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SOCIAL-ECONOMIC ASPECTS OF THE IMPLEMENTATION OF NATURAL INTELLIGENCE TECHNOLOGIES: Part 2 - NATURAL INTELLIGENCE IN GOVERNMENT

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Abstract. The purpose of this article is to investigate the application of artificial intelligence (AI) in public administration. Following up the research of M.V. Fedorov [38-41], which provides an overview of the global effects of AI implementation, covering socio-ethical aspects, economic impact and regulatory framework for sustainable development strategies, the present paper focuses on the key factors that define the framework for the use of AI in public administration. The paper considers AI as part of the overall process of technological development and explores the links between AI and other areas such as computing technology and data collection techniques. Particular attention is paid to the analysis of international and Russian experience of implementing AI in public administration. The authors seek to develop recommendations for further development of this industry based on the experience gained. They also consider approaches that may lead to the development of strategic principles focused on long-term predictions of the effects of AI in optimising public administration, and the subsequent implementation of appropriate regulatory practices. Thus, this article seeks to provide an overview and analysis of the main aspects of the use of AI in public administration with a focus on international and Russian experience, and to offer recommendations for the further development of this field.

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Introduction

With the development of the modern information age, digital technology has integrated into all areas of social relations, becoming an integral part of life itself for many people around the world. The term 'artificial intelligence' (AI) has gained widespread popularity and general adoption, penetrating into areas ranging from retail outlets, restaurants to public transport, mobile apps, and even trying to gain a foothold in creative niches, such as the arts. Users of modern devices with AI apps demonstrate excellent performance in image processing functionality, text recognition and translation, and the application of neural networks to create unique graphical and textual content. It should be noted that AI brings with it not only enormous potential for new opportunities and a new level of entertainment, but also presents a number of significant risks and challenges [17]. The revolutionary changes resulting from the application of AI in social, economic, scientific and other spheres require a balanced public policy aimed at the effective management, implementation and regulation of these technologies [5]. Based on the said above, we believe that prior to the widespread introduction of AI into public administration there is a need to develop performance criteria for public policy in this area. It should be noted that the introduction of AI into public administration should not be done in isolation from the technological and regulatory aspects. Instead, it should be seen as an organic process, building on existing achievements and experience in other areas, and interlinked with the overall public policy for the development and implementation of AI. However, the task of developing and monitoring the effectiveness of public policy in this area is a complex process due to several factors:

a) The rapid speed of change and adoption of technologies: the time from their emergence to widespread use can be only a few months or even weeks. This creates a situation where public policy measures and related regulations become obsolete too quickly, sometimes even before they are implemented;

b) The rapid scaling up of technologies through the development of the Internet and big data: modern technologies can spread rapidly through access to large data sets and the development of a global network. This poses a challenge for public policy as it must a priori be sufficiently flexible and able to adapt to the rapid development of technology.

c) Cross-border nature of technology: The development of the Internet and remote methods of developing software algorithms allows technology to exist without reference to specific geographical boundaries. This means that public policy must also take into account the cross-border nature of these technologies and include measures capable of effectively regulating and monitoring their use.

Given these factors, developing and monitoring the effectiveness of public policy on AI is a complex task that requires flexibility, responsiveness and a cross-border approach to effectively regulate and manage these rapidly evolving technologies.

There is a significant difference in the interests of countries that are currently leaders in the development of AI, such as the US, China and others, compared to those of other countries, including the Russian Federation. This factor is important to consider as historical and foreign experience in the development of national high-tech policies is not always applicable in this case. Thus, the present paper, which tries to analyze and comprehend the results of the state policy in the field of AI in the Russian Federation during the recent years, becomes relevant. The paper proposes an approach based on an analysis of the profile literature, existing standards and regulations in the field of public policy in the Russian Federation regarding the implementation of AI technologies, as well as achievements and growth projections in the field of AI for the period up to 2030. In addition, there is a comparative analysis of the development of this field abroad, with a main focus on China and the USA. The purpose of this paper is to study the specifics of the implementation of the state policy of the Russian Federation in the field of AI and to develop a set of proposals to improve its effectiveness.

