

ARTIFICIAL INTELLIGENCE AS A TOOL FOR STRENGTHENING THE SERVICE-ORIENTED MODEL OF PUBLIC ADMINISTRATION IN THE REPUBLIC OF KAZAKHSTAN

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ABSTRACT

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Amid global digital transformation, public administration systems are increasingly shifting toward service-oriented models that prioritise accessibility, efficiency, and citizen satisfaction in public services. In this context, artificial intelligence (AI) is emerging as an important instrument for improving the effectiveness of public administration. This article examines the role of AI in strengthening the service-oriented model of public administration in the Republic of Kazakhstan. The study analyses institutional and technological conditions for AI implementation within the broader digital transformation of the public sector. The research applies systemic and institutional approaches, regulatory analysis, comparative analysis of governance models, and secondary analysis of official statistical data for 2017–2025. The findings indicate that AI contributes to automation of administrative processes, development of proactive public services, and improvement of decision-making through data analytics. At the same time, institutional constraints, regulatory gaps, and uneven digital competencies within the civil service limit the full implementation of AI technologies. The article concludes with recommendations for strengthening the service-oriented model of public administration through balanced and responsible integration of AI technologies.

Keywords: *artificial intelligence; service-oriented model; public administration; digitalisation; constitutional reforms; public services.*

INTRODUCTION

In recent decades, reform of public administration has become a central priority for many states. Traditional administrative-bureaucratic models - focused on procedures and control - are gradually giving way to service-oriented models that emphasise the needs of citizens and businesses (Andersen et al., 2016). Digitalisation-and, more recently, AI-plays a pivotal role in this transformation. By enabling analytical and predictive capabilities, AI allows governments to shift from reactive service delivery to proactive engagement, better identifying public needs and improving service quality. Many developed countries already apply AI as an integral component of a modern service-oriented governance model.

In Kazakhstan, ongoing institutional reforms and digital transformation policies have created additional momentum for the development of a service-oriented model of public administration. In particular, the recognition of digital rights and the protection of citizens' rights in the digital environment establishes an institutional basis for expanding e-government systems and deploying advanced digital technologies, including artificial intelligence, in public administration.

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This article analyses the role of AI in advancing service-oriented public administration in Kazakhstan, reviews relevant theories and implementation practices, identifies key challenges, and proposes actionable recommendations.

LITERATURE REVIEW

This review examines the main theoretical approaches explaining the transition from traditional administrative-bureaucratic governance toward service-oriented models of public administration. Particular attention is given to how contemporary research interprets the role of digital technologies and artificial intelligence in transforming the interaction between the state and citizens. By analysing these perspectives, the article aims to establish a conceptual foundation for understanding how AI can contribute to strengthening a service-oriented model of public administration in Kazakhstan.

1. Service-oriented public administration and AI: theoretical approaches

Contemporary literature views service-oriented public administration as a natural phase in the public sector's evolution from an administrative-bureaucratic logic toward citizen-centric governance. Through this approach, the state functions not only as a regulator but also as a provider of public services that are accessible, convenient, and effective, thereby fostering public trust (Denhardt and Denhardt, 2000).

Theoretical strands such as service-oriented governance, public value management, and customer-oriented management shift emphasis from procedural compliance to creating public value and improving user experience. In this context, digital technologies-and especially AI-serve as tools that enhance the service orientation of public administration through process automation, personalisation, and data-driven decision support.

AI should therefore be understood not only as a technological solution but also as a factor in institutional change. It affects the organisation of governance processes, the distribution of responsibility, and state-citizen interactions. Within the service-oriented model, AI supports a move from reactive practices to proactive and predictive ones, consistent with the logic of adaptive public administration.

Unlike the traditional administrative model, which focuses primarily on regulations and procedures, the service-oriented state emphasises results, user experience, and the creation of public value for citizens.

