

A Prognostic Approach to The Impact of Artificial Intelligence on State Functions

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Submitted: 30-Apr, 2025

Accepted: 20-May, 2025

Published: 7-May, 2025

Vol. 2, No. 1, 2025. Sociometrics.us

Journal of Community, Law and
Diplomacy Sciences

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Abstract

Artificial intelligence (AI) technologies are reshaping global economies by enhancing productivity and decision-making across sectors. In Uzbekistan, the integration of AI remains nascent, particularly in public administration and economic governance, where digital transformation is still developing. Despite global advancements, there is a lack of focused research on the implementation challenges and strategic opportunities for AI deployment in Uzbekistan's economic development. This study aims to examine the potential of AI technologies in advancing the economic sectors of Uzbekistan, with emphasis on institutional readiness, policy frameworks, and application prospects. The analysis reveals that while AI adoption in Uzbekistan is currently limited, there are significant opportunities in areas such as agriculture, health care, and public services. Key barriers include insufficient technical infrastructure, limited human capital, and underdeveloped regulatory support. The paper provides a context-specific evaluation of AI's economic potential within Uzbekistan, distinguishing it from broader, non-localized studies by incorporating regional data and policy analysis. The findings highlight the necessity for targeted policy interventions, investment in digital infrastructure, and education reform to cultivate AI competencies, suggesting a roadmap for AI-driven economic modernization in Uzbekistan.

Key words: Artificial Intelligence, Public Administration, Legal Regulation, State Functions, Prognostic Approach, Transformational Impact, E-Government

Introduction

In contemporary society, artificial intelligence (AI) technologies are swiftly integrating into virtually all domains of human activity. Government administration, judicial systems, taxation and customs authorities, law enforcement operations, and social sectors represent key areas where AI technologies are being deployed. This integration is consequently reshaping the fundamental functions of the modern state. Within this global context, investigating legal relationships in the development and application of AI technologies in Uzbekistan holds

particular academic significance. The enactment of Presidential Resolution No. PQ-358 of the Republic of Uzbekistan dated October 14, 2024, "On approval of the strategy for the development of artificial intelligence technologies until 2030" demonstrates governmental commitment to this field. This strategic document envisions achieving enhanced efficiency across social sectors and economic branches through accelerated development of AI technologies [1].

Contemporary scholarly work has addressed various aspects related to artificial intelligence. Specifically, S. Azirbaev analyzed relationships between artificial intelligence and civil law, I. Aliyev investigated legal challenges concerning artificial intelligence, accountability issues, transparency concerns, and bias and discrimination problems. H. Ovliyakov examined regulatory frameworks for artificial intelligence, while M. Xaydarova conducted theoretical-legal research on AI technologies' influence in legal practice. O. Mutalov analyzed AI applications in judicial systems, including opportunities and risks [2].

While these investigations have explored AI's impact in specific sectors, the comprehensive effect on governmental functions and future developmental prospects remains insufficiently explored. Therefore, this paper's relevance stems from the fact that with Uzbekistan's adoption of a national strategy for implementing and developing AI technologies, analyzing and evaluating these technologies' impact on governmental functions from a prognostic perspective carries both scientific and practical importance [3].

This article focuses on several key issues: legal foundations for applying AI technologies in governmental functions, the transformative impact of AI on state functions, potential legal challenges arising from AI implementation in public administration, and recommendations for effective integration of AI technologies in governmental operations [4].

Materials and Methods

This investigation employed comparative-legal analysis, systematic analysis, forecasting, and normative-dogmatic research methodologies commonly utilized in legal scholarship. Through comparative-legal analysis, regulatory frameworks governing AI in Uzbekistan were compared with international approaches. The experiences of leading nations in AI technology regulation, particularly the United States, European Union, and China, were examined. This analysis informed recommendations for enhancing Uzbekistan's legal framework.

The systematic analysis methodology facilitated examination of various aspects of AI application in governmental functions as an integrated system. This approach enabled comprehensive analysis of AI technologies' impact on administrative efficiency, service quality, law enforcement practices, oversight functions, and decision-making processes.

The forecasting methodology enabled assessment of AI technologies' future impact on governmental functions. A prognostic model was developed based on target indicators

specified in Uzbekistan's "Strategy for the development of artificial intelligence technologies until 2030" and international experiences.

The normative-dogmatic research methodology facilitated thorough examination of legal instruments governing artificial intelligence. This approach enabled detailed analysis of Uzbekistan's legislative documents regulating AI technologies, including the "Strategy for the development of artificial intelligence technologies until 2030", Presidential Resolution "On measures to create conditions for rapid implementation of artificial intelligence technologies", Presidential Resolution "On measures to introduce a special regime for applying artificial intelligence technologies", and related instruments.