In the course of this study, a systematic analysis was carried out to identify the characteristic features of the main vectors of implementation and development of the AI technology stack in public administration. The main methodological approach was to analyse the current literature, existing standards and regulations in the field of public policy of the Russian Federation on the implementation of AI technologies, as well as a comparative study with similar development strategies of leading states in this area and global trends. Based on the results obtained, a number of practical recommendations for improving the effectiveness of public policy in this area have been proposed.

A brief overview of approaches to shape goals for further implementation of AI in public administration

AI represents an advanced, end-to-end technology that has an impact on all areas of life. Its widespread use is redefining the way we integrate information, analyse data and use the results to improve decision-making.

One of the most significant and promising areas of interaction between business entities is the connection in the field of legal regulation of AI, which forms the basis of any public policy in this area. This circumstance is primarily due to the innovative nature of the object of regulation, as the application of AI replaces human activity in many aspects [18]. However, such application meets difficulties in the legal qualifica-

tion of AI [34]. Ambiguity in defining the legal status of AI has been noted in a number of foreign studies [69]. The field of ethics and safety of AI is also gaining importance. It highlights the need for responsible design and implementation of AI systems in public administration [69]. Research on the legal regulation and ethics of AI is relevant and important because it contributes to understanding and adapting legal norms and regulatory approaches to the new challenges posed by advances in AI.

A brief overview of the legal regulation of artificial intelligence in Russia

Russia is currently actively working on the development of documents, standards and regulations governing the use and application of AI [33]. This process has its own history, reflecting the main steps taken towards the introduction of AI at the state level in Russia.

In January 2019, the President of the Russian Federation Vladimir Putin, following a meeting of the Supervisory Board of the Agency for Strategic Initiatives to Promote New Projects (dated 15 January 2019), commissioned the development of approaches to a national strategy for the development of AI in Russia. The Government of the Russian Federation, together with Sberbank and other interested parties, was appointed responsible for the development of this strategy.

In May 2019, the establishment of the Technical Committee for Standardisation of AI (TC-164) was announced. The main task of the committee is to bring together relevant organisations, educational institutions, research organisations and authorities to address standardisation issues in the field of AI, develop quality criteria for AI systems, prepare definitions and terminology, and work in the field of information security at the national, interstate and international levels.

On 10 October 2019, the President of the Russian Federation signed Decree No 490 "On the Development of Artificial Intelligence in the Russian Federation". This Decree also approved the National Strategy for the Development of AI for the period until 2030. In February 2020, Moscow launched an info system that includes AI projects, including both domestic and international practices. In the same year, an experimental legal regime regulated by the first law of its kind on AI came into force in Moscow City in order to create the necessary conditions for the development and implementation of AI technologies in Moscow - the Federal Law "On conducting an experiment to establish special regulation in order to create the necessary conditions for the development and implementation of artificial intelligence technologies in the subject of the Russian Federation - Moscow City and amending articles 6 and 10 of the Federal Law "On personal data" of 24. This project is designed for five years and aims to create favourable conditions for the implementation and development of AI technologies with a view to further scaling up.

In July 2020, the concept of AI regulation was presented, which implies the need to solve existing problems in the legal regulation of AI and robotics. The work to create a legislative platform in this area is ongoing. On August 19, 2020, the Government of

the Russian Federation Order No. 2129-r approves the Concept for the Development of the Regulation of Relations in the Sphere of AI and Robotics Technologies until 2024. The document is designed to define the norms according to which the regulatory activities will be developed in the future.

In addition, an important step was the approval of the Federal Project "Artificial Intelligence" by the Government of the Russian Federation in August 2020. The aim of the project is to create favourable conditions for businesses and citizens to access products and services based on AI technologies of high quality, predominantly based on domestic developments.

Simultaneously with the approval of the federal AI project, a total of RUB 12 billion was announced to support small IT companies engaged in projects in the field. The presented state aid scheme is intended for more than a thousand startups and will be in effect for four years.

At the regional level, the development of AI systems is also being actively pursued. For example, in November 2020, the Governor of St. Petersburg signed Decree No. 90-pg, which establishes a world-class research and education centre "Artificial Intelligence in Industry" and the supervisory board of the research and education centre. The main task of the centre is to develop and implement AI technologies to meet the urgent needs of the Russian economy, which is gradually transitioning to innovative "digital rails".

