

ARTIFICIAL INTELLIGENCE APPLICATION PROSPECTS IN THE PUBLIC SECTOR: OPPORTUNITIES AND RISKS

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ABSTRACT

Introduction. These days, the public sector digitalization stands as one of the most crucial global trends. Artificial intelligence (AI) emerges as a key technology within GovTech approach, and its application can significantly enhance the efficiency and quality of state and municipal services. Simultaneously, the rapid introduction of new technologies into such a sensitive sector is associated with risks that, under conditions of insufficiently developed risk management systems, can even undermine national security. This research aims at conducting a comprehensive analysis of the prospects for implementing AI solutions in the public sector within the GovTech context, and it is intended to study the key capabilities of this technology and the systemic risks accompanying them, as well as to develop a solution for their minimization.

Materials and methods. To achieve the set goal, a comprehensive methodology was applied, encompassing documentary analysis of scientific literature (published between 2022–2025), content analysis, and comparative analysis (of opportunities and the associated risks in AI implementation within GovTech). The final stage of the methodological process was the results processing into a holistic conceptual model. The choice of a qualitative methodology, rather than a quantitative one, was determined by the necessity of creating a holistic picture of the phenomenon. The article logically stems from the research previously published by the authors.

Results and conclusions. The results of the conducted research indicate the necessity of recognizing the fundamental importance of a risk management system when implementing AI solutions in the public sector and the unconditional priority of “Trusted AI” principles at all stages of the system lifecycle. During the research, the authors described the directions of AI application within GovTech across various spheres of public administration and presented a classification of risks. This allowed for the identification of a dialectical relationship between them and the determination of key problematic areas in risk management practices. The novelty of the research lies in conducting a comprehensive analysis of the synergies and contradictions of the public sector.

Discussion. The results present value in defining the importance of overcoming a narrowly focused approach and the actual implementation of the ethically sound “Trusted AI” concept, as well as integrating risk management into the core processes of AI development and implementation within GovTech approach.

KEYWORDS

GovTech, artificial intelligence, digital technologies, machine learning, public services, digitalization, risk management.

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AUTHORS' CONTRIBUTION

All the authors participated in the research concept development, processing and analysis, manuscript text writing and conclusions formulation. Data collection was carried out by A. D. Volodina.

CONFLICT OF INTEREST

The authors declare interest conflict lack.

USE OF AI TOOLS DECLARATION

The authors declare that they have not used Artificial Intelligence (AI) tools to write this article.

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ИССЛЕДОВАТЕЛЬСКАЯ СТАТЬЯ

ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ В ГОСУДАРСТВЕННОМ СЕКТОРЕ: СИНЕРГЕТИЧЕСКИЙ ЭФФЕКТ И СИСТЕМНЫЕ РИСКИ

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АННОТАЦИЯ

Введение. Цифровизация государственного сектора является одним из важнейших глобальных трендов. Цель исследования заключается в проведении комплексного анализа перспектив внедрения ИИ-решений в госсекторе в контексте GovTech, в выявлении сопутствующих им системных рисков и разработке решений для их минимизации.

Материалы и методы. Использована комплексная методология, включающая документальный анализ научной литературы (2022–2025 гг.), контент-анализ и сравнительный анализ возможностей и сопутствующих им рисков внедрения ИИ в рамках GovTech. Анализируются практические кейсы внедрения ИИ в госсекторе России.

Результаты. Систематизированы ключевые направления применения ИИ в государственном секторе: социальная поддержка граждан, здравоохранение, обеспечение правопорядка и контроля соблюдения законодательства, городская и транспортная инфраструктура. Синергетический эффект от применения ИИ в госсекторе заключается в комплексном использовании технологий машинного обучения, обработке естественного языка и компьютерного зрения. Это позволяет повышать скорость и точность обработки данных, реализовывать упреждающее реагирование на вызовы, усиливать обоснованность решений и улучшать доступность сервисов. Обоснована необходимость создания системы управления рисками при внедрении ИИ-решений в госсекторе: ее социальные, правовые, технические, этические аспекты. Выявлена взаимосвязь жизненного цикла ИИ-системы в госсекторе с группами рисков. На стадии проектирования ключевыми являются правовые и этические риски (оценка допустимости применения технологии для конкретной задачи, соответствие правовым нормам и этическим принципам); на стадии разработки ИИ-систем доминируют технические риски (корректность архитектуры, качество и репрезентативность наборов данных); при внедрении и эксплуатации – социальные риски (потеря рабочих мест в госсекторе, низкая квалификация госслужащих) и технические риски (неадекватная работа модели в реальных условиях, кибератаки); на этапе мониторинга критическими становятся правовые (несоответствие модели изменяющемуся законодательству) и этические риски (выявление непредвиденных негативных последствий в процессе длительной эксплуатации). Преодоление выявленных рисков авторы связывают с внедрением принципов «доверенного ИИ», предполагающего

обязательный аудит алгоритмов до и в процессе их эксплуатации ИИ в государственном секторе; создание при ключевых ведомствах этических комитетов, уполномоченных проводить экспертизу проектов на предмет алгоритмической предвзятости; разработку и утверждение единых стандартов качества данных, используемых в госсекторе.

