing efficiency, generating new solutions, and creating social and economic impacts, artificial intelligence ranks among the most effective and popular innovative technologies today. It has achieved this popularity and reached its current position as the result of a specific historical process and accumulation. Although its intellectual foundations go back to the 1950s, it acquired its present form after the 2000s. Thus, even though artificial intelligence remained for more than half a century a domain of scientific uncertainty and limited practical interest, it has now secured a definite place in the lives of individuals, societies, and states thanks to developments in the internet, computers, big data, and computing power (Haenlein & Kaplan, 2019, p. 5).

Today, in addition to artificial intelligence, many innovative technologies have been developed. These are technologies that meet the needs of individuals, societies, and states, enable the achievement of goals, and produce new solutions to users' problems (Coccia, 2021, p. 1). In other words, they are called technologies that resolve existing problems with new kinds of technologies, generate alternatives, make processes faster, more efficient, and effective, make life easier, attract people and firms, and create new opportunities for them. Innovative technologies incorporate new methods, tools, and systems, and they move societies, economies, and states to more advanced levels. Today, fields such as blockchain, the Internet of Things (IoT), digital twin, mobile applications and digital platforms, big data and data analytics are cited as examples of innovative

technologies. These technologies are used in many areas not only in the private sector but also in public administration (such as health, education, defense industry, social security).

Public administration, artificial intelligence, and innovative technologies have formed a dynamic ecosystem that mutually transforms one another today. In order to adapt to the digital age, public administration is undergoing a transformation by drawing on innovative technologies such as artificial intelligence, big data, the Internet of Things, cloud computing and blockchain to become more functional and advanced. These transformation processes reshape the functioning, structure, decision-making capabilities, and service processes of public administration. Public administration is undergoing a new transformation from a classical structure and service understanding toward a proactive, data-driven, personalized service understanding. For example, through AI-supported digital platforms, a public administration that provides access to services 24/7 has become possible. Again, through artificial intelligence and innovative technologies, transportation and traffic services have taken on a structure that can be tracked and analyzed instantly. Similarly, through AI-supported chatbots and virtual assistants, important services such as the ability to apply for health services and receive basic health support have become feasible. Starting from socioeconomic data, services can be provided by identifying impoverished individuals; complaints, suggestions, and demands related to services can be received from different segments of society thanks to translation features, and many other services can be offered to citizens. Therefore, public administration has taken on a rapid, predictive, participatory, and more agile structure through artificial intelligence and innovative technologies.

4. Catalysts of the Digital Age: Innovative Technologies and Their Types

From the perspective of public administration, innovative technologies denote the technological tools, systems, and applications that offer new solutions in the service-delivery processes of public institutions and organizations. Today, many innovative technologies have been adapted to public administration, and some of these are as follows.

Cloud Computing: This technology "is an internet-based technology that enables the storage, backup, and on-demand sharing of data whose volume is increasing" (Çelik, 2021, p. 436). Cloud computing, as a platform that offers users the ability to access, store, and transfer data on a remote server via the Internet, is used today in many sectors and fields (Uslu, Eren, & Özcan, 2021, p. 49).

Artificial Intelligence (AI): Although there is no universally accepted definition of artificial intelligence, it is generally referred to as a machine's ability to learn from experience, adapt to new inputs, and perform human-like tasks (Duana, Edwards, & Dwivedi, 2019, p. 63). Today, artificial intelligence is actively employed in many public services, including education, health, the defense industry, social security, and more. It provides numerous benefits such as increased efficiency and speed, supervision, prediction, analysis and decision support, automation, and rapid data analysis.

Big Data and Data Analytics: Big data is generally a field concerned with the analysis, processing, and storage of large datasets collected from different data sources (Doğan & Arslantekin, 2016, p. 23). Data analytics, on the other hand, refers to the techniques and methods that allow large-volume data to be easily integrated into research, that enable

these data to be interpreted quickly and accurately, and that make it possible to obtain various information and findings from big data (Mete, 2023, p. 101). Data analytics renders large amounts of data ready for use by analysing them. This situation provides important advantages for individuals, institutions, and states such as gaining competitive advantage, formulating up-to-date policies, developing recommendations, obtaining and providing information, productivity, increasing performance, identifying needs, developing new strategies, reducing costs, and increasing efficiency.