In order to overcome regulatory and technical obstacles to the implementation of federal AI projects in the Russian Federation, a "Prospective Standardisation Programme for the 'Artificial Intelligence' priority area for the period 2021-2024" was approved on 22 December 2020.

The Russian government has also actively allocated financial resources to support the development of the domestic AI industry. In March 2021, a total of 1.4 billion roubles was announced to support start-ups engaged in AI technology. In May 2021, the Government of the Russian Federation signed Resolution No. 767, which allocated a total of RUB 5.26 billion in subsidies for companies implementing AI systems.

In March 2023, new, very decisive steps were also taken to intensify the process of AI development in the Russian Federation. The Ministry of Digital Development, Communications and Mass Media (Ministry of Digital Development) announced the launch of large-scale grant competitions to financially support IT projects. The Russian Information Technology Development Fund (RTDF) is expected to allocate a significant amount of RUB 3.8bn by the end of this year. This will enable startups and digital technology companies to obtain the necessary funds to implement their ideas and developments.

In addition, as of January 2023, the agreement on the Roadmap for the development of artificial intelligence, signed by leading experts and industry representatives, came into force. The document defines the key areas and priorities of AI development for the coming years. It sets ambitious goals for the country and creates a foundation for sustainable development of the AI industry. Within this roadmap, special attention

is paid to the development of the education sector. In 2022, several decrees were signed to support educational activities in the field of AI, which should strengthen the education and training needed for the development of the AI industry.

In September 2022, the launch of the National Artificial Intelligence Development Centre under the Government of the Russian Federation was announced, with the Higher School of Economics as the location. The Centre was established to facilitate the implementation of the Federal project "Artificial Intelligence" and is a platform for selecting effective solutions in the field of AI. It provides expert and analytical support for the implementation and development of AI in industry and the public sector, and coordinates the work of authorities, research institutes and the business community.

In order to boost the development of the industry, in April 2022, the Government adopted Order No. 714-r, which allocated significant funds of RUB 21.5 billion to support the IT industry in 2022. As part of this decree, it was also decided to increase the maximum amount of grants for digital technology projects.

All of the above measures and initiatives demonstrate Russia's serious intentions as a technological country on the AI track. The government actively supports and stimulates the development of the core industry, recognising its strategic importance and potential for the economy and society. Intensive implementation and use of AI algorithms and software solutions has already been observed in large organisations across the country. Russia is striving to become a leader in the field of AI, and all the steps and decisions taken are important milestones on this path.

The state policy of the Russian Federation in the field of AI is manifested in the intensive development of the legal and regulatory framework that ensures the implementation of this technology in all spheres of the social and economic life of the country. Over the past three years, from 2019 to 2022, relevant legal frameworks have been adopted at the federal and regional levels. The process began with an awareness of the importance of AI for the future development of the country. As part of this policy, a number of federal and regional regulations have been developed and adopted that define the rules and conditions for the implementation and use of AI. The aim of these legislative innovations is to create an enabling environment for the development of AI in all spheres of life. They regulate data protection, information privacy, responsibility for the use of AI algorithms, ethical and other important aspects.

Ontological problems in the field of AI

AI algorithms are already actively changing the world, with important issues arising for society, economics and governance. It should be noted that these changes are occurring exponentially, as the components of this technology are changing very rapidly, with revolutionary changes in the industry occurring within a few years. It should also be emphasised that the development and application of AI are cross-border processes with high speed and low barriers to scale. This raises a number of ontological

problems, largely because the process of describing new processes and phenomena associated with AI has not kept pace with the speed of development of these technologies.

The ontological challenges to the implementation of AI in public administration is one of the important aspects of current research in this field. Indeed, the issue of AI terminology is complex and often leads to misunderstanding and disagreement. The lack of a single agreed definition of AI creates uncertainty and makes it difficult to establish a common understanding of the phenomenon.