Обсуждение. Полученные результаты способствуют реализации этически корректной концепции «доверенного ИИ», а также интеграции управления рисками в ядро процессов разработки и внедрения ИИ в рамках GovTech.

КЛЮЧЕВЫЕ СЛОВА

GovTech, искусственный интеллект, цифровые технологии, машинное обучение, государственные услуги, цифровизация, управление рисками.

ФИНАНСИРОВАНИЕ

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ВКЛАД АВТОРОВ

Все авторы участвовали в разработке концепции исследования, обработке и анализе данных, написании текста рукописи, формулировке выводов. Сбор данных осуществлялся А. Д. Володиной.

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■ INTRODUCTION

GovTech-led digital transformation of the public sector is now becoming a global trend. The desire of states to improve management efficiency, quality and accessibility of services for citizens, ensure transparency and reduce transaction costs is manifested in the active introduction of advanced digital technologies. In the Russian Federation, this trend is reflected in the national program «Digital economy of the Russian Federation» (for

the period 2017-2024), as well as the subsequent national project «Data economy and digital transformation of the state» (for the period 2025-2030), which highlight the importance of digital governance, singled out as a separated federal project, as one of the key priorities.

Among the GovTech technology drivers, artificial intelligence (AI) has a special place, including machine learning (ML from English: «machine learning»), natural language processing (NLP

from English: «natural language processing») and computer vision. At the same time, the rapid penetration of AI into the sensitive sphere of public administration entails considerable risks and complex challenges: social, legal, technical and ethical. Underestimating these risks may not only negate the potential benefits of AI, but also cause significant damage to public interests and trust in state institutions.

The aim of this work is to conduct a comprehensive analysis of the prospects for the application of artificial intelligence in the public sector in the context of GovTech, including identification and evaluation of key opportunities and associated systemic risks, as well as development of solutions for their minimization.

■ LITERATURE REVIEW

Numerous authors have studied features of the digitalization of public administration in the modern period. It has been determined that the GovTech market combines several technological industries [1]: «Smart City» (urban management technologies for local authorities, B2G); «UrbanTech» (platform solutions (delivery, carving) to improve the quality of life of citizens (B2C)); «CivicTech» (tools to simplify communication and solve social issues between citizens (B2C) and authorities (B2G)); the actual «GovTech» (technologies for providing public services to the population and improving the efficiency of public works (B2G), including urban planning, Budgetary and procurement decisions). Sirokova L. V. and Astaf'eva I. A. [2] consider GovTech (GosTeh) as an industry of technological solutions for public purposes, and highlight the following vectors of GovTech market development: management of integrated IT-environment for work with big data; development of cooperation between the state and business through hackathons, accelerators, special GovTech-habs, etc.; Making of a common innovation culture of the human resources of the public and municipal administration (PMS) sector through the development of digital competences, introduction of project approaches, creation of motivation systems and talent search through platforms of «Russia - country of opportunities»; Building partnerships with the population and involving citizens in the development and monitoring of public services.

Heji A. E. and co-authors [3] note that digital technologies not only increase the efficiency and speed of public services, but also transform the very nature of GM by promoting the transition to a model of «good governance» based on the principles of openness, transparency, accountability and cooperation with non-state actors.

In general, regarding the experience of the Russian Federation, it can be noted that in the process of transition of the state to the GovTech model, a key problem becomes the obsession with one instrument of digital transformation, namely state-owned digital platforms, which, despite positioning «GosTech» as an integration platform for all GIS, do not involve the full spectrum of GovTech technologies. The main barriers identified are [4, p. 102-103]: a trend towards unjustifiable extension of experiments indicating insufficient prior assessment of the effectiveness of practices before their introduction, The lack of a well-developed systematic mechanism to assess the effectiveness and efficiency of pilot digital initiatives at their validation stage, as well as the practice of analysing the project risks of implementing digital solutions leading to their dysfunctionality. The study by Leonova O. V. [5, pp. 64-65] on digitalization of social and economic policy in Russia highlights its dual nature: on the one hand, it is a driver for improving the efficiency of public administration, access to social services (education, health care, employment) and cost savings through platforms such as «Public Services» and GESSO; on the other hand, it generates risks of digital inequality, data security threats, ethical dilemmas of AI application and institutional barriers.

Some studies [1; 6, p. 19, 24] insist that Russia is one of the leading countries in the field of development and implementation of digital technologies in innovation processes of public administration of social sphere. In addition to the high level of technological development, Russia has a great experience in designing IT services for state and municipal services. It is confirmed by their wide prevalence in the field of private service compared with foreign counterparts. Ioda J. V. and co-authors [7] in their study insist that the main vector of development of the digital system of state and regional government of Russia should be the introduction of the principle of adaptability, involving the rapid improvement of service delivery methods and technologies in accordance with

changing consumer demands and the development of technical solutions, as well as the optimization of internal interaction and participation of consumers in the creation and use of digital services. In general, the priority conditions for GovTech market growth in Russia today are [8, p. 156-157]: implementation of investments in the development of start-up ecosystems, creation of joint GovTech centers to integrate the state and business, as well as purchase by large companies (for example, «Sber» and Mail.ru) technological startups to further reach state customers.