Internet of Things (IoT): Conceptually introduced for the first time in 1999 by Kevin Ashton (Ashton, 2009), the IoT is the technological innovation that enables objects (such as vehicles, machines, devices) to become more functional by connecting to the Internet and communicating with each other. In this way, the aim is to exercise control over the objects in the environment, to obtain information about them, and to make broader use of them. The IoT can be used in many fields such as health (for example, monitoring a patient), smart home and workplace systems (security, energy saving, automation), production processes (providing cost, speed, and efficiency), agriculture (monitoring weather conditions, automating irrigation systems), transportation (vehicle tracking systems), and logistics (stock management, customer services, tracking systems) (Brou & Janssen, 2015, p. 218).

Blockchain Technology: Blockchain, an innovative database technology, is a single, decentralized data-recording technology that stores any kind of data and can share it transparently. In other words, blockchain is a method that ensures data security and makes it possible for information to be shared simultaneously by millions of users (Babaoğlu & Karasoy, 2022, p. 284). In this technology, information is recorded in units called blocks that are linked to one another in a chain, and because these data are unalterable, a secure and transparent flow of information is provided to users (Atılgan Yaşa, 2022, pp. 616-617). Blockchain technology has become usable today in many important areas such as the banking system, social security, health, taxation, education, agriculture, the energy sector, document management, identity and passport procedures, contracts, digital payments, database and record management (Kırbaş, 2018, pp. 80-81; Ammous, 2016, pp. 2-3).

Digital Twin: The concept of the Digital Twin was first used in 2003 by Michael Grieves at a "Society of Manufacturing Engineers" conference in the context of "product lifecycle management" (Grieves, 2015). A digital twin is defined as a dynamic software model of a physical object or system, developed to analyse and simulate real-world conditions, respond to changes, and improve operations (Erturan & Ergin, 2018, p. 815). By creating a virtual twin of a real-world object in a digital environment, the digital twin makes it possible to perform functions such as simulation, monitoring, analysis, prediction, optimisation, and auditing.

Robotic Process Automation (RPA): RPA refers to the use of intelligent automation technologies to perform the repetitive office tasks of human employees—such as data extraction, form filling, moving files, and more (ibm, 2025). The main goal here is to ensure that repetitive, manually performed routine tasks—which consequently take a great deal of time—are carried out rapidly through robotic automation, thereby saving time, costs, and labor. RPA has many functionalities such as minimizing the margin of error and risk, providing cost and labor savings in high-volume work, allowing resources

to be allocated to value-added tasks, increasing efficiency, enabling rapid decision-making, and facilitating auditing (Özdem & Bora, 2022, pp. 3-4). Today, Robotic Process Automation is utilized in many areas of public administration. For example: Receiving applications, informing citizens, registering social aid, recording or updating the training and leave information of public personnel, etc...

The innovative technologies mentioned above provide advantages in many areas such as ensuring economic growth and the development of competitive power, increasing efficiency and productivity, solving societal challenges and problems, scientific and technological progress, user empowerment and participation, and sustainable development (Jain, 2023). For this reason, (especially developed) countries support the development of such technologies and are increasingly incorporating them into managerial processes more extensively.

5. Innovative Technologies, Public Administration and Global Experiences

Innovative technologies make significant contributions across a wide spectrum, from making decision-making processes more inclusive, to identifying and meeting citizen demands more accurately, and improving the quality of services. For this reason, innovative technologies, which have become one of the main components of modern management approaches, are actively used in many countries around the world. Under this heading of the study, countries that have successfully implemented innovative technologies and important experiences are addressed with examples and in a comparative manner.

