Prospects to create and apply artificial intelligence in the activities of public authorities

G M Kadyrova\(^1\), Y N Shedko\(^1\), L A Orlanyuk-Malitskaya\(^1\) and D V Bril\(^1\)

\(^1\)Financial University under the Government of the Russian Federation, 49 Leningradsky Avenue, Moscow, 125993, Russia

E-mail: GMKadyirova@fa.ru

Abstract. The article is devoted to the research of conceptual sources to create and apply artificial intelligence in the activities of public authorities. The author systematizes scientific developments on application of artificial intelligence, robotics, computer technologies and other information tools in the activities of public authorities. The concept of "intellectual management" has been reviewed and its importance for implementation in the activities of public authorities has been determined. The history of global intellectual governance development is described. The world positive and negative experience of introducing cyberdemocracy, electronic government, electronic requests and other technologies in public administration was analyzed. Prospects for governance intellectualization in public authorities of the Russian Federation have been defined. It has been found that attempts to intellectualize governance are being actively introduced on a global scale, but this process is time-consuming and has many obstacles which the study is focused on.

1. Introduction

One of the priorities of public administration development in the Russian Federation is to introduce intellectual governance mechanisms in activities of public authorities, the implementation of which will contribute to transparency of relations between the government and society, increase the effective performance of functions by officials, improve public services provided to the population in the context of service-oriented national public policy in accordance with the European standards, democratization and ensuring the electoral process integrity. Intellectual governance is rather new both for the Russian Federation and around the world. Introduction of information, digital and computer technologies based on artificial intelligence, robotics, etc. into the public administration system has both benefits and threats. The key benefits include fast processing and interoperability of large databases, analytical work performance, cooperation between different departments and branches of government regardless of their territorial location, etc. The risks of intelligent management are that the creation of a single information space with automated data processing systems is a danger associated with cyberterrorism, unlawful acquisition of personal data of citizens, intelligent system failure and loss of important data. In this regard, it is relevant for the study to carry out an analysis of scientific research and the world experience in introduction of intellectual management mechanisms in the activities of public authorities, which will become a valuable asset regarding the ways of further solving of this problem in the Russian Federation, choosing the ways to implement these mechanisms and methods to overcome the risks of their practical application.
Problems of intellectual management were studied in the works of L.N. Alekseyeva [1], I V Guseynova [2], N.L. Krasnyukova [3], V. A. Nikiforova [4], A. Yu. Peskova [5], N.K. Padyuk [6; 7], S.E. Prokofiev [8], G.F. Ruckina [9], I. N. Rosenberg [10], E. Toffler [11], M. Hagen [12], R. Hollander [cited by 12], et al. The previously unresolved parts of a common problem were defined. Scientists established the nature and characteristics of “intellectual management” - it is a scientific area which combines mathematical knowledge, logic, systematic analysis skills, etc. [10, p. 27]. Intelligent management mechanisms are the introduction of techniques, intelligent technologies (artificial intelligence, robotics, etc.) into the management process [4]. Despite the fact that society actively introduces technological advances in its life, the question remains how intellectual technologies can be used in public administration to improve interaction between state authorities and society.

The aim of the article is to study the evolution and prospects of artificial intelligence use in the activities of national public authorities.

The history of intelligent governance systems goes back to the first attempts to create artificial intelligence (hereinafter AI), which developed as a science and technology creating smart machines. John McCarthy was a pioneer in this area. In 1956, he took part in the Dartmouth College Conference, where the use of intelligent machines to study human intelligence was discussed [14, p. 4]. Attempts were later made to define the role of AI in governance. In particular, M. Minsky defines that AI is a tool to create programs that can be used to solve problems involving human intellectual efforts [14, p. 4].

Intelligent governance is based on AI methods. The evolutionary outcome of further developments in this area was robotics creation. Smart robots were created to automate processes and facilitate human work. Robotic tools combined knowledge of microelectronics, physics, computer technology and other scientific fields. L.N. Alekseeva, determining the place of robots in the governance process, defines their main functions as a replacement for monotonic human labor and ensuring effective performance of complex physical processes [1].

Starting from 1980, intellectual governance evolution accelerated. This phase was marked by the rapid development of the Internet, information and communication technologies. Proliferation of these technologies has completely changed the forms of international relations which have made more intense and reactionary due to this process. [15] The late 20th and early 21st century was marked by the intelligent governance system introduction into commercial activities. Robotization and automation in managing companies and enterprises have improved business environment analysis, monitoring any changes in the enterprise, market control and consumer needs [16].

