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AI-DRIVEN DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION: INTERNATIONAL EXPERIENCE AND INSTITUTIONAL PERSPECTIVES OF UZBEKISTAN

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Abstract: The article explores the transformation of public administration under the influence of artificial intelligence and its technologies. The purpose of the study is to identify effective international models for AI implementation and determine the mechanisms for their adaptation within developing systems. The research methodology is based on a comparative analysis of the experiences of Estonia and Kazakhstan, as well as a structural-functional approach. As a result, the authors identified and classified key institutional barriers for Uzbekistan: interdepartmental data fragmentation, the rigidity of administrative law, and a shortage of specialized personnel. The scientific novelty of the work lies in the substantiation of a hybrid model of public administration. It combines centralized strategic leadership with a distributed architecture for information storage and exchange. The authors propose a specific mechanism for adapting this model at the architectural, organizational, and functional levels to increase the efficiency of public services.

Keywords: artificial intelligence, digital public administration, institutional barriers, hybrid governance model, data architecture, digital transformation, Uzbekistan.

Introduction

Currently, a fundamental digital transformation of public administration is widely observed. The global transition from traditional government models to their digital forms is characterized by the use of artificial intelligence (AI) and big data (Big Data). States capable of integrating AI into government and decision-making processes gain exceptional opportunities for accurate forecasting of social and economic trends and cycles, optimization of budgetary expenditures, and achieving transparent public administration. The intensification of international competition in the field of digital technologies dictates the need for accelerated adaptation. For states striving to secure stable positions in the global digital economy, the development and implementation of effective and institutionally sound strategies for using AI in public administration becomes a central issue for the country's long-term sustainable development.

In contemporary global literature, most research focuses on the experience and development of AI implementation strategies in advanced economies. These countries possess mature institutions, significant financial resources, and the necessary infrastructure. However, ready-made models of AI institutionalization rarely consider the specifics of transition economies facing limited resources, an underdeveloped institutional structure, and the need to reform the traditional state apparatus. Uzbekistan is among the developing economies and markets. Thus, the main goal of this study is to search for and identify the most effective and dominant institutional models of artificial intelligence implementation in public administration on the international stage and to determine specific perspectives and mechanisms for their adaptation to the conditions of the Republic of Uzbekistan.

The scientific novelty of this study lies in the fact that the authors attempted to expand and develop the theory of institutional digital governance to the context of developing economies, where research related to the study of advanced economies previously dominated. Additionally, a classification of institutional barriers to AI implementation specific to post-Soviet countries is proposed, and a hybrid model for Uzbekistan has been developed, which combines centralized strategic management (Kazakhstan's experience) with a distributed data architecture (Estonia's experience).

Research Methods

The main research method is the comparative case study method, which allows for a systematic analysis of existing AI implementation models in various institutional environments. Based on this method, an in-depth qualitative analysis was also conducted as an indirect method supporting the analysis via the main method. Two countries were selected for the analysis based on the following criteria: the availability of open data and reports, and contextual relevance-successful transformation from a similar starting position (Estonia) and a post-Soviet administrative heritage (Kazakhstan). The following methods of cognition were also used:

1) The method of systematic data collection and observation. This method is characterized by purposeful monitoring and the collection of factual information on the current state of digitalization in public administration.

2)

The method of structural-functional analysis. The study was conducted by breaking down the complex system of "digital public administration" into the following components: the institutional environment-the regulatory framework and state institutions; technological infrastructure-algorithmic systems and big data processing systems; human capital-the competencies of civil servants for proficient work alongside AI, and digital culture.

3) The method of deduction. The deductive approach allowed for the assessment of the possibilities of integrating international standards and successful cases into the national context of Uzbekistan. This made it possible to identify potential advantages and barriers of transformation, as well as the process of adapting global best practices to local administrative conditions, determining the optimal trajectory for the institutionalization of digital public administration.

Results

First, it is necessary to provide a definition of AI-driven public administration.

According to the study by B. W. Wirtz and W. M. Müller, artificial intelligence-based public administration is the integration of intelligent digital solutions, such as: data analysis, algorithmic assessment systems, automated services) to ensure more efficient and transparent execution of state functions, optimize interdepartmental interaction, and improve the level of digital services for citizens [2].

The study by D. Valle-Cruz, E. A. Ruvalcaba, R. Sandoval, and J. I. Criado states that AI-based public administration is a system of using artificial intelligence, big data, and algorithmic

models to automate, optimize, and support decision-making in the public sector with the aim of increasing the efficiency, transparency, accuracy, and adaptability of government functions [3].