• **Estonia:** Estonia is among the leading countries that have been able to integrate innovative technologies into public administration in the fastest and most comprehensive manner today. Through the e-Estonia initiative, it has adapted many innovative technologies into public administration in order to ensure that citizens receive public services more quickly and to make these services efficient and effective. In this context, many public services such as e-government, digital identity, and e-democracy applications are offered in digital environments and with the support of artificial intelligence. Having made significant progress in digital governance on a global scale and therefore referred to as a digital republic, Estonia strives to further increase the efficiency and effectiveness of governance through digital technologies.

Through a series of public policies implemented over time, Estonia has adopted innovative technologies, integrated them into public administration, and thereby achieved significant success. In 1997, programs aimed at increasing computer education and use among young people were implemented; in the same year, the Databases Act (1997) and the Official Statistics Act (1997) were enacted. In 1998, the Principles of Information Policy were adopted, defining the country's IT policy. In 2000, internet access was declared a human right, and a comprehensive program was adopted to expand internet access, including in rural areas. With the Public Information Act, which came into force in 2001, public institutions were obliged to disclose and disseminate information to the public via the internet. In 2002, the digital national identity card and digital signature application were introduced. Since 2005, electronic voting has been practiced. In 2006, the Information Society Strategy Document was implemented (Diaz, 2022, p. 6–7; Reinsalu, 2006, p. 68). Today, Estonia has integrated innovative technologies such as artificial intelligence (AI), blockchain, big data, and data analytics into many

services offered on digital platforms. In this way, it actively uses innovative technologies in public administration and services. To consider some of these:

Portal (E-Government) application: This application, which provides access to more than 800 public services through a single access point for government institutions, businesses, and citizens, was launched in 2003 via the web address "eesti.ee" and has since become accessible through mobile applications and digital platforms using digital signatures (Margetts & Naumann, 2017, p. 5). Innovative technologies such as Keyless Signature Infrastructure (KSI blockchain) for data security, data analytics for better understanding and identifying citizen needs, and artificial intelligence for the delivery and personalization of services are used on this platform (e-estonia.com, 2025).

X-Road: A secure and scalable data exchange platform that connects numerous public and private sector databases. The essence of the X-Road platform is based on innovative technologies such as digital twin, blockchain, and artificial intelligence (e-estonia.com, 2025). For example, in the X-Road platform, each government institution, citizen, and company has a digital twin, allowing transactions that would normally be carried out in real life to be executed in a virtual environment.

Bürokratt (KrattAI): Established in 2019, this platform hosts nearly 120 artificial intelligence and innovative technology applications that are used, tested, and maintained particularly in public administration and public services. Among these are AI-supported applications aimed at ensuring data security in the public sector, accelerating border control and border crossings (biometric identity verification), generating automatic subtitles for the hearing-impaired in public environments, and creating pre-visit services for patients (kratid.ee, 2025). These applications incorporate innovative technologies such as blockchain, big data, and data analytics. In this way, a fast, efficient, secure, accessible, and functional public administration is targeted.

•**Singapore:** In 2014, Singapore launched the "Smart Nation" initiative. Through this initiative, innovative technologies such as artificial intelligence, IoT, and blockchain have been made available and widely accessible to all citizens via websites, digital platforms, and mobile applications. "Smart Nation" is a policy adopted by Singapore, a country with a small geographic area, limited natural resources, and increasing urban density, in order to overcome such challenges, enhance the quality and performance of services, ensure sustainable development, and improve citizens' lives (Sipahi & Saayı, 2024, p. 43–44). With Smart Nation, the state and citizens are intended to cooperate through innovative technologies on issues such as education, health, traffic, infrastructure, population, urbanization, and housing to produce solutions to problems.

Lastly, Singapore implemented two National Artificial Intelligence Strategies, the first in 2019 and the second in 2023. With these strategies, decisions were made to invest in artificial intelligence and innovative technologies, to establish teams and initiatives working in this field, and to develop the economy in a more sustainable manner

(smartnation.gov, 2025). Thanks to these initiatives and developments, Singapore has taken significant steps toward building a smart city-state by holistically using a wide range of innovative technologies, especially artificial intelligence, as well as data analytics, the Internet of Things (IoT), blockchain technology, sensor systems, wireless communication networks, cloud-based computing, smart devices, and mobile applications (Hoe, 2016, p. 325). Some application examples of artificial intelligence and innovative technologies in Singapore are as follows:

LifeSG: A mobile application that gathers more than 100 public services in one place and provides personalized suggestions through artificial intelligence.