Within the frameworks of good governance and the new public service, scholars emphasise that the effectiveness of public administration should be assessed through the lens of the public value created for citizens (Moore, 1995; Denhardt and Denhardt, 2000, 2015; Bryson et al., 2014). In this logic, digital technologies - and, at the current stage, AI - serve as tools for enhancing the adaptability and customer-centred orientation of the state apparatus.

AI in public administration is generally defined as a set of algorithmic and analytical solutions that enable process automation, big data processing, and evidence-based decision-making (Everest-Phillips, M. 2019). Researchers note that AI has the potential to transform not only the technological infrastructure of the state but also the institutional foundations of governance, laying the groundwork for a transition to a proactive model of public administration.

However, studies underline that AI is not a universal remedy for all public administration challenges. Its effectiveness depends directly on institutional maturity, the quality and

coherence of the regulatory framework, and the human-resource capacity of the civil service (Perry, 2021). For this reason, AI should be viewed not as an autonomous actor in governance but as an instrument for improving the service-oriented model of government activity.

2. AI in public administration: international and regional studies

International experience shows that countries with robust digital infrastructure and strong public institutions achieve the best results with AI in public administration. Practices observed in Canada, Singapore, and the European Union demonstrate effective use of AI in service delivery, social-data processing, and analysis, and enhancing transparency of management processes AI in public administration is generally defined as a set of algorithmic and analytical solutions that enable process automation, big data processing, and evidence-based decision-making (Everest-Phillips, 2019). In these jurisdictions, AI is increasingly understood as a tool for strengthening interaction between governments and citizens and improving the efficiency and accessibility of public services.

Research on civil service reform emphasises that successful AI adoption hinges less on technological novelty than on a disciplined focus on achieving concrete service outcomes. This approach emphasises outcomes for service users, prioritising public value over technology for its own sake (OECD, 2025, 2026; Vatamanu, 2025). In this view, AI becomes a core component of data-driven governance, improving the validity and predictability of decisions.

Regional studies of post-Soviet countries highlight institutional barriers similar to those identified in international studies of digital public administration, including organisational resistance to change, gaps in digital competencies, and fragmented regulatory frameworks (Janenova and Yesdauletov, 2017; OECD 2024 a, b). Such findings regarding institutional barriers to digital transformation and AI implementation are especially relevant for Kazakhstan, where rapid technological development must be accompanied by institutional adaptation and improvements in regulatory and managerial frameworks.

3. AI as a tool for developing the service-oriented model

Within a service-oriented model, AI is a multifunctional tool for transforming government operations. First, it automates routine administrative procedures, reduces transaction costs, streamlines workflows, and shortens service-delivery times. Second, AI expands the analytical capacity of public bodies. Big-data processing and predictive models help reveal patterns not easily detected by traditional methods, improving the quality of strategic planning and decision-making. Third, AI enables proactive service delivery, where agencies initiate services based on life-event analytics. Thus, AI is becoming an important driver in strengthening the service-oriented character of public administration.

This approach aligns with the principles of a service-oriented state and contributes to higher levels of user satisfaction with public services (OECD, 2020; Denhardt and Denhardt, 2000), while also reflecting broader public service values emphasised in the literature (Perry, 2021). Thus, AI should be regarded as an instrument for improving the service-oriented model of government, whose effectiveness depends not only on technological readiness but also on the quality of the institutional environment.

METHODOLOGY

The methodological framework of this study aims to analyse the role of artificial intelligence in strengthening the service-oriented model of public administration in Kazakhstan. The research focuses on institutional, regulatory, and technological aspects of digital

transformation within the public sector. To achieve this objective, a combination of qualitative analytical methods was applied.

This study employs an analytical-applied approach and identifies the role of AI in strengthening Kazakhstan's service-oriented model of public administration. It combines systemic and institutional approaches to examine the digital transformation of public administration alongside legal, organisational, and personnel changes.

Methods:

- **Regulatory analysis:** review of legal acts governing digitalisation and AI in Kazakhstan, including government programs and policy papers.
- **Comparative analysis:** comparison of administrative and service-oriented models and assessment of how state functions evolve under digitalisation.
- **Secondary analysis** of official statistics drawn from government reports and analytical materials (2017–2025), enabling time-series comparisons and identification of trends.
- **Content analysis** of relevant literature: review of domestic and international publications on the service state, digital public administration, and AI in the public sector.