However, AI-based public administration is a digital, high-tech model of organizing state power, in which artificial intelligence systems, machine learning, and neural network algorithms are integrated into the management cycle of public administration at every level as entities for supporting or automatically making decisions. Unlike classic electronic government, where technologies merely provide communication between the state and the citizen, AI-based administration makes it possible to create a so-called state machine that possesses the capability for independent cognitive analysis, forecasting, and adaptation of management decisions without direct or partial human intervention in each routine operation.

For an objective analysis and assessment of the positions of the studied countries, an analysis of international digital readiness indexes was conducted. Table 1 presents data from the Government AI Readiness Index (Oxford Insights), which evaluates the potential for AI implementation in the public sector, and the UN E-Government Development Index (UN), which measures the overall level of service digitalization; these two indexes are the most authoritative sources for the comparative evaluation of digital governments.

Indicator/Country	**Estonia**	**Kazakhstan**	**Uzbekistan**
Government AI Readiness Index 2025 (scores)	69,6	56,7	56,1
Government AI Readiness Index 2025 (rank)	21	58	62
Government AI Readiness Index 2024 (scores)	72,6	51,4	53,6
Government AI Readiness Index 2024 (rank)	21	76	70
Динамика рейтинга Government AI Readiness Index	Stable	+18 positions	+8 positions
E-Government Development Index 2024 (scores)	0,9727	0,9009	0,7999
E-Government Development Index 2024 (rank)	2	24	63

E-Government Development Index 2022 (scores)	0,9393	0,8628	0,7265
E-Government Development Index 2022 (rank)	8	28	69
Динамика рейтинга E-Government Development Index	+6 positions	+4 positions	+6 positions

Table 1. Comparative analysis of state digital transformation indexes [4], [5], [6].

Based on the data in Table 1, the quantitative indicators confirm Estonia's position as one of the leaders, as well as the positive dynamics of Kazakhstan and Uzbekistan. However, to examine the institutional mechanisms that ensure the achievement of these values and results, a qualitative analysis is required:

The Estonian Model:

Estonia represents a unique example of a state that has built its digital system on the principles of radical decentralization and trust. Holding the second place in the world in the UN E-Government Development Index, the country has successfully transitioned to the implementation of AI through the construction of the national KrattAI strategy and an advanced technological architecture:

1) Technological architecture: X-Road. The foundation of Estonian success is the X-Road platform-a distributed data exchange environment that serves as the connecting point for the information systems of various government agencies. The distinguishing feature of the platform is that X-Road allows data to be retained by the agencies themselves while ensuring instant and secure access for requests from other departments. The "once-only" principle means that the state does not have the right to request information from a citizen that is already in the system [7].

The implementation of the "once-only" principle is one of the key links in the system. Thanks to X-Road, government authorities exchange data with each other automatically. This eliminates the need for citizens to repeatedly provide the same certificates, as agencies receive information from the primary source in real time. For citizens and businesses, such a system ensures the elimination of certificate bureaucracy and saves time. For the state, in turn, this system allows for: reducing operational costs and making a transition toward departmental proactivity. This system also ensures the security and high control of data. The decentralized architecture of X-Road rules out the existence of a single database that can be hacked. All data is stored by the owners, i.e., ministries, and citizens themselves can track who requested their personal information and when, which significantly increases the level of institutional trust among the country's citizens [8].

2) The KrattAI Strategy and the Bürokratt Project. In Estonia, the national AI strategy for 2024-2026 (KrattAI) is aimed at creating an "invisible" government. The name "Kratt" refers to a mythological creature that performs work for its master, which allows us to understand the service role of artificial intelligence. Meanwhile, the "Bürokratt" project is a network of

interoperable AI agents that allow citizens to interact with the state through a voice or text interface, regardless of which agency is responsible for their issue [9].

All these reforms in the public administration system also carry institutional benefits. For example: the fight against corruption-the automation of data verification deprives officials of the opportunity to demand unnecessary documents or to interpret them subjectively. Furthermore, the investment climate improves-for business, the simplification of registration and licensing procedures through automatic data exchange is a powerful motivation for development and digital integration into the economy.

The Kazakhstan Model:

In turn, Kazakhstan demonstrates an alternative path of development, the feature of which is a strong, centralized, and rapidly scalable model of AI-based public administration. The country ranks 24th in the UN rating and is the leader in Central Asia in terms of the AI readiness index-60th in the world. The features of the Kazakhstan model are:

1) Centralized model: Smart Data Ukimet. At the core of the Kazakhstan system lies the information-analytical system Smart Data Ukimet (SDU)-a large-scale database, controlled and administered by the "NIT" Joint-Stock Company. More than 100 databases of government agencies have been integrated into SDU, with data from them synchronized daily for subsequent analysis and management decision-making [10].