According to Narrative Science, at the beginning of the 21st century the use of AI and robotics around the world increased by 60%. In 2017, 61% of companies and enterprises operating in various economic sectors introduced AI into their operation. In 2018, 71% of companies and businesses claimed to be developing their own strategies to further improve AI technologies and their business; 59% of companies started to invest a separate budget to introduce AI [17].

Having developed in the sphere of economics, intellectual management processes have spread to the sphere of public administration. The American researcher E. Toffler, studying the intellectualization features of public administration, introduces the term cyberdemocracy. The scientist emphasizes that the use of computer technologies, mobile phones and smartphones, tablets and other robots can become the basis for the state to develop its own political decisions closely cooperating with the public. It can be stated that E. Toffler actually predicted the interest of the world powers in introducing intellectual mechanisms for managing the processes of interaction between authorities and society in the 20th-21st centuries [11].

The term “cyberdemocracy” became common in the United States in 1969. It was the result of the ARPANET global network emergence and its rapid spread, which became a prototype of the modern Internet. However, despite the positive attitude towards governance intellectualization, a German researcher Martin Hagen notes that most governments are skeptical of this issue [12]. In his book Videodemocracy (1985), researcher R. Hollander reveals the ideas of governance intellectualization
adopted by national public authorities. This scientist states that robotics and computer tools are the basis for implemented direct democracy in the state [cited by 18].

R. Hollander’s studies have also encouraged postindustrial scientists to get engaged in research on the possibilities to introduce new information and digital technologies in order to improve the efficiency of public administration. However, these studies were then fragmented. Researchers J. A. Taylor and X. Williams reviewed the experience of using these technologies in various countries. In particular, in the 1970s in the United States in Indiana, citizens got the opportunity to register vehicles via the Internet network. According to researchers, at this time Americans gained access to the Internal Tax Service and the opportunity to file electronic declarations [19].

The term "information bureaucracy" appeared in the 1990s. H. Yates argues that there is now a need to modernize the bureaucratic government using digital management techniques that have been widely used in the private sector. The use of information tools and digital technologies has reduced pressure on citizens, which has been associated with traditional bureaucratic procedures when doing the paperwork, etc. [20].

Due to the increased interest in intellectual governance mechanisms introduction, the scientist T. Yanovsky developed a four-component model of the governance digital evolution: the "digitization in government" component; the "government transformation" component, the "attraction and dissemination of e-government" component, and the "contextually-based intellectual governance controlled by authorities" component. The scientist emphasizes that each of these components depends on many factors, and therefore is characterized by instability. In particular, according to T. Yanowski transition of the government from traditional to intellectual governance mechanisms depends on the structure of political power in the country, organizational peculiarities of central and territorial authorities, political situation in the country, etc. [21]. In 2014, L. Luna-Reyes and J. Gil-Garcia proposed a theory of the overall evolution of intellectual technologies and mechanisms to transform the government. Scientists focus on the fact that intellectual management changes the internal government work primarily, not interaction with society only. Thus, researchers note that the governance intellectualization changes cooperation between all public authorities. This interpretation should be based on when considering intellectual management as a mechanism to transform the work of the government [22]. The Russian researcher A. Kosorukov notes that the primary application of intellectual technologies was aimed to accelerate the exchange of information between the state and society. Through the governance intellectualization, it has become possible to quickly finalize any government issues between structures and divisions, and the interaction of authorities with the external environment has changed. Governance intellectualization has become an incentive to release the pressure from the state structures and has contributed to the reduced bureaucracy. The researcher notes that as a result of such a technocratic administration development, the government is given every opportunity to move towards more transparent governance and free access to public information. [23]

The Canadian researcher A. Clark notes that introduction of intelligent mechanisms into public administration is a necessity in the age of cutting-edged digital technology. Through intelligent governance, governments will be able to use social media to share information, mobilize public support, access common platforms, etc. [24].

2. Materials and methods
To write this article, popular scientific, private and special methods to study technological phenomena and processes taking place in the sphere of public administration were used: retrospective, logical, analytical, systematic structural, analysis and synthesis, deduction and induction, comparison, statistical, modeling, etc. The information base was composed of scientific works, articles published in printed russian and foreign publications on issues of intellectual management; notes, reviews, statistical materials, etc., on the internet, including on the use of artificial intelligence, robotics, computer technologies and other information tools in the activities of state bodies.
3. Results and discussion

Intelligent management mechanisms were applied in 2002 in the United States when the Help America Vote Act was adopted. Adopting this law, Americans used sensory technologies at polling site commissions from which data were transmitted to the central server. Intellectual management mechanisms were tested in Russia in 2018. During the elections, vote count was carried out using automated ballot processing. As a result of the use of intelligent management systems, the risk of fraud when counting votes was reduced. In 2017, smart management practices based on intellectual technologies were applied in the Kyrgyz Republic, with 374 electronic ballot boxes installed during the elections. However, it is worth noting that some countries, in particular Brazil, have had negative experience in implementing intelligent management systems. When using electronic ballot boxes, some of them failed to function for technical reasons, and they had to be replaced accordingly. This shows that there are some problems in terms of technical support for mechanisms ensuring such type of management.