These findings regarding institutional barriers to digital transformation and AI implementation are especially relevant for Kazakhstan, where rapid technological development must be accompanied by institutional adaptation and improvements in regulatory and managerial frameworks.

Limitations: This study relies primarily on secondary data and official statistical sources related to the digital transformation of public administration in Kazakhstan. While this approach does not allow for a direct assessment of citizens' perceptions of service quality or AI-enabled services, it is appropriate for the objectives of this research, which focus on identifying institutional and technological trends in the development of a service-oriented model of public administration. By analysing government programs, policy documents, and statistical indicators, the study is able to evaluate the structural conditions and institutional dynamics that influence the implementation of AI within the public sector.

RESULTS AND DISCUSSION

Key results of AI adoption within the service-oriented model of public administration

The analysis of official statistical indicators, national digitalisation programs, and policy documents illustrates that the introduction of AI into Kazakhstan's public administration contributes to the gradual development of a service-oriented model.

To identify trends and gauge effectiveness of digital transformation, a comparative analysis of targets and metrics for 2018–2025 was conducted. Table 1 summarises results.

Indicators for 2018–2025 show consistent, system-wide progress in digital public services. The share of electronic and online services exceeded 90% by 2024–2025, reflecting both the growing digital maturity of public administration and the increasing demand of citizens for accessible online public services. Growth in services delivered within five minutes underscores a focus on accessibility and efficiency. The rollout of the service-oriented model across state bodies and public service centres (PSCs) reached 100% of key structures by 2022, with "super-PSC" formats expanding thereafter—evidence of a shift from formal digitalisation to comprehensive

service orientation. In the economy and industry, digitalisation contributed to external economic shocks associated with the COVID-19 pandemic (World Bank, 2021), despite a temporary decline in 2020 linked to external shocks; targets recovered and were exceeded in 2021–2022.

At the same time, data-management and cybersecurity remain problem areas. Low rates of business-process digitalisation and fluctuating information security indicators call for stronger institutional and technological measures. Positive trends include growing numbers of trained IT specialists, rising e-Gov Mobile users, expanded chatbot use, and improved positions in international rankings (IMD, UN EGDI) - all pointing to a strengthening digital foundation and rising public trust in digital channels.

Overall, Kazakhstan's digital transformation of its public sector is both consistent and comprehensive. Further progress toward a service-based model will require improved data quality and governance, stronger cybersecurity, and deeper integration of digital tools into managerial decision-making.

Table 1. Indicators of digital transformation and service-model development in Kazakhstan’s public administration (2018–2025)

Section / area	Target indicator / metric	2018	2019	2020	2021	2022	2023	2024	2025 (10 months)
Public services	Electronic services	680/850 → 80%	720/850 → 85%	650/850 → 76%	790/900 → 88%	820/900 → 91%	–	93%	91%
Public services (online)	Share of online services	65/75 → 87%	70/80 → 88%	68/80 → 85%	80/85 → 94%	83/85 → 98%	–	1,382 / 92%	1,447 / 95.4%
Public services (≤ 5 min.)	Services provided within five minutes	–	–	–	–	–	25% / 25% → 100%	23%	25% / 25% → 100%
Public services (volume)	Number of services provided	–	–	–	–	–	–	341 million / 91% online	> 10 million
Mobile services	Services available via smartphone	–	–	–	–	1,074 / 80%	–	90.8%	95.4%
Economy	Increase in labour productivity	6.5/7 → 93%	8/8 → 100%	4.5/8 → 56%	8.2/9 → 91%	9/9 → 100%	–	–	–
Industry	Firms implementing digital technologies	120/150 → 80%	135/150 → 90%	100/150 → 67%	170/180 → 94%	175/180 → 97%	–	–	–
Infrastructure	Integration of information systems	20/40 → 50%	30/40 → 75%	30/40 → 75%	60/60 → 100%	65/65 → 100%	–	–	–
Service-oriented model	State bodies/PSCs implementing the service-oriented model	20/40 → 50%	25/40 → 63%	30/40 → 75%	60/60 → 100%	65/65 → 100%	–	8 PSCs	20 PSCs + 4 “super- PSCs”
Investments	Investments in startups (KZT in billions)	–	–	–	15.2	35.9	67.69	–	–