AI Verify: A platform established to assess the performance and reliability of artificial intelligence applications used in various services.

National Speech Corpus (NSC): An AI-supported application developed to convert speech to text and text to speech to enable individuals with visual or hearing impairments to access public services.

OneService Chatbot: A platform that allows access to public services, acquisition of basic information, and the submission of complaints and requests through virtual assistants and chatbots.

Project Pensieve and SELENA+: These applications are used in the healthcare field (e.g., to assist in the early diagnosis of diseases such as eye conditions, diabetes, and dementia).

SingPass: An artificial intelligence application that enables access to public services through fingerprint, facial recognition, and retina scanning.

• **Türkiye:** Türkiye is a country with significant achievements in integrating innovative technologies into public administration. Türkiye's digital transformation journey dates back to the 1990s. The Türkiye Informatics and Economic Modernization Project was launched in 1993, and in the same year, the first internet infrastructure works were carried out. In 1999, the KamuNet circular was issued to enable communication between public institutions. By the 2000s, the process had accelerated further. In 2002, the e-Turkey Circular came into effect, in 2003 the e-Transformation Türkiye Project was launched, and in 2006 the e-Government was established. In 2008, the e-Government platform became operational. The National Artificial Intelligence Strategy 2021–2025, which was published in the Official Gazette and entered into force in August 2021, outlined the use, benefits, and risks of artificial intelligence and other innovative technologies in public administration. With this strategy document, objectives such as the widespread adoption of artificial intelligence in Türkiye, its empowerment, and increasing global competitiveness in this field were established.

Today, the e-Government platform has become a platform through which hundreds of public institutions provide services. This platform, where innovative technologies are increasingly integrated, can serve citizens 24/7. While the e-Government platform has transformed the service delivery structure of public administration, it has also enhanced citizens' capacity to benefit from public services. As of today, the e-Government platform (turkiye.gov.tr, 2025) has 67.5 million users and provides access to hundreds of services in areas such as justice, education, health, transportation and traffic, telecommunications, local government, social security, and tax services. Today, these services are accompanied by artificial intelligence and other innovative technologies. For example, the "Artificial Intelligence Supported Mobile Speed Detection System," which can operate in all weather

conditions and does not require any GSM operator, has been implemented for transportation, traffic, and road safety (icisleri.gov.tr, 2024). Serious steps have also begun to be taken regarding artificial intelligence in higher education, and new programs have started to be opened in this context (for example, the Department of Artificial Intelligence Engineering).

In 2024, artificial intelligence began to be used in the National Screening Mammography Reporting System in the field of health services; the artificial intelligence system was trained with 1 million mammography images and reached an accuracy rate of nearly 90% in detection and evaluation (aa.com.tr, 2025). In 2024, the Ministry of National Education launched the "MEBİ" application, an artificial intelligence-supported personalized education platform. The application was developed to provide personalized learning opportunities with the support of artificial intelligence, particularly for high school students preparing for university (meb.gov.tr, 2024). Artificial intelligence, especially in the field of education, is attracting great interest in many countries, including Turkey, due to its functional capabilities such as eliminating the boundaries of time and space, providing students with individual learning opportunities, and tracking students (Alkan, 2024, s. 486). Finally in 2023, the "GİBİ" application, a digital tax assistant designed to answer questions related to taxation and financial matters, was launched (gib.gov.tr, 2025).

• **India:** India, with a population of approximately 1.5 billion today, is the most populous country in the world. Due to the dense population, it is vitally important that public services are fast, efficient, and cost-effective, and that public resources are used prudently. At this point, artificial intelligence and other innovative technologies have significant roles to play. In this context, India has implemented a series of important initiatives.