A lot of work is devoted to the study of existing methods [9] and the development of new ones for evaluating the digitalization of the public sector. Mikhoulya Y. U. [10, pp. 64-66] criticizes the existing international indices (UN EGDI; World Bank GTMI; OECD DGI; European Union DESI), emphasizing their declarativity and subjectivism, general neglect of assessing demand characteristics as well as considering citizens' needs, business and civil servants. It offers an author's classification of methods for estimating digitization according to the information needs of the stakeholders by three groups: estimating the intensity of digitalization; evaluating the supply of digital services; assessing the satisfaction of the beneficiaries. In the context of Russian practice, priority should be given to developing a methodology for the latter group. It is very important that the technological optimism in the implementation of digital ecosystem models [11, p. 187-188, 193] does not distance from the institutional complexity of the state sector and do not ignore possible value conflicts between stakeholders to make sure there is no gap between digital services and the real needs of citizens.

Bogdanovsky I. Y. [12, p. 11-12] proposes its own multicomponent model of the economic result of digitalization including four components: R1 direct savings in financial costs; R2 direct cost savings for service recipients; R3 increase of transparency and decrease of human influence; R4 increase of system manageability. Digitization is economically justified if the ratio of direct savings (R1) to digitalization costs (C) is greater than 1 ($R1/C > 1$). If $R1/C \leq 1$, it is necessary to justify the socio-economic efficiency by proving that the sum of all four components exceeds the costs ($R1 + R2 + R3 + R4 > C$). The R2-R4 components require complex, often expert, financial interpretation.

It is noted that the greatest potential in the field of GM has AI and ML, which open great prospects for changing the system of interaction between state and citizens [13, p. 1421]. AI can be used mainly in three directions [1, p. 21]: for B2C-applications, in IT-solutions for organization of civil service work, in operational management systems and important strategic decisions. It is noted that given the speed of AI development, humanity is not prepared for large-scale global AI challenges and does not have international cooperation mechanisms to effectively manage them [14].

Quite a few authors address the topic of AI in GM from different sides. Goloshapova L. V., Asmyatullin R. R. and Shipshova O. A. [15] analyze the dual impact of AI on the economy, highlighting its potential for productivity growth and creation of new markets, as well as social risks (unemployment, deepening inequality, ethical-legal challenges), proposing minimization strategies through educational initiatives, global regulation and the implementation of ethical development principles. Harchenko N. P. [16] explores the application of AI technologies for intensification (acceleration, increase of reasonableness and efficiency) of management decision-making in socially responsible systems (SOCs), studying world practices of integration of AI in Scandinavia, Germany, USA, Asia, Australia and New Zealand. It was determined that the successful integration of AI into SOS depends not only on the level of technological development, but also on the political will, social activity and long-term strategy. Article by Mahusin et al. [17] explores key challenges (ethical dilemmas, infrastructural constraints, manpower shortages) and strategies for implementing AI in the public sector to improve service efficiency and public good. Shah M.A., Haq I., Rasool A. [18] also explore global possibilities of using AI in GM to increase efficiency and transparency of services through the lens of public value.

Alhosani K. and Alhashmi S.M. [19] explore organizational strategies for the implementation of AI in the public sector to optimize the provision of public services. van Donge W., Janssen M.F.W.H.A., Bharosa N. [20] justify the need to create multi-actor information infrastructures (MAII) that allow data exchange between multiple actors (public authorities, private sector, intermediaries). They also identify 24 key variables (related to information and data formats, processes and systems, management)

of MAII for the optimization of data exchange and preparation of hosts for the use of AI. Sirait E., Zuidervijk A., Janssen M. [21] in their paper propose a conceptual model for assessing the readiness of the public sector to implement artificial intelligence by classifying readiness factors (basic, AI-specific, state-specific) and studying their dynamics at different stages of the AI implementation cycle. Belikov V. A. [22] in his work studies the role of international organizations (UN, EU, ISO/IEC) in developing standards for legal regulation of AI and analyzes key problems (differences in national legal approaches, technological uncertainty due to rapid development of AI), preventing the development of common global standards.

A number of works focus on the ethical aspect of using AI in the public sector. Thus, Gorman A.V. [23] traces the evolution of concepts of confidence in AI («ethical», «useful», «beneficial», «responsible») as stages of forming an integrated concept of «trusted AI» and identifies continuing philosophical challenges, related to the application of the concept of trust in inanimate systems. De Falco C.C. and Romeo E. [24] formulate key dimensions of ethical and legal regulation of AI in the public sector, aimed at minimizing risks and ensuring social benefit in accordance with the principles of the New Public Service. Belarusov M.M., Dmitrieva E.A. and Martynova A.E. [25], considering in their work key ethical risks and security risks of AI, justify the need for comprehensive measures (international cooperation, regulation, education) to minimize them and ensure responsible use of technologies. Murlov O. V. [26] also addresses the question of whether there are ethical and legal aspects to the introduction of AI in various spheres.