Characteristically, in the context of developing the first global international document, the Recommendation on the Ethics of AI, UNESCO has decided not to provide a formal definition of AI due to its constant development and change [77]. This reflects the difficulties in defining AI, especially in light of advances in neuroscience and cognitive sciences that require periodic review of scientific definitions of concepts related to intelligence and mind.

There are currently more than 100 definitions of AI in various expert communities, of varying degrees of vagueness and uncertainty. Typically, these definitions associate AI with machines capable of responding to stimuli, making decisions and solving tasks comparable to human intellectual activity. However, such definitions are not clear-cut and do not provide a complete picture of AI as a phenomenon.

In this regard, it was decided to use the terminology presented in the National Strategy for the Development of AI until 2030, approved by the President of the Russian Federation (Decree No. 490 of October 10, 2019). This definition of AI implies a set of technological solutions that allow imitation of human cognitive functions, including self-learning and search for solutions without a predetermined algorithm, and achieve results comparable, at least, to the results of human intellectual activity. The definition also highlights the importance of information and communication infrastructure, software, data processing and decision making in the context of AI. Recently, RAS Academician I.A. Kalyaev proposed a quantitative approach to measuring the "power" of AI based on the number of test intelligence tasks that an AI system is able to solve per unit time [66]. We believe this is a very interesting approach to develop a consistent system of terminology in the field of AI and related technologies. However, it should be recognised that the debate on AI definitions and terminology is ongoing in the expert community and new research and development may lead to revision and refinement of these definitions in the future.

It is also worth noting that the blurring of AI terminology is not the only ontological problem in this area. We note a number of other ontological issues that need to be addressed in the widespread implementation of AI in public administration.

- *Ontological ambiguity of data:* The implementation of AI in public administration requires the processing of large amounts of loosely structured data. A noticeable part of it is represented in textual form. However, there is a problem of ambiguity in the semantics and syntax of this data, which makes it difficult to interpret and use.

- *Ontological disconnect:* the different systems and applications used in public administration may have different ontologies and data structures, making integration and interaction between them difficult.
- *Knowledge formalisation problem:* The knowledge formalisation process required to deal with AI requires the definition of formal models and constraints, but in public administration there is difficulty in formalising complex and fuzzy concepts and policy processes. AI operates on the knowledge and concepts embedded in algorithms, but in public management there is a difficulty in defining and delimiting the kinds of knowledge that are needed for decision-making and appropriate action.
- *Feedback and learning challenge:* The use of AI in public administration requires the ability to adapt and learn from feedback and experience, with the challenge of providing a reliable and effective feedback and learning system. Moreover, learning implies reproducibility of results, but in many public administration issues, this is almost impossible to achieve (the system being managed is constantly changing dynamically).
- *Ontological transparency:* The implementation of AI in public administration raises the need to understand the algorithmic decisions made and their transparency, but problems arise in explaining and justifying the decisions made on the basis of complex AI models, including at the 'household' level.
- *The ontological problem in assigning ethical and legal responsibilities:* the introduction of AI into public administration raises questions of ethical and legal responsibilities, as there is a need to define responsibility for actions taken by autonomous AI systems. Robots should be slaves). However, ontological issues are crucial in defining these actions and processes, especially as a number of issues in this area are new (such as the issue of responsibility for the dissemination of deepfakes).
- *The ontology continuity problem:* The transition from traditional management systems to AI systems poses knowledge and process continuity challenges, requiring strategies for effective AI implementation and change.
- *The problem of a lack of ontology-literate experts:* Introducing AI into public administration requires experts capable of designing and managing AI ontology systems, but there is a lack of skilled professionals in this field.
- *Social perception problem:* Introducing AI into public administration can cause public resistance and misunderstanding, which requires public trust and transparency in the use of AI. In doing so, addressing ontological issues is key to building discussions with all layers and groups in society - from technical experts to the general public.

The role of ethical regulation in AI

AI algorithms are different from passive machines and many are capable of making decisions based on real-time data. They combine information from different sources, analyse it and take appropriate action. Modern data storage systems, high-speed processing of large amounts of information, machine learning algorithms and analytical techniques allow them to perform sophisticated analysis and make decisions.