Aadhaar: Through the Aadhaar system, the biometric data (fingerprints, iris scans, and facial photographs) of millions of people have been collected in a centralized database, and each individual has been assigned a twelve-digit identification number linked to their biographic information (name, age, gender, address) (Rao & Nair, 2019, p. 469). This application aims to enable citizens to carry out daily tasks such as selling and purchasing goods, opening bank accounts, and buying airplane, train, and bus tickets, as well as to benefit from various services provided by the central government and states (Mishra, Mishra, Jugran, Goel, & Raj, 2023, p. 456). This system incorporates many innovative technologies such as cloud-based computing, mobile applications, facial recognition, and blockchain.

CPGRAMS AI: The Centralized Public Grievance Redress and Monitoring System is an artificial intelligence-supported application that classifies complaints related to problems in accessing public services by topic and forwards them to the relevant public authorities (pgportal.gov.in, 2025).

Kisan e-Mitra: This voice-based AI-supported chatbot was developed by the Ministry of Agriculture to help farmers solve agricultural problems and clarify their questions (india.gov, 2025).

Bengaluru Adaptive Traffic Control System (BATCS): This is an artificial intelligence-supported traffic application designed to regulate traffic flow, prevent congestion, and reduce delays throughout the city (Jeevanandam, 2024).

• **China:** China is among the leading countries in the world in the production and use of innovative technologies. In fact, in 2023 alone, it filed more than 370,000 patents related to artificial intelligence, becoming a global power in AI innovation (Yıldırım, 2024). Some of the innovative technologies in which China ranks among the top in the world are as follows (Li, Ji, & Dayong, 2020, pp. 10–12), (Wiggins, 2025), (Ma, Ping, Wu, Chen, & Shi, 2019):

Security and surveillance applications: Development of AI-supported facial recognition programs and establishment of tracking systems for public order and security.

Creation of new artificial intelligence platforms: China has achieved great success by developing open-source and significantly lower-cost AI platforms such as Ernie 4.0 and DeepSeek, which rival some of the world's most popular AI platforms like ChatGPT, Grok, and Gemini, based in the United States.

Smart cities and urban applications: A smart city is defined as a system that is more livable and functional than traditional cities, adopts innovative governance approaches, can adapt new and up-to-date technologies to daily life, uses resources more efficiently, promotes energy-saving practices, has lower environmental pollution, and applies the principle of participation in urban planning. China is one of the countries that has achieved significant success in the field of smart cities. For example, in 2024, China's city of Shenzhen received the Smart City Award. The Hangzhou City Brain 3.0 application has been optimized with the support of DeepSeek artificial intelligence for real-time traffic, disaster, and urban services.

Justice: Artificial intelligence is currently used in judicial services, especially in court proceedings. For example, with China's Smart Court application, an AI system has been developed that can support judges in their decision-making processes and automatically convert speech into text for court hearings. This artificial intelligence has been used in more than 27,000 court sessions; the speech recognition accuracy rate has exceeded 90%, and average hearing durations have been reduced by 20–30% (Wang & Qu, 2024, pp. 311–312).

Medical AI applications: In medicine, artificial intelligence is used to assess disease onset and risk, predict treatment success, manage or mitigate complications, monitor ongoing patient care, and investigate the effectiveness of continued treatment (Becker, 2019, p. 198). In China, AI is utilized in various areas including medical statistics, assisting in diagnosis and treatment, robotic surgery, medical imaging (AI-supported MRI, ultrasound, computed tomography), and human biology studies (Li et al., 2020, p. 1).

Apart from the examples given above, innovative technologies are also used in many fields in China such as nuclear energy, 5G (high-speed internet), and telecommunications. With these innovative technologies, China aims to achieve goals such as sustainable development, increasing national welfare, and becoming a global power.

• **USA:** Just like China, the United States is one of the leading countries in both the production and utilization of many innovative technologies. Numerous innovative technologies have been implemented in public work and services. Some of these are as follows:

Smart City Applications: New York City (NYC) is an advanced urban area that received the Smart City Award in 2016 and hosts many innovative technologies. The smart city components of NYC include sensors (used for purposes such as measuring air quality, smart waste management, water quality, energy, noise, temperature, and monitoring hot water in buildings, as well as real-time traffic tracking), IoT (for smart systems to function effectively, they must be interconnected and able to communicate with each other, which is made possible by IoT), GPS, Internet Access/Data Infrastructure, Websites/Mobile Applications, and Urban Innovation Centers (Osakata, 2019, pp. 20–24).