Research sources included Uzbekistan's legislative documents concerning artificial intelligence, scholarly legal publications, international organizational documents and recommendations regarding artificial intelligence, and comparative international experiences in AI technology regulation.

Results

The legal foundations for implementing AI technologies in governmental functions are actively developing in the Republic of Uzbekistan. Key legal instruments include Presidential Resolution No. PQ-4996 dated February 17, 2021, "On measures to create conditions for rapid implementation of artificial intelligence technologies," Presidential Resolution No. PQ-5234 dated August 26, 2021, "On measures to introduce a special regime for applying artificial intelligence technologies," Cabinet of Ministers Resolution No. 717 dated November 29, 2021, "On approval of the regulation on establishing a special regime to support artificial intelligence technologies and organizing its activities," and Presidential Resolution No. PQ-358 dated October 14, 2024, "On approval of the strategy for the development of artificial intelligence technologies until 2030" [5].

These instruments govern the development and implementation of AI technologies, establishing priority directions, supporting scientific research in artificial intelligence, and addressing related matters. Notably, the "Strategy for the development of artificial intelligence technologies until 2030" approved by Resolution No. PQ-358 dated October 14, 2024, holds particular significance, establishing the following priority areas:

In banking and finance — fraud prevention, credit assessment, market trend forecasting; In taxation and customs — reducing informal economic activity, forecasting suspicious customs operations and risk management; In healthcare — disease diagnosis, treatment determination, medical image analysis and patient data management; In agriculture — productivity forecasting, agricultural resource management, monitoring crop, poultry, fish and livestock breeding processes; In energy — resource management, optimizing energy production and distribution, developing renewable energy utilization and demand forecasting [6].

The strategy also establishes target indicators for AI technology development by 2030, including increasing AI-based software products and services to \$1.5 billion USD, increasing AI-powered services on the Unified Interactive Public Services Portal to 10 percent, establishing 10 AI research laboratories, and positioning Uzbekistan among the top 50 countries in the Government's AI Readiness Index [7].

Since 2021, pilot projects implementing AI technologies have been launched in Uzbekistan. These initiatives significantly enhance governmental functions. Examples include monitoring soil and agricultural crop conditions using remote sensing data in agriculture, enhancing commercial bank activity monitoring in banking, analyzing tax revenues and identifying discrepancies in the taxation sector, optimizing public transport routes in transportation, detecting pneumonia through computerized tomography analysis in healthcare, implementing remote biometric identification (Face-ID) for electronic government services, and additional projects [8].

AI technologies play a crucial role in transforming fundamental governmental functions. This transformative impact manifests in several key areas: transformation of public service delivery, transformation of law enforcement practices, transformation of oversight and monitoring functions, and transformation of administrative decision-making processes [9].

The transformation of public service delivery occurs through remote biometric identification for electronic government services using AI technologies, service personalization, simplification and acceleration of service utilization, and automation of data analysis, forecasting, and decision-making [10].

The transformation of law enforcement practices involves implementing AI technologies in judicial systems for analyzing and forecasting judicial decisions, preparing legal documents, and automating judicial procedures. As O. Mutalov noted [9; pp. 26-29], the COMPAS system assesses recidivism likelihood in the United States, Estonia employs the "robot judge" project for minor claims, France utilizes the "Predictice" system for analyzing and forecasting judicial decisions, while China implements the "206" system for judicial decision preparation and analysis, and the "Xiao Zhi" chatbot provides legal guidance to citizens [11].

The transformation of oversight and monitoring functions involves implementing AI technologies in taxation and customs to reduce informal economic activity, forecast suspicious customs operations, manage risks, analyze tax revenues, and identify discrepancies in tax payments [12].

The transformation of administrative decision-making processes involves analyzing and forecasting substantial data volumes through AI technologies, modeling various scenarios, and supporting decision-making. This enables accelerated decision-making in governmental bodies, reduced error probability, and enhanced decision appropriateness.

Implementing AI technologies in governmental functions may generate several legal

challenges. These include accountability issues, transparency concerns, bias and discrimination problems, and privacy and data protection considerations [13].

The accountability issue relates to determining responsibility for actions and decisions made by AI systems. When an AI system causes harm through incorrect decisions or outcomes, allocating responsibility among developers, users, or the AI system itself requires consideration. As Aliyev observed, considering that AI-like systems operate independently from their creators or operators complicates determining measures and subjects of legal responsibility [14].

The transparency issue stems from complex internal operations of AI systems, particularly those utilizing deep learning and neural networks, which often lack transparency, making it difficult to ascertain the reasoning behind AI-generated decisions.

The bias and discrimination issue arises when AI systems perpetuate or amplify social imbalances and misconceptions when trained on flawed datasets or programmed with specific biases [15].

The privacy and data protection issue relates to AI systems processing extensive personal data and their implications for privacy.