Section / area	Target indicator / metric	2018	2019	2020	2021	2022	2023	2024	2025 (10 months)
IT export	Export of IT products	-	-	-	-	-	113.7 / 84 → 135%	-	-
Financing	National Project financing (KZT in millions)	-	-	-	141,977 / 215,023 → 66%	-	177,416 / 183,227 → 97%	236,959 / 237,335 → 99.8%	77,804 / 97,486 → 79%
Data management	Digitalised business processes	-	-	-	-	-	1,095 / 4,355 → 25.2%	620 / 3,500 → 18%	-
GovTech	Qaz-Tech platform coverage	-	-	-	-	-	34 SOs, 4,396 functions	-	-
Cybersecurity	Share of protected IS	-	-	-	-	-	49.3%	41%	49.3%
Human capital	Training of IT specialists	-	-	-	-	-	81,356 / 60,000 → 136%	3,459 vouchers / 115%	1,000+ employees
e-Gov Mobile	Users (millions)	-	-	-	-	-	-	5.6	7.4
International ranking (IMD)	Digital competitiveness	-	-	-	32nd	36th	34th	34th	33rd–35th
International ranking (EGDI)	E-Government Development Index	-	-	-	-	-	-	24th	24th–25th
EGDI-OSI	Online Services Index	-	-	-	-	-	-	Top 10	Top 10
AI (chatbot)	Requests processed (in millions)	-	-	-	6.2	11.1	16.7	-	-
Citizen service quality	Share of citizens receiving consultation (%)	-	-	-	96.3%	98.3%	98.7%	-	-

Source: Author's work

One of the key outcomes is the steadily increasing share of public services delivered electronically and proactively. According to official data, by 2024 more than 90% of public services were available in digital form, indicating that a solid technological foundation has been established for the deployment of AI-enabled solutions. In practice, AI is used primarily to automate routine procedures, support managerial decision-making through data-driven analytics, and facilitate interaction with citizens via digital channels (World Bank, 2016; OECD, 2025, 2026).

In analysing the digital transformation of public administration, particular attention is given to the integration of AI technologies as a central instrument for enhancing the efficiency and customer-centric orientation of the service-oriented model. Building on these results, Table 2 summarises core AI application areas in Kazakhstan's service-oriented model.

Table 2. Selected applications of AI in Kazakhstan's service-oriented public administration

Application area	AI tools and solutions	Service effect
Public service delivery	Chatbots, intelligent forms, proactive notifications	Shorter processing times; lower administrative burden
Analytical support	Big-data analytics, predictive models	Higher-quality decisions; better planning
Social sectors	AI-enabled solutions in health and education	Greater access and quality of services
Internal administration	Process automation, document analysis	Cost reduction; higher operational efficiency

Source: Author's work

The data indicate that the greatest service impact is realised in domains that are directly linked to state–citizen interactions. In these areas, AI reduces transaction costs and enhances user satisfaction with public services. In the area of public service delivery, AI tools - chatbots, intelligent forms, and proactive notifications - shorten processing times and alleviate administrative burdens. Collectively, these improvements expand accessibility and reinforce a customer-centric orientation, a core principle of the service-based model of public administration.

The application of AI for analytical decision support - notably through big data analytics and predictive modelling - is designed to improve the quality and reliability of managerial decisions. Intelligent tools enable a shift from predominantly reactive measures to proactive, evidence-based practices, which is particularly important in conditions of heightened uncertainty and dynamic socioeconomic change, where timely, well-grounded decision-making is essential.