2) AI in the tax and social spheres. Kazakhstan, first and foremost, prioritized the use of AI to increase fiscal transparency and the targeted delivery of social assistance. A special achievement is the Digital Family Card-a system that analyzes the well-being of citizens based on 80 criteria and automatically assigns social payments, completely eliminating the human factor. The system proved to be effective, and tax revenues in 2025 amounted to 15.2 trillion tenge, representing a 101.6% fulfillment of the plan. Moreover, during 2025, an automated audit revealed 791 financial violations totaling 337.5 billion tenge [11].

Discussion

Currently, the institutional landscape of Uzbekistan is characterized by:

1) Centralization and strategic planning, development of the legal framework. The centralized management model acts as a powerful catalyst for technological breakthrough in Uzbekistan. The adoption of Presidential Decree No. PP-358 "On Approval of the Strategy for the Development of Artificial Intelligence Technologies until 2030" became the culmination of the process of institutionalizing AI as a national priority. This decree sets ambitious targets, such as reaching an AI product volume of 1.5 billion dollars by 2030.

2) Digitalization of public services and platforms. Uzbekistan demonstrates impressive rates of public service digitalization. As of the end of 2024, more than 700 types of services are provided through the Single Portal of Interactive Public Services (my.gov.uz), covering over 60% of all government interactions [12].

Thus, we can compile a comparative table of the countries:

Criterion/Country	Estonia	Kazakhstan	Uzbekistan
Governance architecture	Decentralized	Centralized	Hybrid (in the process of transformation)
Data interoperability	High	Medium	Fragmented
Legal framework on AI	AI and Data Action Plan (Kratt) for 2024–2026	Resolution of the RK on the Concept for the Development of Artificial Intelligence for 2024–2029	Resolution of the President of the RUz: Strategy for the Development of Artificial Intelligence Technologies until 2030
Functional scope of AI implementation	Interdepartmental proactive automation of public services	Analytics in the field of tax administration and the system of targeted social assistance	Pilot digital projects for AI implementation
Institutional trust	High	Medium	Emerging

Table 2. Comparative table of digital governments of Estonia, Kazakhstan, and Uzbekistan

From here, it can be concluded that a centralized digital government model ensures a high speed of decision-making and reduces the transaction costs of government agencies, but data centralization is associated with risks of vulnerability and security of this data due to its concentration. In turn, a decentralized architecture increases transparency and enhances the institutional trust of citizens, but it requires stable functional interoperability and strong coordination between ministries-conditions that are difficult to ensure in the short term. Based on these reasons, a hybrid model seems to be the most optimal, combining centralized strategic management with a distributed data storage and exchange architecture.

However, despite the active state policy of AI implementation in Uzbekistan, there are barriers to the institutionalization of AI-based public administration:

1) Fragmentation and the problem of departmental isolation. One of the central problems is the fragmentation of the digital environment. Despite centralized planning, in practice, the implementation of systems occurs according to the "siloed" principle. Data is often duplicated across various departments, and a uniform data exchange standard is absent, which leads to the emergence of contradictory databases [13].

2) Administrative rigidity and legal imbalance. Research points to a phenomenon where digital reforms outpace the development of administrative law institutions. Automated platforms often introduce rigid rules that do not allow for the consideration of individual circumstances of citizens, which contradicts the requirements of the Law on Administrative Procedures.

3) Talent deficit. Human capital is one of the key factors of digital transformation. There is a high demand not only for programmers but also for AI systems architects, big data specialists, and machine learning experts. Although the "One Million Coders" program establishes a

foundation for training specialists, the need for highly qualified AI specialists to develop complex AI systems remains unmet [14].

For the successful integration of AI into the public administration system of Uzbekistan, a transition to a comprehensive adaptation model covering architectural, organizational, and functional levels is required:

1) **Architectural level:** Creation of an independent infrastructure. It is necessary to create:

- Computational clusters-the planned establishment and launch of 1 MW GPU clusters in cooperation with NVIDIA will provide government agencies with resources for training AI models.

- Single database. A transition is required from fragmented databases to a centralized data center where information is stored in a standardized form, undergoing automatic grouping and cleaning.

2) Organizational level. It is necessary to create:

- AI regulatory authorities. The introduction of special legal bodies and regimes for regulating and testing AI startups and state pilots.

- Competence centers and AI laboratories. Creation based on IT centers, leading universities, and research centers focused on the creation, testing, and implementation of AI models tailored to applied tasks of public administration.

3) Functional level. Functional adaptation should be aimed at solving the most pressing socio-economic challenges:

- Intelligent social support. The use of AI in the unified registry of social protection for the automatic identification of low-income families based on the analysis of indirect data.