Literature analysis show that existing studies often focus either on the technological capabilities of AI in GovTech or on the common risks of AI. At the same time, there is a scientific gap that indicates at the need to conduct a comprehensive analysis of specific synergies and contradictions between the capabilities of public sector AI and its inherent risks in the context of GovTech. This is particularly relevant given the rapidly changing regulatory environment and the characteristics of the GM sector, such as accountability, transparency, public value. This study is intended to close the scientific gap.

■ MATERIALS AND METHODS

The present work is a qualitative study based on a comprehensive analysis of documents. The choice of qualitative methodology stems from the objective of the paper, which requires a deep understanding of the context, mechanisms and consequences of the implementation of AI within GovTech, rather than quantitative measurement of variables.

We collected empirical data mainly by means of documentary analysis. This method involves the systematic search, selection and critical examination of textual information. Leading academic databases (Springer, eLibrary.ru) were used as sources for searching documents. The selection criteria were: direct relevance of the research topic (keywords: «artificial intelligence», «GovTech», «public services», «digitalization», «AI ethics») and topicality (scientific publications for 2022-2025).

Content analysis was also used by the authors to systematically identify and categorize key themes, concepts and patterns related to AI capabilities and associated risks. We implemented comparative analysis to study the actual opportunities and risks of AI implementation in state and municipal administration.

At the end of the research work, synthesis was applied to generalize and integrate results of documentary, content- and comparative analysis and formulated conclusions on key applications of AI within GovTech, structure of risks, developed sound recommendations for their minimization.

■ RESULTS

The analysis of AI implementation practice in the public sector allows to identify and systematize key areas of its application within the framework of the GovTech concept. It is noteworthy that these areas cover a wide range of government functions, demonstrating the significant potential of technology to transform the GM system.

According to the analytical report prepared by the National Center for the Development of Artificial Intelligence under the Government of the Russian Federation, in 2023 at the federal level as of the end of 2023 in 40 executive bodies implemented 86 decisions, 26 were in the process of implementation, and 37 were planned for implementation; 22 departments have already used or planned to use only domestic AI solutions. At the same time, the effects achieved from

the use of AI (increase in speed, quality, economic efficiency and other characteristics of business processes) only for 2021-2023. increased by 1.5 times.

The period of 2023-2024 in Russia was characterized by an active phase of import substitution and adaptation of domestic AI solutions in the public sector. According to the Ministry for Digital Development, the share of Russian software in this field increased from 25% to 40%, and the size of the domestic AI market exceeded 250 billion rubles. In accordance with the National Strategy for the Development of Artificial Intelligence until 2030, it is planned to create 25 «artificial-intellectual» regions where large-scale implementation of technologies in urban management, health care and transport infrastructure will be carried out. A practical example of such integration is the Moscow AI-based urban data analysis system, currently processing more than 10 million queries daily¹.

Generally, AI is most actively implemented in the social sphere, where it is used to automate the processing of citizens' applications (such as for benefits), to identify potential fraud and to predict individual or family needs for social support measures. The implementation of AI in these cases, above all, allows to increase the speed of service delivery, contributes to reduce the administrative burden and errors related to manual labor, optimization of budget expenditures through targeting orientation. As a consequence, it increases the availability of assistance to vulnerable groups.

In the social sphere, the health system should not be overlooked, where AI capabilities are focused on improving the accuracy and speed of diagnosis, reducing the burden on medical personnel, increasing access to specialized medical care, especially in remote areas, and ultimately improving the quality and effectiveness of treatment. As part of the assessment of the economic impact of the introduction and use of AI in some sectors of the economy of Russia by 2035, it is predicted that in health care and social services it will be 1.7 trillion rubles².

The use of AI in the field of transport and urban infrastructure generates significant prospects, lying in the core of the concept of «Smart City». Here, technology is used to optimize road traffic and manage traffic lights in real time, monitoring

the state of critical infrastructure (roads, bridges, buildings) using computer vision and sensors, predicting emergency situations in urban areas, parking space management and transport network development planning. Currently, among the key outcomes of utilizing AI solutions in this domain, apart from a significant cut in costs and time for logistics operations, experts emphasize: reduction of congestion up to 50%, increase in the capacity of the road network up to 22% and reducing the number of accidents on the roads to 8.2%.

The use of AI for law enforcement is developing simultaneously. AI systems are used to recognize persons, analyze large amounts of data for the purpose of combating crime. In particular, AI algorithms help to identify money laundering schemes. According to a survey conducted by PwC, in 2023 62% of financial institutions have already used AI to some extent to combat money laundering, and it is expected that by 2025 this figure will increase to 90%. Additionally, AI can be used to automate the control of compliance with legislation, such as immigration registration.

The application of AI in public administration deserves special attention. GovTech in this field shows itself through such tools as chat bots and virtual assistants, tools for analysis of the texts of citizens' communications and in general implementation of integrated analysis of big data, tools aimed at optimizing internal administrative procedures within state and municipal authorities. The application of all these mechanisms creates a basis for improving public policies and services, and, as a result, increasing transparency and accountability of government.