In the social sectors, especially healthcare and education, the deployment of AI-enabled solutions broadens equitable access to public services and improves service quality. Personalised approaches, intelligent decision-support systems, and the automation of discrete procedures allow for a more precise response to citizens' needs and strengthen the resilience of the social system overall.

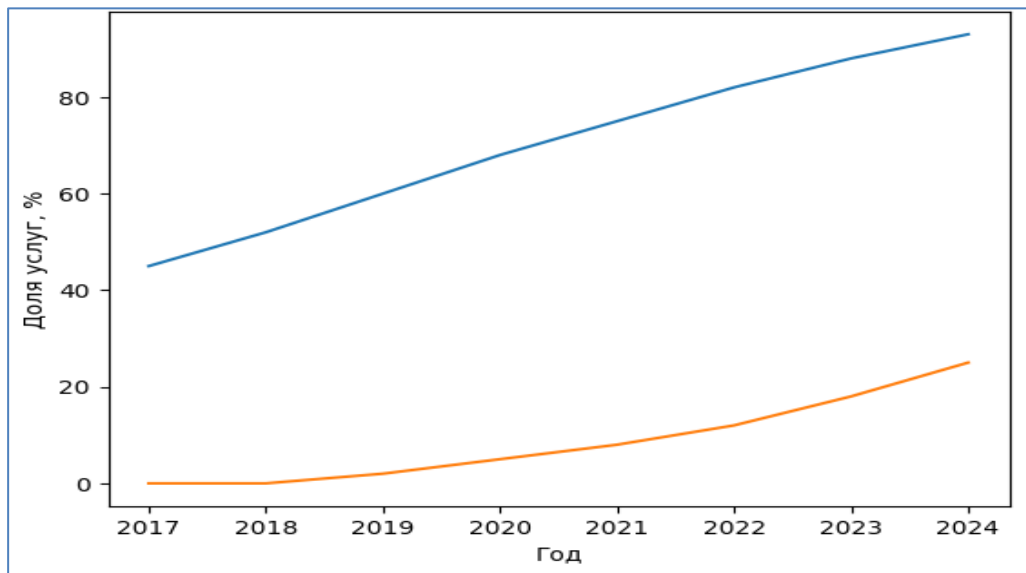
Within internal administrative activities, AI technologies optimise workflows, automate document management, and support analytical operations. These changes reduce costs and raise operational efficiency, while freeing resources for strategic and service-oriented tasks that carry long-term significance for the development of public administration.

Taken together, these areas of application demonstrate the substantial potential of AI as a transformative instrument for advancing a service-oriented model of public administration -

one focused on improving service quality, enhancing managerial efficiency, and more effectively meeting citizens' needs.

To illustrate the trajectory of electronic and proactive public service development in the Republic of Kazakhstan over 2017–2024, Figure 1 presents a diagram visualising the main trends in digitalisation and the expansion of the service-oriented approach within the public administration system.

Figure 1. Development of electronic and proactive public services in Kazakhstan (2017–2024)



Source: Author's work

Proactivity in this context is reflected not only in the number of electronic services but also in the expansion of automated service delivery mechanisms, such as proactive notifications, automatic benefit assignment, and AI-supported interaction channels. As the national digital infrastructure has expanded, elements of proactive service delivery have been progressively integrated into the public service system, enabled by the application of analytical tools and AI technologies.

At the early stages of digital transformation, the primary objective of e-government initiatives was to convert traditional public services into electronic formats. However, the current stage of digital development reflects a transition toward a service-oriented governance model. This shift involves not only digital access to services but also proactive service delivery, predictive analytics, and personalised interaction with citizens, increasingly supported by AI technologies.

Understanding these dynamics points to a gradual transformation in the underlying logic of digital public administration. The trajectory observed reflects a gradual transition from an e-government model focused primarily on providing online access to public services toward a more advanced service-oriented model. This transition is reflected in several institutional and technological changes, including the expansion of proactive service delivery mechanisms, the introduction of AI-based interaction tools such as chatbots and intelligent forms, and the integration of data analytics into administrative decision-making processes. In practice, this shift can be observed in the increasing share of services delivered automatically or proactively, the development of mobile digital platforms such as e-Gov Mobile, and the growing use of AI technologies to personalise public services and anticipate citizens' needs.

