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## **ARTIFICIAL INTELLIGENCE AS A TOOL TO IMPROVE THE EFFICIENCY OF MUNICIPAL GOVERNMENT IN KAZAKHSTAN**

### **Abstract**

This article discusses the possibilities and prospects of using artificial intelligence in the urban government system of the Republic of Kazakhstan. The role of smart technologies in improving the efficiency of management processes, decision quality and provision of public services at the local level is analyzed. Key problems of implementing intelligent systems are identified, including personnel, institutional and legal constraints. The necessity of an integrated approach to the development of artificial intelligence in urban management has been proven as an important element of the digital transformation of the public sector in Kazakhstan. In the Republic of Kazakhstan, the digital transformation of public authorities is considered a strategic priority with the aim of increasing transparency, efficiency and customer-orientation of management. In this regard, the study of the potential of artificial intelligence as a tool to improve the efficiency of urban public administration in Kazakhstan is an urgent scientific work.

**Key words:** artificial intelligence, digitalization, municipal management, public administration, e-government, data analysis, legal and ethical aspects.

### **Introduction**

In the context of global digital transformation, Public Administration is undergoing a profound shift in relation to the introduction of modern information technologies, digital platforms and AI tools. For the Republic of Kazakhstan, which is implementing a strategy to create a "digital State," modernizing the urban government system as the closest level of government to the population is of particular importance. It is at the municipal level that key socio-economic processes related to the provision of public services, infrastructure management, territorial development and ensuring the quality of life of citizens are focused [1].

Issues of the use of artificial intelligence in public administration are actively addressed in foreign scientific literature. For example, B.W. Wirtz, J.C. Weyerer and C. Geyer analyzes artificial intelligence as a tool to improve public sector efficiency and emphasizes its capabilities in automating administrative processes, data management, forecasting and Decision Support. At the same time, the authors draw attention to the risks associated with transparency of algorithms, responsibility of government agencies and ethical constraints when using artificial intelligence in the public administration system [2].

J. Bullock, M. Young and W. Wang examine the impact of AI on administrative structures and administrative powers, noting that AI not only accelerates management tasks, but also changes the nature of interaction between civil servants, data and citizens. Research M. Young, J. Bullock and J. Lecy emphasizes that the main applications of artificial intelligence in the public sector are non-structured data processing, pattern identification in large amounts of information, and automation of individual administrative functions [3,4].

Internal investigations also confirm the relevance of the matter to Kazakhstan. Work M. K. Baimbetov examines the current state and prospects for the use of artificial intelligence in

the general management system of the Republic of Kazakhstan, where artificial intelligence is defined as one of the tools for improving the quality of management decisions and the development of a digital State. A. Samarkhanov analyzes artificial intelligence in the context of strengthening the public management service-oriented model in Kazakhstan, citing its importance for automating administrative processes, developing active public services and improving the quality of data-driven decision-making. E. Nuruly highlights resource allocation in a systematic review of the use of machine learning in public administration, areas such as ensuring transparency and ethics. Analytical support and improved efficiency of administrative processes [5,6,7].

For Kazakhstan, this issue has not only scientific, but also practical significance. In 2024, the concept of AI development for 2024-2029 was adopted with the aim of developing data, infrastructure, human capital, scientific research and regulating legal relationships in the field of AI. The document considers AI to be one of the priority areas of digital transformation, including in public administration, setting the stage for the introduction of smart solutions at the municipal level [8,9].

Thus, the study of artificial intelligence is associated as a tool to improve the efficiency of urban public administration in Kazakhstan, as it is associated with the need to improve the quality of public services, the efficiency of processing citizens' requests, the rational use of data and the formation of a more open, active and demographic-oriented management model.

### **Materials and methods**

Research materials included the regulatory documents of the Republic of Kazakhstan on the digitization of Public Administration, strategic plans for the development of a digital state, open data from government agencies, analytical materials on the introduction of artificial intelligence, as well as scientific publications on Digital Transformation, Platform Management and the use of smart technologies in the public sector.

Special attention was paid to the analysis of digital platforms and information systems used in Kazakhstan for interaction between government and citizens, including e-government services, public appeal processing services, cross-sectoral data exchange systems and analytical management tools. Reviewing these materials allowed us to determine how artificial intelligence can be integrated into urban management processes to increase efficiency, transparency and quality of decisions.