Of interest is the experience of introducing AI into anti-corruption. Thus, since 2012 the People's Republic of China carried out an experiment to introduce "Zero Trust" AI into the anti-corruption system developed by the Academy of Sciences of China together with the regulatory authorities of the Chinese Communist Party. AI was tested in only 1% of China. The experiment involved provision of an access for the Zero Trust system to reach extensive central government and regional databases to analyze data on officials. It has been found that AI transaction tracking and withdrawal systems can cover almost all untargeted spending. All that used to require enormous financial and labor costs - checking tons of declarations, requests to the agencies, identifying and comparing discrepancies in income and expenditure - can be fulfilled by the machine intelligence. Thus, the system showed high efficiency in detecting corruption violations. However, the developers stress that the disadvantage of the project was that the technology signaled only possible cases of corruption against particular officials - without a detailed explanation of why a particular conclusion was drawn.

Many countries have a common interest in exploring AI as an anti-corruption tool. AI's ability to identify patterns, classify information, or predict results based on large and complex data turns it into a potential tool to eradicate corruption.

There are many examples of efficient, cost-effective and reasonable use of AI, from tax authorities using AI to detect tax fraud to government agencies using AI to perform recurring and time-consuming formal procedures. There are also opportunities to use new technologies and AI to develop processes that deliberately or non-deliberately reduce the risk of fraud or corruption. For example, mobile banking protects digital transactions, which are not only easier to track but they also facilitate people's transfer from the invisible to the visible sphere. The lack of digitized data is a major obstacle to introduce AI into anti-corruption activities.

In addition, in the civil servant cash allowance system or the remuneration system, the shift from physical cash to digital funds using credit cards or mobile money has increased security and reduced fraud. When a transaction flow is digitized, it can also be tracked. IBM researchers are working with Kenyan government to rise in the Ease of Doing Business ranking. One measure was to reduce the number of interactions with the government required to start a business. During the project, the number of contacts was reduced from 11 to only three simplified steps. They also plan to explore the role of AI and blockchain technology to improve public service delivery. The term "corruption" is not mentioned, but this may be an alternative way to use technology to fight fraud or reduce the risk of corruption. Since the beginning of the project the country has risen from 92nd to 61st position in the rating.

Anti-corruption AI systems are also used in Germany. The Berliner Zeitung report indicates that the Berlin Administration's public administration office operates a system that was launched in 2017. AI IBM Watson system tracks payments and detects violations. According to the Main Anti-Corruption Task Force headed by Attorney-General Rudiger Reiff, this system recognizes whether the official makes payments that are slightly below the allowed limits. The system also recognizes permits that are issued too quickly or uncommon bookings, such as those made after 8 pm or on weekends.
Before the system was introduced, corruption auditors could recognize such incidents only by accident.

Estonia has had effective experience implementing intellectual governance in the activities of state authorities. In 2005, the country counted votes through electronic means for the first time, and the process of interaction between society and authorities was carried out through a computer network. As a result, 31% of citizens used computer and Internet technology to vote. The dynamics of the increase in the number of Estonian citizens who voted through the Internet is shown in Figure 1.

![Figure 1. Number of residents who voted on the Internet, 2005-2019 (compiled by the author according to the Estonian State Election Commission).](image)

It is obvious that the intellectual governance mechanisms applied by state authorities should be aimed to form relations between the government and citizens based on one of the types of interaction (Figure 1). In the Russian Federation, introduction of intellectual management mechanisms in the activities of state authorities is still at its early stage of development. This is caused by the fact that the active and widespread use of intellectual technologies implies the acquisition of the appropriate Internet skills for most Russians. At the same time, today the Russian Federation has all prerequisites for further development in this area. In the Russian Federation, almost all public authority representatives at different levels have created their own websites. But it is not the formal presence of authorities on the Internet that becomes relevant, but interaction between power and citizens, primarily through the management of public service delivery in the context of service-oriented state policy using the latest technologies, as well as interaction between authorities and business, including cluster-based mechanisms.