This dynamic complicates the application of traditional methods of legal regulation such as laws, instructions, regulations and others. The ontological problems discussed above lead to additional difficulties. In the Russian Federation today there is only one federal law related to AI, namely the previously mentioned Federal Law №123-FZ "On conducting an experiment on establishing special regulation in order to create the necessary conditions for the development and implementation of artificial intelligence technologies in the subject of the Russian Federation - Moscow city of federal significance and amending Articles 6 and 10 of the Federal Law "On personal data". This is due to the fact that the legislation has not kept pace with the pace of innovation in the field of AI.

Thus, it is difficult to develop one universal approach to public policy and regulatory practices in this area, and often public administrations legalise an already established order of things. This problem is global and requires further research and the development of effective legal mechanisms to regulate AI in the future.

Moreover, there are diverse perspectives in different countries and expert communities on the legal regulation and ethics of AI. Many issues related to the subjectivity of AI, monitoring the use of technology and the protection of personal data are the subject of complex debates and require intensive discussion and more research.

In such a situation, soft law instruments such as ethical guidelines, codes and technical standards become very important. Ethical regulatory mechanisms allow the flexibility to fill regulatory gaps and thereby reduce the social and economic risks of implementing AI algorithm-based solutions. Technical standards, within their role, help ensure the necessary level of engineering and infrastructure safety when using AI.

Russia is actively working on the ethical regulation of AI. Our country was one of the first states to develop and implement national soft law - the Code of Ethics in the field of AI. The experience gained in preparing this code has been and continues to be used by Russian representatives in developing AI ethics documents within UNESCO and other international organizations. The findings on ethical regulation of AI are also reflected in the current state policy in the field of AI.

A primary focus on ethics is an important element of Russian public policy and helps to fill the gaps that remain due to the rapid development of technology and the lack of formal, i.e. traditional legal regulations. The focus on ethical regulation in Russian public policy in the field of AI, including the area of implementation of AI in

public administration, allows the creation of a framework in which the regulation and use of AI is carried out in accordance with ethical principles and values, promoting a responsible and sustainable approach to this technology.

Public policy mechanisms for introducing artificial intelligence in public administration

Motivational principles

Despite the problems discussed above, many governments are actively adopting AI in public administration, as the positive potential of this end-to-end technology more than outweighs the known and foreseeable risks. In this sense, a set of core motivational principles for the use of AI in public administration is well within reach.

These positive outcomes include the following:

- *Improving efficiency and productivity:* The use of AI in public administration can improve the efficiency and productivity of administrative processes, optimise resource allocation, improve the quality of decisions and accelerate their adoption.
- *Increasing the availability and improving the quality of public services:* AI can help to automate and streamline the delivery of public services, improving their accessibility and quality, as well as reducing the administrative burden on citizens and businesses.
- *Improved forecasting and planning:* the use of AI allows the analysis of large amounts of data and more accurate forecasts of future events, which helps in making more accurate decisions and planning long-term strategies in public administration.
- *Providing more accurate monitoring and control:* AI can be used to monitor social and economic processes, detect anomalies, provide early warning of crisis situations and increase the level of control in public administration.
- *Enhancing national security:* AI can be applied to detect and prevent threats to national security, such as cyber-attacks, acts of terrorism or acts of organised crime, raising the overall level of protection and security of national systems and infrastructure.
- *Increasing transparency and openness:* the application of AI can contribute to greater transparency and openness in public administration by enabling analysis and verification of decisions and actions based on AI algorithms.
- *Resource and budget optimisation:* AI can help to optimise government budget and resource spending by providing analytical tools and models to improve business processes and financial management.
- *Increasing citizen engagement in public administration and improving decision-making:* The use of AI can help improve citizen participation processes in public administration and decision-making, for example by providing access to information, analytical tools and platforms for discussion and collective decision-making.

- *Reducing risk and improving decision-making reliability*: AI can help reduce the risk of error and improve the reliability of decision-making in public administration, especially in areas where big data analysis and complex relationships need to be taken into account.
- *Fostering innovative development:* the use of AI in public administration can stimulate innovative economic and social development by enabling the development of new technologies, business models and supporting research projects.