- Digital healthcare. Implementation of AI-based clinical decision support systems based on the analysis of medical images.

- Predictive justice and administrative management. Integration of AI into document management systems for the automatic classification of citizens' appeals and the preparation of draft responses, which will reduce waiting times and improve public satisfaction.

The practical implementation of the proposed model can be tied to the existing capabilities of Uzbekistan: it is advisable to deploy infrastructural capacities in coordination with IT Park to ensure efficient functioning. It is best to establish AI regulatory authorities through mutual cooperation between the Ministry of Digital Technologies of the Republic of Uzbekistan and the Ministry of Justice of the Republic of Uzbekistan. Similar cooperation is needed between the Ministry of Employment and Poverty Reduction of the Republic of Uzbekistan and the My.Gov.Uz platform to create a unified digital registry of social protection.

Conclusion

The integration of AI into public administration represents a fundamental shift in the management paradigm. Comparative analysis has shown that the success of digital reforms depends on the balance between technological architecture and institutional trust. The experience

of Estonia (decentralization via X-Road) and Kazakhstan (centralized analytics via Smart Data Ukimet) confirms that a hybrid path is the most promising for Uzbekistan. This path includes centralized strategic leadership with a distributed architecture for storage and interdepartmental data exchange, which allows for overcoming such problems as data fragmentation, administrative rigidity, and talent shortages, while maintaining a strong national strategy.

References

1. Almanbetova Chynara, Mikhaylov, Alexander Borisovich, and Pulatov, Odiljon Tolib Ugli. "ЦИФРОВАЯ ЭКОНОМИКА КАК ДВИЖУЩАЯ СИЛА СОВРЕМЕННОГО РАЗВИТИЯ: УПРАВЛЕНИЕ И ФИНАНСОВЫЕ ИННОВАЦИИ" Nazariy va amaliy tadqiqotlar xalqaro jurnali, vol. 3, no. 10, 2023, pp. 20-29. https://doi.org/10.5281/zenodo.11003401
2. Wirtz, Bernd & Müller, Wilhelm. (2018). An integrated artificial intelligence framework for public management. Public Management Review. 21. 1-25. 10.1080/14719037.2018.1549268.
3. Valle-Cruz, David & Ruvalcaba Gómez, Edgar & Sandoval Almazan, Rodrigo & Criado, J. Ignacio. (2019). A Review of Artificial Intelligence in Government and its Potential from a Public Policy Perspective. 91-99. 10.1145/3325112.3325242.Braverman, S. Global Review of Data-Driven Marketing and Advertising. J Direct Data Digit Mark Pract 16, 181–183 (2015). https://doi.org/10.1057/dddmp.2015.7
4. Government AI Readiness Index 2025. Online resource: URL: https://oxfordinsights.com/ai-readiness/government-ai-readiness-index-2025/
5. Government AI Readiness Index 2024. Электронный ресурс: URL: https://oxfordinsights.com/wp-content/uploads/2024/12/2024-Government-AI-Readiness-Index-2.pdf
6. UN E-Government Survey 2024. Online resource: URL: https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2024
7. Vassil, K. (2015) Estonia: A Digital Success Story. World Development Report 2016 Background Paper.
8. Krimmer, Robert & Kalvet, Tarmo & Olesk, Maarja & Cepilovs, Aleksandrs & Tambouris, Efthimios. (2017). Exploring and Demonstrating the Once-Only Principle: A European Perspective. 546-551. 10.1145/3085228.3085235.
9. AI and the Kratt momentum. Электронный ресурс: URL: https://e-estonia.com/ai-and-the-kratt-momentum/
10. GovTech Qazaqstan. Online resource: URL: https://www.nitec.kz/en/article/proekty
11. Digital Family Card: A society transformed through technology. Электронный ресурс: URL: https://www.undp.org/kazakhstan/stories/digital-family-card-society-transformed-through-technology

12. Постановление Президента Республики Узбекистан – “Об утверждении Стратегии развития технологий искусственного интеллекта до 2030 года” Электронный ресурс: URL: https://lex.uz/ru/docs/715860
13. Digital Economy of Uzbekistan: The State of Digital Entrepreneurship and Artificial Intelligence/ Электронный ресурс: URL: https://www.undp.org/uzbekistan/publications/digital-economy-uzbekistan-state-digital-entrepreneurship-and-artificial-intelligence
14. Tara Qian Sun, Rony Medaglia, Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare, Government Information Quarterly, Volume 36, Issue 2,2019, Pages 368-383, ISSN 0740-624X, https://doi.org/10.1016/j.giq.2018.09.008.