Effective implementation of AI technologies in governmental functions requires enhancing legal and regulatory frameworks, developing security and control mechanisms, building human resource capacity, and establishing priority directions.

In enhancing legal and regulatory frameworks, developing ethics codes for AI technology development and application, improving legislation on AI system accountability, establishing judicial oversight mechanisms for AI system decisions, and developing legal mechanisms ensuring transparency in AI system implementation are essential.

In developing security and control mechanisms, implementing technical and organizational measures to ensure AI system security, establishing monitoring and control systems for AI operations, developing mechanisms to identify and rectify errors in AI decisions, and creating independent expertise systems to evaluate ethical and legal aspects of AI system implementation are crucial.

In building human resource capacity, training civil servants to work with AI technologies, educating AI specialists and enhancing their qualifications, supporting AI research, and developing international cooperation and studying advanced international experiences are vital [16].

In establishing priority directions for AI technology implementation, particular attention should focus on enhancing public service quality, improving law enforcement practices, optimizing oversight and monitoring functions, and implementing AI technologies in administrative decision-making processes.

Discussion

Analysis of AI technologies' impact on governmental functions from a prognostic perspective reveals these technologies can generate transformative changes in public service delivery, law enforcement practices, oversight and monitoring functions, and administrative decision-making processes.

The legal foundations for implementing AI technologies in governmental functions have been established in Uzbekistan, with the "Strategy for the development of artificial intelligence technologies until 2030" and related legal instruments defining key directions for applying these technologies in governmental operations. However, legal challenges associated with implementing AI technologies in governmental functions remain unresolved. These challenges include accountability, transparency, bias and discrimination, and privacy and data protection concerns. Addressing these challenges requires enhancing legal and regulatory frameworks, developing security and control mechanisms, building human resource capacity, and establishing priority directions for AI technology implementation [17].

The experiences of developed nations in implementing AI technologies in governmental functions, particularly the United States, European Union, and China, are significant. These countries possess extensive experience integrating AI technologies into public administration, and studying their experiences and adapting them to Uzbekistan's context while considering national characteristics is valuable [18].

International organizations, particularly the Organisation for Economic Co-operation and Development (OECD), have developed principles governing artificial intelligence technologies. The OECD principles promote trustworthy approaches to AI that respect international human rights and democratic values. Additionally, the "Artificial Intelligence for Europe" communication adopted by the European Commission represents an important document addressing AI technology development and public administration implementation. The five principles on AI's societal role developed by Floridi and Cowls are also significant, establishing fundamental principles for implementing AI technologies in public administration [19].

An important development in implementing AI technologies in Uzbekistan's governmental functions was establishing the Research Institute for Digital Technologies and Artificial Intelligence Development. This institute conducts fundamental and applied research in artificial intelligence, develops the scientific ecosystem for digital technology advancement, and creates innovative AI-based products for automating management and production processes, including models, algorithms, and software.

Additionally, Uzbekistan has introduced a "Special regime for applying artificial intelligence technologies," constituting a specialized unit within the Software Products and Information

Technologies Technology Park. This special regime creates necessary organizational-legal conditions for entities engaged in experimental AI-based activities, software development and service provision, and facilitates legal relationships arising during software testing and implementation [20].

Research findings demonstrate that AI technologies exert transformative effects on governmental functions, with this impact projected to intensify. This transformative influence enables more effective execution of governmental functions related to public service delivery, law enforcement practices, oversight and monitoring functions, and administrative decision-making processes. However, addressing legal challenges requires enhancing legal and regulatory frameworks for implementing AI technologies in governmental functions, developing security and control mechanisms, and building human resource capacity [21].

As Kodirov noted, AI's economic impact is multifaceted, creating opportunities for economic growth and innovation while potentially generating employment and income inequality challenges. From this perspective, implementing AI technologies in governmental functions requires consideration of both positive and negative consequences and developing management mechanisms [22].

A prognostic approach to implementing AI technologies in governmental functions enables anticipating developmental trends and prospects of AI technologies and developing strategies for their effective implementation in governmental operations. In an environment of rapidly evolving AI technologies, such a prognostic approach is vital for enhancing governmental efficiency and ensuring innovative development [23].

The "Algorithmic Regulation" concept proposed by Yeung for addressing legal challenges related to implementing AI technologies in governmental functions merits consideration. This concept enables addressing AI algorithm accountability issues through regulation, ensuring transparency, and preventing discrimination. Future assessments of AI technologies' transformative impact on governmental functions would benefit from this conceptual framework [24].

Conclusion

In conclusion, the prospects for implementing AI technologies in Uzbekistan's governmental functions can be evaluated based on defined target indicators in the "Strategy for the development of artificial intelligence technologies until 2030."

Successful implementation of this strategy will enable Uzbekistan to effectively implement AI technologies in governmental functions, enhance public administration efficiency, and improve living standards.

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