Institutional implications and limitations

International regulatory frameworks, including the European Union Artificial Intelligence Act (European Commission, 2024), emphasise that AI systems used in public administration should operate under principles of transparency, accountability, and human oversight, ensuring that automated systems remain subject to human control and democratic governance.

A persistent gap remains between technological progress and institutional readiness. Limited digital and analytical skills among segments of the civil service, combined with an evolving legal and regulatory framework for AI, constrain the realisation of the service-oriented model's potential, because effective use of AI systems requires not only technical infrastructure but also analytical competencies, data governance skills, and institutional capacity to interpret algorithmic outputs in policy-making processes.

Overall, the findings of the study indicate that artificial intelligence contributes to several key transformations within Kazakhstan's public administration system. In particular, the analysis demonstrates that AI supports the automation of routine administrative procedures, improves analytical support for managerial decision-making through big-data processing, and enables more proactive interaction between the state and citizens via digital service platforms. These developments collectively strengthen the service-oriented model of public administration. At the same time, the practical effectiveness of AI implementation remains largely contingent upon the quality of the institutional environment, the coherence of the regulatory framework, and the maturity of managerial culture within public institutions.

CONCLUSIONS AND RECOMMENDATIONS

Kazakhstan's move toward a service-based model is unfolding alongside technological and institutional transformations including legal reforms aimed at strengthening digital governance and protecting citizens' rights in the digital environment.

The constitutional recognition of digital rights and of digital mechanisms for interaction between the state and society establishes a durable legal foundation for deploying innovative governance tools, including AI technologies. However, this raises the bar for aligning technology with institutional and legal reforms and for ensuring transparency and accountability in the use of intelligent systems across the public sector.

In these circumstances, AI should not be regarded as an autonomous strand of digitalisation but rather as an instrument for implementing a service-based model of public administration, whose effectiveness depends directly on the quality of the regulatory framework, the digital competencies of civil servants, and citizens' trust in digital public services.

The study confirms that AI is a significant lever for strengthening the service-oriented model of public administration in Kazakhstan. Its introduction facilitates a shift away from administrative-bureaucratic routines toward a more flexible, customer-oriented, and proactive system of public administration. At the current stage, however, AI in Kazakhstan is used primarily as an enabling tool - automating standard procedures, enhancing analytical support for managerial decision-making, and expanding digital channels for engagement with citizens. These developments create the preconditions for greater efficiency and transparency in government, as well as for improved service quality.

At the same time, the evidence indicates that, in some cases, the pace of technological rollout outstrips institutional and organisational change. Limited digital and analytical skills of some

government officials, a fragmented legal and regulatory framework, and persistent regional disparities collectively constrain the use of AI as a fully-fledged instrument of service transformation. Under these conditions, a hybrid model of public administration is emerging, in which service-oriented and AI-enabled practices coexist with traditional administrative and bureaucratic approaches.

Considering the features and challenges identified, it is appropriate to proceed to formulating recommendations aimed at enhancing the effectiveness of AI implementation and further advancing the service-based model of public administration:

- Develop human resource capacity through systematic training in data-driven governance and practical applications of AI in public administration.
- Advance the regulatory framework for AI in the public sector, with particular attention to transparency of algorithmic decisions, personal-data protection, and clear allocation of ethical responsibility.
- Expand proactive public services based on life-event analytics, treating proactivity as a core element of the service-oriented model rather than a peripheral feature.
- Strengthen institutional coordination so that digital initiatives are aligned with organisational and managerial reforms, ensuring coherent implementation across agencies and levels of government.

In our view, the implementation of these recommendations will strengthen the sustainability of the government's service-oriented model and create the necessary preconditions for a more balanced and effective utilisation of AI within the public administration system of the Republic of Kazakhstan.

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