International experience

There are already a number of examples of projects that have received recognition and positive feedback on the application of AI in the public sector:

1. *Estonian e-Residency project:* Estonia has raised the evolution of e-government to a new level, which includes the application of AI in various areas such as e-voting, e-government services (including an AI assistant functionality for citizens) and cybersecurity.
2. *Smart Dubai project:* the city is actively introducing AI into various areas of public administration, including transport, health, education and urban planning.
3. *City Brain project in Hangzhou, China:* It uses AI to manage urban resources such as transport infrastructure and public safety.
4. *AI Singapore Project:* AI Innovation Singapore works with government and companies to develop and apply AI in various areas, including health, transport and education.
5. *AI for Agriculture project in India:* The initiative uses AI to improve agriculture, optimise water use and increase yields.

It is not possible to achieve significant applied results in the implementation of AI in public sector management decision-making processes without prior scenario modelling, which is based on the goals and objectives of national strategic planning documents. Below are some of the country approaches that have been successfully converted into globally recognised practical results.

Estonia

In recent years, the Republic of Estonia has held leading positions in various rankings for the development and application of AI technologies in state and municipal administration, as well as in building a proactive digital society based on interoperable AI systems.

In 2019, the Estonian Ministry of Economic Affairs and Communications developed and, in agreement with the Government, adopted a two-year National AI Strategy. The main objective is to introduce AI systems in the mechanisms of the Crossroads ecosystem (patented technology for cross-use of databases of different state, municipal and private institutions through one universal portal) with a focus on proactive ser-

vices and services that improve the quality of human interaction with the public and private sector. The strategy for 2022-2023 is currently being implemented in line with the ideas of the 2019 inception document [55]. The strategy is broken down into specific areas with implementation timelines and earmarked funding levels. It contains data on subcontractors (other than the main operator) and their areas of responsibility, as well as measures of state support for the implementation of the Government Order. In addition, the document contains a section on planned legislative changes linked to the schedule of implementation of technological innovations in society.

In terms of substantive content, the previous and current National AI Strategy is based on the semantic work of a unit specially established within the Estonian Ministry of Economic Development and Communication under the direct supervision of the Vice Chancellor (Deputy Minister) of the Ministry of Economic Development [55, 56]. In addition, a roadmap for the implementation of all the initiatives envisaged in the Strategy is continuously updated in the country.

A characteristic feature of the Estonian approach to the development and implementation of AI technologies is a clear vision of the final goal of digital transformation, broken down into technological and temporal stages, with the selection of specific means and methods of implementation within a set time frame.

According to the current versions of the aforementioned founding documents, by the end of 2023, more than 2,600 digital services provided to the public today should become "seamless" and mostly proactive. Officials and third parties will be completely excluded from digital interactions with the citizen, and their role as assistants will be taken over by interoperable AI algorithms that form a single ecosystem and entry point for the user to interact electronically with the world around them. Such an entry point is gradually becoming the AI assistant "Kratt" (in Estonian folklore, Kratt is the equivalent of "The Ghost", who helps in the household of all positive heroes). Its concept involves rethinking, at a higher technical level, the current services in the Crossroads ecosystem. Kratt interacting with a person or business entity should be able to anticipate possible user needs and offer the best options to meet them. In today's version, Kratt's AI system relies on machine learning, text interpretation and translation capabilities, voice recognition and speech generation. In the future, its visualisation is envisaged, and user image recognition capabilities will also be added. After 2023, the plan is to merge Kratt with its Finnish counterpart Aurora, which is expected to bring cross-border services to a new level for residents of both countries.

In addition to the further development of the Kratt's concept, Estonia's AI policy documents set the goal of introducing an AI assistant for state agencies by 2023 in order to manage basic document flow, i.e. initial analysis, filtering and distribution of appeals within state agencies according to their belonging, and preparation of responses.