Judicial System: In the judiciary, artificial intelligence is used in risk assessment processes. For example, the Predpol software attempts to identify potential crime locations and offenders, the Static-99 software records statistics of adult sexual offenders and evaluates their likelihood of reoffending based on these records, and the COMPAS software is used to predict a person's risk of recidivism (Abanoz Öztürk, 2024, p. 18).

Security: Accessible Property Screening uses artificial intelligence to identify both non-explosive threats and prohibited items in carry-on luggage as bags pass through Computed Tomography (CT) scanners at airports (dhs.gov, 2024).

E-Government and Digital Services: The United States is able to provide many public services at both the federal and local levels through digital platforms. These include: USA.gov (the official government portal, which provides access to many services such as taxes, social security, healthcare, and citizenship procedures), the Internal Revenue Service (a system enabling tax obligations to be fulfilled electronically), the Social Security Administration (a platform for managing social security transactions), and the Department of Motor Vehicles Online Services (a platform for handling vehicle-related services such as driver's licenses, registrations, and permits) (usa.gov, 2025). The Data.gov platform, launched in 2009, provides public access to open data from government institutions, thereby aiming to implement a transparent and accountable model of governance.

As can be seen, there are many innovative technologies applied in public administration in the United States. These technological platforms, which are widely and intensively used, not only facilitate citizens' daily lives but also enhance the efficiency, transparency, and effectiveness of public services, as well as improve citizen satisfaction.

Table 1: Comparative Analysis

Country / Criterion	Estonia	Singapore	Türkiye	India	China	USA
Core Strategy	E-Estonya	Smart Nation	E-Transformation, E-Government Gateway National Artificial Intelligence Strategy	IndiaAI AI for All India AI Innovation Centre	- Made in China 2025 - Digital China 2025	The American AI Initiative
Innovative Technologies	AI Block Chain RPA Digital Twin Big Data	AI IoT Blockchain	AI, Cloud Computing, Block Chain	AI Block Chain CloudComputing	AI, Block Chain, RPA, Digital Twin, Big Data	AI, Cloud Computing, RPA, Digital Twin, Big Data
Featured Application Examples	Portal X-Road Bürokratt (KrattAI)	LifeSG AI Verify National Speech Corpus OneService Chatbot Project Pensieve SELENA SingPass	MEBİ, EBA, GİBİ, E-Nabız	Aadhaar, Bhashini AI, Supreme Court Portal Assistance in Court Efficiency (SUPACE)	Smart Court 3.0 Hangzhou City Brain 3.0 AI Health Assistant AI Hospital WeRide	Accessible Property Screening, MyCity Chatbot, Next Generation Fire System,
Application Areas	Education, Health, Tax, Transportation	Justice, Education, Health, Tax, Transportation	Education, Finance, Transportation, Health,	Health, Education, Agriculture, Transportation	Justice, Health, Education Public Safety, Transportation	Defense Industry, Transportation, Tax, Disaster Management, Finance