It is important to note that when implementing the application of digital technologies in these areas, there is often a synergistic effect that enables us to address the various types of tasks within the GM system most effectively. Thus, automation of routine processes, predictive analysis, support for decision-making, improvement of interaction with citizens are implemented through appropriate AI technologies (ML, NLP, computer vision, recommendation systems). Together, these technologies provide the following key benefits: a significant increase in speed and accuracy of information processing, the ability to respond proactively to emerging

¹ Artificial intelligence: global trends and Russian reality up to 2030. URL: https://www.vedomosti.ru/press_releases/2025/07/15/iskusstvennii-intellekt-globalnie-trendi-i-rossiiskie-realii-do-2030-goda (access date: 27.08.2025).

² Dranev Y. J., Kuchin I. E., Miryakov M. I. (2025) Economic effect of the introduction of artificial intelligence technologies in Russia. M. - ISIEU NYU HSE. Access mode: <https://issek.hse.ru/news/1022068478.html> (access date: 18.08.2025).

challenges, increased reasonableness of management decisions, as well as increase in the convenience and accessibility of services for citizens.

The Government of the Russian Federation is actively taking various measures to ensure the correct introduction and use of digital technologies in the public sector in order to fully unlock the potential of such tools. For example, at the end of August 2025, it was announced that the selection mechanisms for particularly important projects within the Industrial Competence Centers (ICS) had been revised. Priority was given to developing software with an artificial intelligence module. Currently, 26 AI-based IT solutions are being developed within the CCI and implemented in key sectors of the economy including engineering, shipbuilding, chemicals and metallurgy. AI is used to optimize processes, create digital models, carry out calculations and predictive analysis of equipment, with the final decisions being made by a specialist.

A number of ICC projects using AI have already been completed. For example, the JSC «RZD» implemented a system for modeling and forecasting passenger flows; the system of data collection and equipment diagnostics was implemented for the JSC «МКНХ «Euromim». The projects for MMC «Norilsky Nickel» and the domestic system of

automated design of heavy class for shipbuilding are in final stage.

In addition, the governor of Novosibirsk region has signed an agreement with the head of unit «Technological development» PJSC Sberbank on cooperation in the development and implementation of «innovative solutions», stimulating scientific research and creation «new technological services for business and the public». The key element of this agreement is a training programme for civil servants on neural network technologies³. Within the framework of cooperation, it is planned to create a generative AI laboratory designed to increase the competence of regional authorities as qualified customers of AI solutions, as well as scaling up a successful pilot project using AI to diagnose strokes before commercial use. An additional area of cooperation will be the implementation of a process analysis platform Process Mining based on AI for analyzing the processing of citizens' requests and optimizing the provision of public services.

Simultaneously, considering the implementation of all the aforementioned opportunities for integrating artificial intelligence technologies, it is imperative not to disregard the emergence of associated risks. For illustrative purposes, the main risks faced by the public sector when implementing AI are presented in Figure 1.

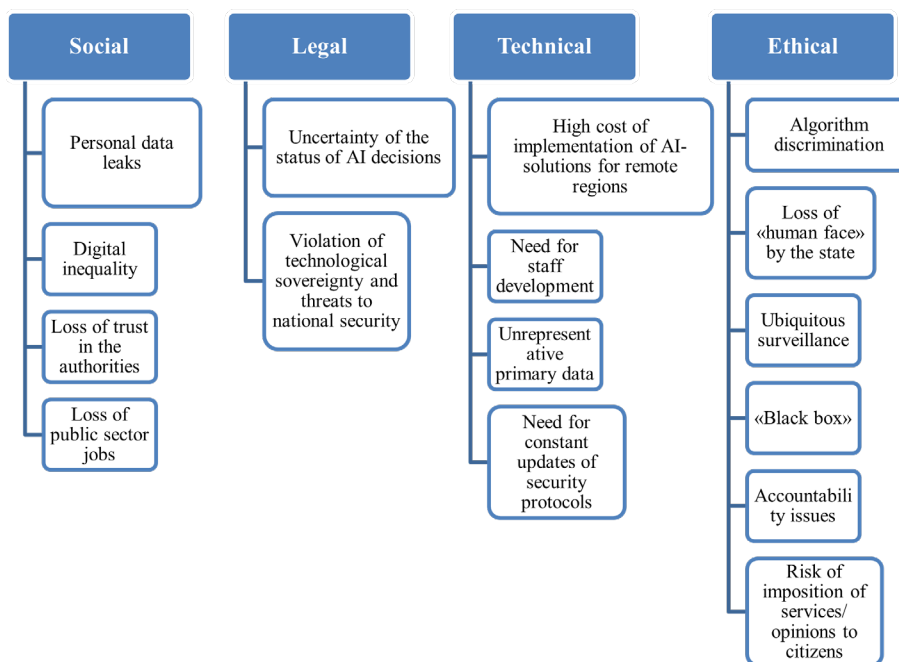


Figure 1 – Risks of implementing AI solutions in the public sector

Источник: составлено авторами на основе [15, 17–18, 22–26]

³ Novosibirsk officials will be trained to work with neural networks. URL: <https://nsk.rbc.ru/nsk/28/08/2025/68afdb639a7947750c27fd10> (access date: 28.08.2025).