The basis of research methodology consists of general scientific and special methods of analysis. This theoretical analysis was used to study scientific approaches to understanding artificial intelligence as a tool for Public Administration. The systematic approach allowed us to consider municipal government as a set of interrelated elements: government entities, digital infrastructure, data, public services, citizens' requests, and law enforcement control mechanisms. A comparative method was also used to compare traditional administrative approaches and capabilities of intelligent digital solutions. This made it possible to identify the benefits of artificial intelligence in terms of automating routine processes, classifying requests, anticipating social and underlying risks, and supporting management decisions.

The structural and functional analysis method was used to determine the main directions of AI application at the municipal level. In particular, areas such as intelligent processing of citizens' requests, big data analysis, quality monitoring of public services, forecasting of population needs, monitoring of enforcement of orders and development of preventive services were highlighted. In addition, the generalization method was used in the work, which made it possible to formulate the basic conditions for the effective implementation of artificial intelligence in the Kazakh municipal government. These conditions include access to high-quality, consistent data, development of digital infrastructure, regulatory regulations, education, ensuring information security and maintaining human control when making important social decisions.

Thus, the selected materials and methods made AI comprehensively considered not only as a technological tool, but also as an element of the modernization of urban government, with the aim of increasing efficiency, openness and orientation of authorities to the needs of citizens.

#### *Theoretical analysis*

Artificial intelligence (AI) is today regarded not only as a technological innovation, but also as a management tool capable of improving decision-making efficiency, optimizing administrative processes and ensuring a more accurate policy orientation to the actual needs of the population. In this regard, it is relevant to analyze the possibilities of using artificial intelligence in the Kazakh urban government, evaluate its effectiveness, as well as identify problems and prospects for further development.

Artificial intelligence is a set of methods and technologies that enable computer systems to perform functions that traditionally require human intelligence, including data analysis, pattern recognition, natural language processing, learning, and prediction. In the field of Public Administration, artificial intelligence is used as a tool to support decision-making, automation of processes, and analysis of large amounts of data [10,11].

Kazakh President Qasim Jomart Tokayev emphasizes that digitization and the active introduction of artificial intelligence is the strategic task of the country and key factors of its national development. Speaking at the 2025 Digital Bridge International Forum, the head of State said that "the transition to the digital format of Public Administration within three years means a profound transformation in the relationship between government and citizens and trade", adding that the creation of the Ministry of artificial intelligence and digital development and the introduction of artificial intelligence in all spheres of life will lead to a more technological and modern public life. [12]

Noting that artificial intelligence should be considered as a vital factor in determining competitiveness and national governance, Tokayev stressed that its application in Economics, Public Administration and education should become the basis of a new digital government. According to him, without the development of artificial intelligence, it is impossible to withstand global competition and ensure sustainable growth [13].

Such statements by the president attest to recognition at the highest level of government the importance of artificial intelligence not only as a technical innovation, but also as a pillar of Strategic Management. This relates to theoretical approaches in which artificial intelligence is considered as a tool for improving the efficiency, transparency and adaptability of Public Administration, which is especially important at the municipal level [14].

The general management of the municipality is characterized by high complexity and multidimensionality, as it includes a wide range of tasks – from planning territorial development to responding quickly to citizens' requests. Traditional model management based on hierarchical and paper-based management document method is often in turn sufficiently flexible and effective in a rapidly changing socio-economic environment. The introduction of artificial intelligence makes it possible to transition to a data-driven governance model, where decisions are made based on objective analysis of information, not only specialized assessments.

So from a theoretical point of view, the use of artificial intelligence in the government and the municipality and help implement new principles of public management, including outcomes for transparency and accountability and customer centricity. The use of Intelligent Systems makes it possible to improve the quality of decision making in management, reduce transaction costs and strengthen interaction between officials and the public.

#### **The results and their discussion**

Kazakhstan has achieved significant success in the field of digitization of Public Administration in recent years. Implementing Kazakhstan's digital programs and e-government development has established the basic infrastructure for implementing digital solutions at all levels of government, including the municipality. Electronic public service portals, electronic

document management systems , databases and analytical platforms have become an integral part of the activities of local executive bodies [15].