Output and Results	
Cost and Resource Savings, Increased Productivity, Effective Decision Support, Citizen Satisfaction.	
Estonia	Artificial intelligence-powered platform that allows citizens to access more than 800 public services from a single point Bureaucratt, recognized by UNESCO as one of the 100 most successful AI projects Increased institutional transparency and speed (e.g. border crossings, health pre-visits) High level of confidentiality and accuracy in data security through the use of KSI blockchain
Singapore	-Gathering more than 100 services on a single mobile platform and AI-supported recommendation mechanism with LifeSG - Secure access thanks to fingerprint, face/retina verification with SingPass - Increased accessibility for the hearing and visually impaired thanks to NSC - Infrastructure optimization in urban planning
Türkiye	Access: 67.5 million users on the E-Government platform (24/7 access) - Health Nearly 90% accuracy in diagnostics -Transportation Traffic control - Education: Potential for personalized teaching and increase in students' success rate with MoNEI - Tax: Instant consultation convenience for taxpayers and reduced burden on the organization with IOP
India	Enrollment of 1.2 billion population in biometric infrastructure with Aadhaar - Greatly reduced language barrier in government services thanks to Bhashini - Faster classification and routing of complaints to resolution authorities with CPGRAMS AI -Providing 24/7 agricultural consultancy services to farmers with Kisan e-Mitra
China	- Transportation Autonomous vehicle technology Urban Management: Shenzhen: - Innovative Technologies: Most AI patents in the world, Alternative low-cost and opensource AI platforms (such as DeepSeek) - Health: Measurable increase in early detection and quality of treatment in medical AI applications
USA	Security and Emergency Management, Increased accuracy rates in risk estimation with systems such as COMPAS / Static-99 - The public availability of federal and state data through Data.gov represents a significant improvement in transparency - Pilot blockchain voting to increase the rate of secure voting by overseas and military personnel - Measurable improvement in citizen satisfaction through platforms such as USA.gov, IRS Online, etc.

Conclusion

In this study, artificial intelligence and innovative technologies in public administration were addressed comparatively through current application examples. The findings and results obtained from the study (for example: the positive reflection of artificial intelligence and innovative technologies on citizen satisfaction, the increase in efficiency in administrative processes, the facilitation and acceleration of decision-making processes, savings in time, labor, and costs, etc.) are generally consistent with the findings and results obtained in similar studies in the literature. In this context, the main findings and results obtained from the study are as follows:

When the country examples and the table are considered, it is observed that artificial intelligence and innovative technologies are prominently on the agenda of countries, have become national policies, and are widely used in public administration.

Although the countries have different geographical, economic, and institutional structures, they are experiencing a transformation toward a digital governance approach. In this transformation process, artificial intelligence and other innovative technologies play a central role. The primary goal is to establish a secure, inclusive, accessible, efficient, and effective public administration and a corresponding digital ecosystem. In this way, a sustainable digital public administration vision is aimed.

It is observed that countries have turned artificial intelligence and innovative technologies into a fundamental national strategy and have implemented them as public policies across different sectors. As can be seen from the countries analyzed, public administration is undergoing a significant transformation with artificial intelligence and other innovative technologies within the scope of strategies such as E-Estonia, Smart Nation, E-Transformation, IndiaAI, AI for All, Made in China 2025, Digital China 2025, and The American AI Initiative.

Although artificial intelligence is the most widely used technological innovation, it is seen that other innovative technologies have also been used to develop solutions for different needs in public services. For example, with blockchain applications, which are among innovative technologies, it is possible to ensure the security of public data, reduce auditing costs, and carry out participation processes in a faster and more reliable manner (e.g., electronic voting methods). Platforms supported by big data (e.g., Turkiye.gov, data.gov) have increased and strengthened the capacity and participation in public services.

Artificial intelligence and other innovative technologies have a wide range of usage in public administration and public service delivery. As seen from the country and application examples discussed, innovative technologies are utilized in many fields such as education, health, taxation, public safety, transportation, and disaster management.

It is observed that countries have different strategies in the use of artificial intelligence and innovative technologies. For instance, there are various usage approaches such as providing services nationally through a single platform (e.g., X-Road, LifeSG, e-Government), implementing national deployment policies through pilot regions, and ministry-based modular service policies.

Artificial intelligence and innovative technologies provide measurable outcomes such as

reducing operational costs and time, expanding public services, increasing accessibility, enabling citizen oversight, and improving the efficiency of public resources. This confirms the potential benefits of artificial intelligence and innovative technologies in public administration. In other words, innovative technologies have made public services accessible 24/7 by transferring them to digital environments, shortened processing times, and reduced costs (for example, it has been revealed that the e-Government application in Türkiye resulted in an annual saving of 2 billion dollars) (trthaber.com, 20019). In this respect, artificial intelligence and innovative technologies have a significant impact on achieving the main goals of public administration (such as cost reduction, service quality improvement, increased public participation, and inclusiveness).

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