It is worth noting that the same risk, for example «digital inequality» can be seen as economic and educational polarization both between social strata and between regions [15, p. 101]. It may emerge as a social and technical risk simultaneously. In the first case, we are talking about a low level of citizen income or digital illiteracy. In the second case, emphasis is placed on the fact that the introduction of AI in the public sector faces infrastructural and resource constraints via the need for improved computing capacity which less developed regions are not always able to meet [17, p. 554]. The risk of «personal data leakage» can also be considered from all four sides, but it was allocated to the group «social» because citizens are the most affected party that is exposed to this threat. Therefore, it is important to make a reservation that all the risks presented in Figure 1 are conditionally divided into groups and are closely interrelated, and its study allows us to form a holistic picture.

According to the authors of this article, one of the most significant risks of using AI within GovTech is the risk of creating threats to national security and violating the technological sovereignty of the state. Dependence on foreign digital platforms, components or expertise creates vulnerabilities that can be used to undermine the state's independence in decision-making, damage critical infrastructure, unauthorized access to confidential data or even manipulation of public administration systems. Shah M.A., Haq I., Rasool A. [18, p. 296-297] in their work separately note that on the global market of AI-solutions states unable to autonomous technological development in this direction are suspended in the context of growing competition from the USA and China. The lack of confidence that foreign-made digital technologies are credible slows down global AI adoption. In general, developing and low-income countries often face a digital infrastructure gap and therefore prefer conservative regulatory options to minimize the negative social consequences of AI use [22, p. 127]. That is why in the public sector the priority direction of development is to

support domestic developers and research centers, as well as improving the national legal framework in the area (for example, creating an analog of the Act on artificial intelligence («AI Act») of the European Union).

In addition, understanding the work of many AI models, especially deep learning neural networks, can be difficult even for their developers because the models function as «black boxes» [25, p. 247]. The complexity inherent in such models makes it difficult to interpret the results, which aggravates the problems of accountability and transparency [17, p. 553]. From the people's point of view, it might resemble of «total» control, which cannot help but affect negatively the perception of the state by citizens. On the other hand, the use of AI in the manipulation of public opinion can occur through unmeasured information substitution (due to incorrect primary data, «black box» algorithms, etc.), which is also unacceptable and illegitimate in terms of undermining the credibility of public institutions and digitalization in public administration as a whole. It seems necessary to develop mechanisms for detecting such anomalies [25, p. 249], because the protection of the autonomy of the individual's will and freedom of choice in a society increasingly oriented towards artificial intelligence is becoming a priority [17, p. 558].

It must also be recognized that the use of AI is quite capable, when used incorrectly, to aggravate the existing bureaucratic inefficiency and imbalance of political forces [17, p. 556]. Therefore, the digital illiteracy of civil servants is extremely dangerous, making relevant the task of regular training of representatives of state structures in the context of digitalization of the industry.

To further explore the dialectical relationship between the most significant public sector AI applications and risks, key aspects are highlighted in Table 1. The analysis concluded that: that the more powerful a technology within GovTech's AI has transformational potential, the deeper are the possible risks of incorrect implementation.

Table 1 – Dialectic interrelation between opportunities and risks of GovTech AI implementation

№ п/п	Key opportunities	Collateral risks
1	Management decisions	AI system as «Black box» Personal data leaks Uncertainty of the status of AI decisions Threats to technological sovereignty and national security Need for constant updates of security protocols Non-representativeness of raw data Failure of AI to take context into account (mitigating or aggravating circumstances)
2	Predictive analytics	Ubiquitous surveillance Personal data leaks Discrimination, algorithmic bias False forecasts due to unrepresentative primary data Need for constant updating of data due to geopolitical instability
3	Reducing transaction costs	Uncertainty of the status of AI solutions (problems of accountability and determination of the degree of human responsibility) Digital inequality (lagging regions, inaccessibility of digital services for citizens) Loss of public sector jobs
4	Services personalisation	Personal data leaks Discrimination, algorithmic bias Risk of imposing services / opinions to citizens Digital inequality Loss of «human face» by the state

Source: Compiled by the authors on the basis of [15, 17–18, 22–26]

Based on Table 1 and Figure 1, there are a number of systemic problems in the area of risk management. The most significant problem area is the apparent delay in the regulatory and legal framework against the background of rapidly developing digital technologies [22, p. 125]. To avoid «blurring» of liability, it seems necessary to consolidate the normative legal status of decisions taken using AI [15, p. 100; 26, p. 23]. Moreover, it is important to achieve a balance between AI-based decision making and the preservation of human judgment and control [17, p. 558]. Currently existing legal systems of individual states often do not contain specific provisions regulating the status of AI decisions, their validation procedure, quality standards (representativeness) the data collected, as well as clear requirements for transparency and explainability of results. This legal uncertainty leaves citizens without reliable mechanisms for the legal protection of their rights and freedoms. At the global level [15, p. 100], the establishment of common mechanisms to prevent abuse is hampered by differences in approaches to AI management in lead countries.

This systemic risk leads to the declarative nature of AI ethical principles in the public sector. The lack of universally applicable standards and methodologies regarding matters like algorithmic bias renders ethical norms merely formalities, which do not influence the actual implementation and use of digital technologies in this crucial sector of the national economy.