At the same time, the level of implementation of AI tools in urban government is irregular. Pilot projects are being implemented in large cities and economically developed areas for the use of intelligent systems in the management of transport, public infrastructure and citizen requests. In rural and remote areas, the potential of artificial intelligence is used to a much lesser extent due to infrastructure, human and financial constraints.

Thus, the current state of digitization of the municipal government in Kazakhstan can be described as transitional: technological and institutional prerequisites for the introduction of artificial intelligence have been formed, but its practical application is still fragmented and requires a systematic approach.

One of the key applications of AI is the automation of administrative processes. Intelligent systems are able to process citizens ' requests, classify requests, form responses, and send requests to appropriate departments. This would significantly reduce the revision review time, reduce the burden on akimat employees, and increase public satisfaction with the quality of Service[16].

Table 1. Main directions for the use of artificial intelligence in public administration of the municipality of Kazakhstan

The direction of AI application	Scope of municipal administration	Functional purpose	Expected effect
Intelligent processing of citizens' requests	Provision of public services	Automatic classification, routing and initial processing of requests	Reducing the time required to review appeals, increasing public satisfaction
Big Data Analysis	Socio-economic planning	Identification of trends, forecasting the needs of the population	Improving the validity of management decisions
Predictive analytics	Infrastructure management	Forecast of network wear, accidents, and peak loads	Reduced maintenance costs and accidents
Intelligent Chatbots	Communication with the public	Consulting on municipal services 24/7	Increasing accessibility and transparency of services
Program effectiveness analysis	Assessment of municipal policy	Monitoring of program indicators and results	Improving the effectiveness of budget expenditures
Note: the table was compiled by the author based on an analysis of the practices of digitalization of municipal government			

AI plays an important role in the field of analysis and forecasting. Municipal authorities have a wealth of data, including demographic statistics, information on social infrastructure, data on the state of public services and traffic flow. The use of machine learning algorithms makes it possible to identify hidden patterns, predict the development of areas, assess risks and form more informed management decisions. A promising area is the application of artificial intelligence to urban and social infrastructure management. Intelligent systems can be used to monitor the state of functional networks, optimize energy consumption, manage traffic and street lighting. This helps to increase resource usage efficiency, reduce operating costs and improve the environmental situation. In addition, artificial intelligence can be used to assess the effectiveness of urban programs and projects. Analysis of program implementation data makes

it possible to identify deviations from planned objectives, assess socio-economic impact and regulate policies in real time.

The effectiveness of the implementation of artificial intelligence in urban management is manifested at different levels. Firstly, at the operational level, it is achieved to accelerate processes and reduce administrative costs. Routine operation automation allows you to reallocate resources in favor of analytical and strategic activities.

Secondly, the rationality of decisions made increases at the level of quality of management. The use of analytical models and forecasts reduces the likelihood of errors related to subjective factors and contributes to a more rational allocation of funds.

Thirdly, on a social level, the introduction of artificial intelligence helps to increase the trust of citizens in local authorities. Transparency of accountability processes and improvement of service quality in the form of a positive understanding of the state municipality and increased civic participation.

In the context of Kazakhstan, the potential of artificial intelligence to coordinate regional development is particularly important. If successful solutions are scaled, intelligent systems can help improve managerial efficiency not only in large cities, but also in small towns [17].