Today, AI technologies, robotics, computer technology, and the Internet are widely used to intellectualize the processes of automatic content generation, such as news content; social network content; advertising content; even the banking system content. The use of chat bots has contributed to the speed of obtaining information from citizens. Experts predict that most sectors of socio-economic and socio-political life in the Russian Federation and around the world will have become intellectual by 2020. A bright example of governance intellectualization in the Russian Federation is the use of these technologies in the medical area. Using various mobile applications and computer technology, the Russians have gained access to data on their health and have the opportunity to contact doctors through computers and consult them.
(1) Interaction between public services and society;

(2) Interaction between the state and existing business structures in the country;

(3) Interaction between public organizations and its personnel, i.e. cooperation between different departments within the same organization or between employees of different public organizations;

(4) Interaction between central and local public authorities.

Figure 2. Types of interaction between the government and citizens in the context of using intellectual governance mechanisms by public authorities.

Summarizing all above-mentioned information, it should be noted that introduction of intellectual governance mechanisms in the activities of public authorities is in its early stage of active development. The study has proved that the basis for this was scientific research and development to create artificial intelligence, robotics, etc. Today, intellectual management mechanisms are introduced into the commercial area, medicine, environmental sphere, public utilities. In particular, attempts to intellectualize the election process and introduce electronic democracy were made by such countries as the United States, Estonia, Kyrgyzstan and others. Estonia continues its active development in this area. The study shows that the Russian Federation is trying to introduce intellectual management mechanisms in some areas, but this process is not easy to implement further so far due to the lack of a state program on AI development. 19 countries (including the United States and China) have already developed or are currently preparing national strategies for AI system development.

In addition, we conclude that artificial intelligence is an effective tool to fight corruption due to the ability to analyze a large amount of data in a shorter period, as well as lack of interest. Traditionally, due to the large amount of data it is difficult to reveal corruption. However, digitalization and big data popularity has led to new methods of data management aimed to prevent fraud and abuse in the public sector. Fraud analytics is now capable to identify patterns of suspicious transactions in such areas as taxation and health care, and by means of real-time detection fraud can be detected, stopped and eliminated, leading to billions in potential savings.

The experience of foreign countries shows that artificial intelligence cannot work on its own, it is just a tool in the hands of a human who sets the required parameters and it needs highly qualified specialists to create a properly functioning system with a minimum number of errors.

It should also be noted that the new President of Ukraine has just conducted the first-ever successful virtual election campaign. Vladimir Zelensky did not arrange any face-to-face campaigns, did not make speeches, did not hold meetings, avoided trips around the country, did not give press conferences, avoided in-depth interviews with independent journalists and until the last day of the election campaigning did not get into arguments. Before running for the office, Zelensky was all-pervasive on Ukraine's most popular 1 + 1 television network, filling up hours of weekly programs with his variety shows, comedy talent contests and series about the president - Servant of the People. When he announced his candidacy in a 2019 New Year's Day promo-video after opinion polls revealed him to be one of the favorites, many people assumed he would run a typical celebrity campaign full of public appearances and speeches. However, Zelensky's virtual strategy allowed him to make vague promises and avoid detailed policy positions. Unlike President Donald Trump, who held regular rallies and appeared in television debates, Zelensky avoided human contact with his electoral base. He reached out to voters through YouTube and Instagram short posts, as well as TV appearances. One of his online videos calling for debates, which he postponed to publish until the last
minute, gained 14 million views. Some voters even seem to identify him with a character, a schoolteacher whose viral YouTube joke against corruption and government incompetence makes him the Ukraine’s chosen president. A peculiarity of his campaign also involved his seeking voters’ advice on the website of the campaign, and his online-published platform contained only a few general proposals, each focusing on key issues on security, economy, health, education and anti-corruption. The experience of today’s elections in Ukraine shows that the Internet-created parties with no functionaries are much more attractive to citizens. This trend is evident and, in my opinion, it clearly indicates the new role of the Internet in statehood development (or stagnation vice versa). Information technology fundamentally changes our world order. And this is the key factor in the need to use artificial intelligence in the activities of public authorities - the modern state cannot exist without its active use.