The value aspects of providing public services using AI can provoke debate about the fundamental democratic principles involved: algorithms may inadvertently violate basic norms of equality, transparency and citizen participation in governance [17, p. 555]. Discrimination in algorithms can be manifested in the form of bias towards certain demographic groups, which may increase social tensions and require careful monitoring at the stage of development and testing of technologies [15, p. 100].

The immediate result of the aforementioned issues, along with technological challenges, is a lack of adequate explanation regarding the AI solutions that have been implemented. As already mentioned, systems often function as «black boxes» not only for

developers, end-users - citizens, but also for employees of public authorities. This directly contradicts the fundamental principle of accountability of the state and makes it difficult to identify the causes of errors or unjust outcomes.

At the same time, there is a significant lack of necessary competences among public officials responsible for the creation of requirements, selection, implementation and control of AI systems. Insufficient understanding of the basic principles of AI work, its limitations and risks hinders effective project management, informed choice of technological solutions and adequate evaluation of suppliers' offers.

This problem exacerbates the risks related to data quality and safety of data collection. Many artificial intelligence models require large amounts of data for practical learning. Therefore, ensuring the representativeness of primary data, their reliability and sufficiency, comes to the fore [17, pp. 553, 557]. At the same time, any use of digital technologies, including AI, is obliged to protect the privacy of citizens [15, p. 100]. However, the issues of quality and legitimacy of data collection as well as cybersecurity of AI models themselves are often seen in isolation rather than as an integral part of integrated AI risk management, which is not acceptable

Now let us consider some real cases of AI implementation in the state sector of Russia. Thus, the implementation of an online camera system for monitoring waste removal is a good example of the state's solution to the problems of housing and communal services⁴. By February 2025, the authorities of 30 regions of Russia are transmitting video streams from cameras located near container sites to the Federal State Information System for recording solid municipal waste. Moreover, the Russian environmental operator is developing a neural network that provides predictive and objective control over the condition of sites and allows to identify and eliminate such violations as waste accumulation, overcrowding of containers and poor-quality removal. The key risks of this project are related to the need to ensure high accuracy and reliability of computer vision algorithms in various and non-standard operating conditions (difficult weather conditions, problems with camera viewing angle or image quality, etc.), as well as ensuring the confidentiality of data obtained (cameras take not only garbage, but also car numbers, people's faces, windows of nearby houses. All this is personal

data whose leakage can create threats to privacy and safety of residents). Within this case we can see, in particular, the following dialectical interrelations (according to Table 1): «Predictive analysis» - «Total surveillance», «Personal data leaks», «False forecasts due to unrepresentative primary data».

Next case: the use of AI in strategic planning. By September 2025, the Government announced the introduction of artificial intelligence into the state system for monitoring and managing national projects and public programs. The key implementable capabilities of this case are the transition from retrospective control to predictive analysis through unveiling unobvious intersectoral links between the activities of various state projects and forecasting risks of failures in their implementation with an accuracy of up to 96%. AI system processes more than 1 thousand possible options per minute, which significantly reduces the time for analysis of indicators and activities. At the same time, this case demonstrates the systemic risks associated with the delegation of analytical functions to algorithms. This case shows that the final decision is made by a person, which somewhat reduces risks, but even so there is an urgent need to ensure a high degree of interpretability and reliability of output AI-systems. Considering this example through the prism of the dialectical relationships of risks and opportunities from Table 1, we can see, in particular, the following coincidences: «Reduction of transaction costs» - «Uncertainty of the status of AI decisions» (measures to minimize this risk have been taken); «Management decision-making» - «Unrepresentativeness of primary data»; «Predictive analytics» - «False forecasts due to unrepresentative primary data».

The identified systemic gaps in risk management, along with the confirmed close relationship between the significant capabilities of AI and its inherent risks, make it necessary to fundamentally change the approach to the introduction of technologies in the public sector. The key conclusion of this study is that sustainable and socially responsible AI-based GovTech development is possible only if the principles of «Trusted AI» are unconditionally prioritized at all stages of the systems' life cycle [23; 22, p. 126]: from concept and development to implementation, operation and monitoring. This concept is now presented as a certified technology that provides functionality and security, and as an algorithm endowed with

⁴ 30 regions have started to use online cameras for tracking the removal of waste. URL: <https://iz.ru/1834656/2025-02-06/v-30-regionah-nacali-ispolzovat-onlain-kamery-dla-slezhenia-za-vyvozom-othodov> (access date: 28.09.2025).

human and social trust to perform certain functions by analogy with the trusted person. It complies with all relevant laws and regulations («responsible AI»), follows ethical principles and values («ethical AI») and ensures the technical and social sustainability («useful AI») of the system [23, p. 61, 56]. In practice, the mechanisms of implementation of «Trusted AI» can be: introduction of mandatory audit of algorithms before and during their operation in the public sector; creation of ethics committees at key institutions, responsible for project evaluation of algorithmic bias and other ethical group risks; development and approval of common data quality standards used to train public sector models.

Moreover, ethical responsible implementation of AI in the public sector should conform to the following six key dimensions [24, pp. 37-39]: transparency (hybrid decision-making models, «Human-in-command» approach, i.e. «Man-in-chief»), fairness (development of codes of ethics for AI), privacy protection, public participation, accountability (principle of «experimental proportionality» (limited test periods), audit of algorithms, disclosure of their work), education and awareness (specialized institutes at the intersection of IT, law and ethics).