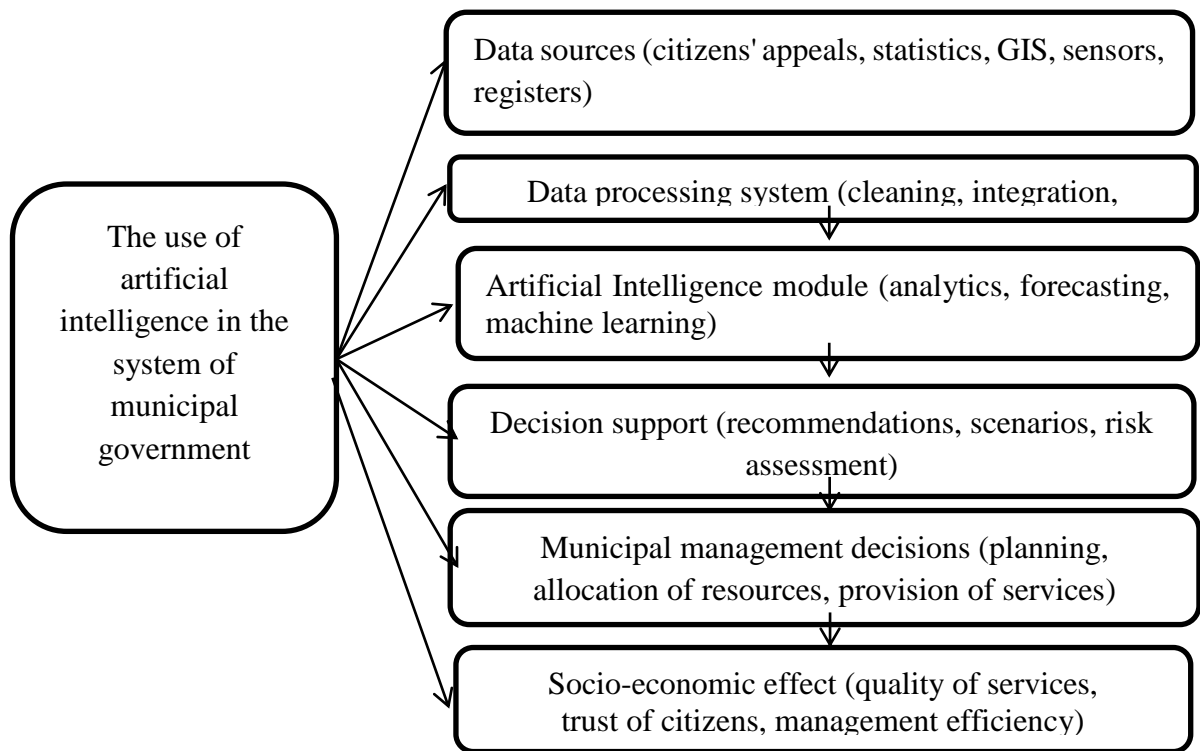


Figure 1. Application of artificial intelligence in the system of municipal government

Despite the obvious benefits, the introduction of artificial intelligence in municipal government comes with a number of problems and limitations. One of the key issues is the shortage of qualified personnel. For the effective use of Intelligent Systems, Specialists in the field of data analysis, information technology and management are required, the training of which requires time and resources. Fragmentation of data and the lack of uniform standards for its storage and processing remain a serious challenge. Incompatibility of Information Systems makes it difficult for different parts of integration and reduces the effectiveness of analytical solutions. Legal and ethical aspects of the application of artificial intelligence require special attention. Issues related to personal data protection, transparency of algorithms and responsibility for decisions made by automated systems require clear regulatory regulations. Without building trust in technology from citizens and government officials, the potential of artificial intelligence cannot be fully realized [18].

In order to increase the effectiveness of the use of artificial intelligence in the urban management of Kazakhstan, it is necessary to implement an integrated approach, including institutional, personnel and technological measures. An important step is the formation of a unified data architecture and the development of integration between the Departments of Information Systems. Human Resource Development should become a priority of government policy professional development programs, cooperation with universities and research centers, as well as private sector participation can ensure sustainable development of AI competencies. Equally important is improving the regulatory framework governing the use of artificial intelligence in public administration. Clear rules and standards help minimize risks and ensure responsible use of technology.

### **Conclusion**

AI is a powerful tool to improve the efficiency of municipal government in Kazakhstan. Its implementation helps to optimize processes, improve the quality of solutions and increase management orientation to the needs of citizens. At the same time, successful realization of AI potential requires a systematic approach, including infrastructure development, personnel, regulatory framework and data-driven management culture. In the context of ongoing digital transformation, it is the urban level that can become a platform for testing innovative solutions and forming a new public management model focused on Sustainable Development and improving the quality of life of the population of the Republic of Kazakhstan.