4. Summary
Thus, artificial intelligence technologies are one of the key areas of technological development that determine and will continue determining the future of the whole world. Artificial intelligence mechanisms enable rapid, real-time decision-making based on the analysis of huge amounts of information, the so-called “big data”, which offers enormous advantages in quality and performance. Such advances will undoubtedly have an active impact on the lives of citizens in the strategically important to the state areas: economy and productivity, efficiency of management, education, health care, defense capacity and everyday life. In this regard, it is required to form effective legal regulation of data turnaround, advanced infrastructure for its processing and storage, as well as to propose informed decisions that will allow to use data to create artificial intelligence algorithms. Finally, the most important issue is the extent to which the society and citizens are ready to introduce such technologies widely. Broad-based digital education and re-education programs are required to be initiated.

5. References
[1] Alekseeva L N 2019 Application areas of the latest electronic technologies in public administration (Journal of the Plekhanov Russian Economic University) 2 191-197
[2] Guseynova I V, Mishura L G 2020 State Development Institutions as a Tool for Creating New High-Tech Markets (Modern Economy Success) 1 137-143
[3] Krasyukova N L, Rozhdestvenskaya I A, Eremin S G, Galkin A I, Alyautdinov N F 2018 Legal Regimes for State Property Management. Regimenes legales para la gestión estatal de la propiedad (Utopía y Praxis Latinoamericana) 82 302-309
[4] Nikiforov V O, Slita O V, Ushakov A V 2011 Intellectual management under uncertainty. St. Petersburg: ITMO St.Petersburg State University
[5] Peshova O Y, Polovko I Y, Fateeva S V 2014 Review of approaches to electronic voting organization (SFU News. Technical Sciences) 2 237-247
[6] Popadyuk N K et al 2018 Features of Financial and Legal Incentives of Investment Activities in the Regions (Journal of Advanced Research in Law and Economics) 1 210-218
[7] Popadyuk N K, Rozhdestvenskaya I A, Eremin S G, Galkin A I, Komov V E 2018 Legal Aspects of Municipal Service in Territory Development Programs (Aspectos legales del Servicio municipal en programas de desarrollo territorial) 82 311-318
[8] Prokofiev S E et al 2018 Professional Development of Civil Servants of Russia: Legal and Organizational Aspect (Journal of Advanced Research in Law and Economics) 1 234-241
[9] Ruchkina G et al 2018 Norms of Soft Law as a New Source of Financial Law of Russia. (Journal of Advanced Research in Law and Economics) 1 278-286
[10] Rosenberg I N 2016 Intelligent Transport Systems Management. (State Councillor) 3 26-32
[11] Toffler E 2004 The third wave. ACT publishing house. Moscow
[12] Hagen M A Typology of Electronic Democracy. Web site Martin Hagen. http://martin-hagen.net/publikationen/elektronische-demokratie/typology-of-electronic-democracy (date
[13] Clarke A, Lindquist E A, Roy J 2017 Understanding governance in the digital era: An agenda for public administration research in Canada (Canadian Public Administration) 4 https://onlinelibrary.wiley.com/doi/full/10.1111/capa.12246 (date of the address: 07.05.2020)

[14] Minsky M 2006 The Emotion Machine Simon & Schuster

[15] Villani C. For a Meaningful Artificial Intelligence towards a French and European Strategy 2018 (Official website of the EU) https://www.aiforhumanity.fr/pdfs/MissionVillani_Report_ENG-VF.pdf. (date of the address: 11.05.2020)

[16] Raso F et al 2018 Artificial Intelligence & Human Rights Opportunities & Risks

[17] Outlook on Artificial Intelligence in the Enterprise: report Narrative Science 2019 (National Business Research Institute) 2 12

[18] London S Electronic Democracy 2019 http://www.scottlondon.com/reports/ed.html (date of the address: 17.05.2020)

[19] Taylor J, Williams H 1991 Public Administration and The Information Polity (Public Administration) 96 171-190

[20] Ates H, Bozali S 2005 Public Administration in the Information Age: Tow ards an Informatised Bureaucracy (Kocaeli Universitesi Sosyal Bilimler Enstitiisu Dergisi) 10 46-68

[21] Janowski T 2015 Digital government evolution: From Transfonnation to contextualization (Government Information Quarterly) 32 221-236

[22] Luna-Reyes L F, Gil-Garcia J R 2014 Digital government transformation and internet portals: The co-evolution of technology, organizations, and institutions (Government Information Quarterly) 31 545-555

[23] Kosorukov A A 2017 Digital Government Model: Theory and Practice of Modern Public Administration (Journal of Legal, Ethical and Regulatory Issues) 20 2-10

[24] Clarke A, Lindquist E A, Roy J 2017 Understanding governance in the digital era: An agenda for public administration research in Canada (Canadian Public Administration) 4 https://onlinelibrary.wiley.com/doi/full/10.1111/capa.12246 (date of the address: 19.05.2020)