All this implies the transformation of risk management systems of AI-solutions: from an optional or post-event activity, it should become an integral element in the public sector. This approach requires proactive identification and assessment of risks at the earliest stages of design; actual, not merely stated, application of the principles of fairness, explainability, security, privacy and accountability when implementing AI solutions through improvement of the regulatory framework; targeted development of digital competences of government employees and support of domestic developers, as well as creation of transparent mechanisms for forming a positive public opinion on digitalization of the state sector and for auditing AIdecisions.

It should be considered that at each stage of the AI system's life cycle, the risks of different groups will prevail in the public sector. Thus, in the design phase, legal and ethical risks are key (assessment of the suitability of the technology for a particular task, compliance with legal standards and ethical principles); in the development phase - technical (correctness of architecture, quality and representativeness used in testing data sets); implementation and exploitation - social (loss of public sector jobs, low qualification

of civil servants, digital inequality) and technical risks (the model does not work adequately in real conditions, cyber attacks, high cost of implementation and updating AI-systems); finally, during the monitoring phase, legal (inconsistency of the model with changing legislation) and ethical risks become critical (identification of unexpected negative consequences during long-term use). Only the systemic integration of risk management into the AI lifecycle will help unlock the GovTech's potential while minimizing potential harm.

■ DISCUSSION

The results of the comprehensive analysis confirm the thesis that underestimating the systemic risks of AI implementation in the public sector can cause serious damage to both the state and individual citizens. Simultaneously, this research presents several notable limitations, mainly attributed to the qualitative aspect of the analysis, which relies on secondary information sources. Although this has identified a range of key issues and their interrelationships, it does not provide a quantitative assessment of the extent of risks or the comparative effectiveness of measures to minimize them, and may not reflect the internal aspects of the implementation of specific projects. Moreover, the dynamic nature of the field of digital technologies and, in particular, artificial intelligence in GovTech, the gradual improvement of laws, leads to a rapid loss of relevance of scientific research. The implementation of technology solutions and regulatory framework (both global and national) may change significantly in the short term, which means that the findings of this study reflect the situation at the time of analysis (August 2025) and require periodic updating as the technology and regulatory environment evolve. These limitations form clear priorities for further scientific research. Most important is an empirical assessment of the real impact of AI in the public sector, comprising both a measurement of the actual reduction of transaction costs and an analysis of social consequences (citizen trust indicators, actual cases of algorithmic bias (discrimination) and personal data leaks from state digital platforms). In addition, it is necessary to conduct a comparative analysis of the effectiveness of different regulatory and ethical approaches to the use of AI in different jurisdictions, as well as the perception of technologies by key stakeholders (citizens and civil servants) to develop socially acceptable implementation strategies.

Simultaneously, notwithstanding certain limitations, the findings of the study offer a significant contribution by creating a comprehensive understanding of the landscape of AI opportunities and risks within GovTech. It highlights systemic deficiencies in existing risk management practices and reinforces the necessity of incorporating the principles of «Trusted AI» throughout all phases of the systems life cycle.

■ CONCLUSION

This article delivers a detailed exploration of the prospects for integrating artificial intelligence into the public sector, as outlined by the GovTech concept. It focuses on recognizing essential opportunities, the risks that accompany them, and the significance of implementing AI responsibly. The relevance of the topic stems from the rapid digitalization of the GM system, where AI acts as a powerful driver for efficiency, service quality and transparency, simultaneously generating complex challenges that require systemic thinking.

The analysis allowed to systematize diverse areas of AI application in GovTech in various spheres of public administration (social, health, transport and urban infrastructure, law enforcement and public administration). The authors highlighted the significant potential of digital technologies in management decisions, in the application of predictive analytics to reduce transaction costs, and in personalization of state and municipal services for citizens. At the same time, a detailed risk map covering social, legal, technical and ethical aspects was developed. Another vital outcome was the discovery of a dialectical

connection between notable AI capabilities and the inherent risks they pose, indicating that the realization of extraordinary technological benefits often involves mechanisms that may cause irreparable harm to both the state and its citizens, thereby threatening national security.

The investigation into the integration of AI in the public sector has highlighted systemic challenges in managing the associated risks. Key issues identified include a regulatory and legal framework that is lagging behind technological progress, the establishment of ethical principles, the presence of algorithmic bias and discrimination, an inadequate level of decision-making transparency, low digital literacy among public officials, and concerns regarding data quality and the safety of data collection processes. These gaps, along with the proven close connection of opportunities and risks, led to a key conclusion of the study: sustainable and socially responsible AI-based GovTech development is possible only if the principles of «trusted AI» are unconditionally prioritized. The essence of the proposed solution is to transform risk management from an optional activity into an integral, built-in element of the entire AI life cycle in the public sector.

Despite the limitations associated with the qualitative nature of the study and the reliance on secondary data, the work achieves its objective. Thus, the study contributes to scientific understanding of the prospects for responsible AI implementation in the public sector, providing a conceptual basis for further empirical and theoretical research in this dynamically developing field.

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