The analysis suggests that the use of artificial intelligence in urban government can be more effective in areas such as processing citizen requests, automating administrative procedures, anticipating social and infrastructure risks, monitoring the quality of Public Services, big data analysis, and supporting management decisions. The use of Intelligent Systems makes it possible to reduce the time to review requests, increase the accuracy of resource allocation, identify problem areas in the development of territories and meet the needs of the population in a timely manner. Of particular importance is the transition from the traditional reactive management model to an active model in which government agencies not only respond to requests from citizens, but also identify possible problems in advance based on data analysis. In this context AI can become a tool to avoid managerial risks, increase transparency in local authority activities and strengthen citizens' trust in government institutions. However, the introduction of artificial intelligence to municipal government should not be regarded only as a technological process. It requires high-quality institutional readiness and information dependent on internal departments integrating information systems, training from Information Compliance Specialists security requirements and ethical principles. This is especially important to maintain human control when making social decisions from AI should not be an alternative to an employee but as an auxiliary tool to improve the quality of your work.

Therefore, the effectiveness of the use of artificial intelligence in the general management of the Kazakh municipality depends on a balanced combination of digital technologies, managerial responsibility and orientation towards the interests of citizens. With proper and phased implementation, AI can become an important factor in modernizing local government, improving the quality of public services and creating a more open, flexible and efficient public management system.

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## **ЖАСАНДЫ ИНТЕЛЛЕКТ ҚАЗАҚСТАНДАҒЫ МУНИЦИПАЛДЫ БАСҚАРУДЫҢ ТИІМДІЛІГІН АРТТЫРУ ҚҰРАЛЫ РЕТІНДЕ**

### **Түйін**

Бұл мақалада Қазақстан Республикасының қалалық басқару жүйесінде жасанды интеллектті қолдану мүмкіндіктері мен перспективалары қарастырылған. Басқару процестерінің тиімділігін, шешімдердің сапасын және жергілікті деңгейде мемлекеттік қызметтерді көрсетуді арттырудағы ақылды технологиялардың рөлі талданады. Зияткерлік жүйелерді енгізудің негізгі проблемалары, оның ішінде кадрлық, институционалдық және құқықтық шектеулер анықталған. Қала менеджментінде жасанды интеллектті дамытуға кешенді көзқарастың қажеттілігі Қазақстанның мемлекеттік секторын цифрлық трансформациялаудың маңызды элементі ретінде дәлелденді. Қазақстан Республикасында мемлекеттік органдарды цифрлық трансформациялау басқарудың ашықтығын, тиімділігін және клиентке бағдарлануын арттыру мақсатында стратегиялық басымдық болып саналады. Осыған байланысты Қазақстандағы қалалық мемлекеттік басқарудың тиімділігін арттыру құралы ретінде жасанды интеллекттің әлеуетін зерттеу өзекті ғылыми жұмыс болып табылады. Халықпен тікелей өзара әрекеттесетін муниципалды билік деңгейі мемлекеттің әлеуметтік-экономикалық саясатын жүзеге асыруда шешуші рөл атқарады.

**Кілттік сөздер:** жасанды интеллект, цифрландыру, муниципалдық басқару, мемлекеттік басқару, электрондық үкімет, деректерді талдау, құқықтық және этикалық аспектілер

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## **ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ КАК ИНСТРУМЕНТ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ МУНИЦИПАЛЬНОГО УПРАВЛЕНИЯ В КАЗАХСТАНЕ**

### **Аннотация**

В данной статье обсуждаются возможности и перспективы применения искусственного интеллекта в системе городского управления Республики Казахстан. Анализируется роль интеллектуальных технологий в повышении эффективности управленческих процессов, качества принятия решений и предоставления государственных услуг на местном уровне. Определены ключевые проблемы внедрения интеллектуальных систем, в том числе кадровые, институциональные и юридические ограничения. Необходимость комплексного подхода к развитию искусственного интеллекта в городском управлении как важного элемента цифровой трансформации государственного сектора в Казахстане доказана. В Республике Казахстан цифровая трансформация государственных органов рассматривается как стратегический приоритет, направленный на повышение прозрачности, эффективности и клиентоориентированности управления. В этой связи изучение потенциала искусственного интеллекта как инструмента повышения эффективности городского государственного управления в Казахстане является актуальной научной задачей.

**Ключевые слова:** искусственный интеллект, цифровизация, муниципальное управление, государственное управление, электронное правительство, анализ данных, правовые и этические аспекты.