Finland

In 2017 and 2018, the Finnish Ministry of Economic Affairs issued two policy documents. The Finnish Ministry of Economic Affairs issued two policy documents that constitute the national approach to the development of AI technology with the main idea of creating a comprehensive AI-based government ecosystem for the digital transformation of society and the digitalisation of business activities [58. 59]. The first document focuses on outlining the horizon for the implementation of AI technologies in key areas based on the existing potential, outlining the intentions of the country's leadership to carry out point-by-point transformations in selected areas. The second analyses the impact of AI technology on economic growth and employment; the labour market, identifying in-demand professions and competencies; the impact on education and further training; and ethical regulation.

Finland's approach to the development and implementation of AI technology has much in common with the Estonian experience, although it also has differences. A similar idea is the creation of the state interoperable AI system Aurora (similar to the Estonian Kratt), but in practical terms the focus is shifted from the individual to public-private partnerships and the promotion of business activity in the field of AI, while maintaining the concept of providing a full range of proactive services to citizens with the help of the Aurora AI assistant. In contrast to Kratt, which began rolling out back in 2020, the first version of Aurora launched in December 2022. In both cases, the Finnish telecommunications company Elisa is the authorised operator of the public AI ecosystem.

Singapore

Singapore's National AI Strategy was adopted in 2019 [73]. It focuses on separate blocks - national projects linked to the country's socio-economic priorities (Intelligent Freight Planning; Seamless and Efficient Municipal Services; Prevention and Treatment of Chronic Diseases; Individual Education through Adaptive Learning and Skills Assessment). In this sense, the National Strategy largely echoes the Nordic countries documents in terms of priorities receiving targeted state support. The focus is on key areas of national development with a focus on improving the quality of life of citizens as a result of the application of AI systems. The national strategy also implies the need to revise and update legislation when introducing new AI technologies.

As such, there is no single coordinating body for AI in Singapore, but the Government Technology Agency and the Office of Smart Nation and Digital Government Initiatives are responsible for key issues. These agencies plan and prioritise the national projects in terms of implementing AI, and are also responsible for the application of AI solutions in government. For this purpose, these institutions are authorised to in-

volve interested ministries, agencies, businesses and academia to work together on the implementation of the national projects. The main idea of the National Strategy is to combine the efforts of all actors for a successful digital transformation in the interests of society and to commercialise their developments, including abroad.

However, strategic planning documents and action plans for their implementation are far from comprehensive approaches, as they are subordinated to solving specific tasks rather than developing their national AI industry as such. By contrast, large countries are pursuing a comprehensive AI development scenario with a focus not on their own technological independence and dominance.

Thus, an analysis of government policy on the development and integration of AI in China and the US reveals the main factors contributing to their technological superiority over Russia in this area. Below are the main aspects and links to relevant sources for a more detailed analysis:

- *Investment in research and development:* China and the US are actively investing in AI research and development. China has integrated AI industry development into its 'Made in China 2025' strategy and the US introduced a 'National Artificial Intelligence Strategy' in 2019.
- *Support for innovative start-ups:* In both countries, there is strong support for innovative AI start-ups. In China, the development of IT giants such as Alibaba, Tencent and Baidu has risen to the level of public policy, while in the US, companies such as Google, Microsoft and Amazon are actively investing in AI research and development.
- *Strengthening science and technology education:* Both countries attach great importance to the development of science and technology education, including the field of AI. In China, specific AI training programmes have been established, while in the US, universities and research centres are actively developing educational programmes in the field.
- *Military applications of AI:* China and the US are also actively developing and applying AI in the military sphere. This may be related to the development of autonomous systems, cyber security, intelligence and other aspects.
- *International cooperation and policy harmonisation:* China and the US are actively engaging with other countries and international organisations to develop and standardise AI technology. An example is the interaction with the European Commission and the UN in developing regulations and ethical principles in the field of AI [57, 77]. It should be noted that precise information on the strategic directions and priorities of AI development in China and the US may be limited due to the peculiarities of the military industry and objectively high confidentiality. However, an analysis of open sources allows us to highlight the above factors that contribute to the superiority of these countries in the field of AI.

It is worth noting that the AI development in the US has a long and rich history. The distinctive features and reasons contributing to US excellence in this area can be attributed to several factors:

- *Early research and development:* The US had an advantage in AI over other countries, starting with the development of the first algorithms in the 1950s and 1960s. This set the stage for subsequent research and development.

- *Funding and investment:* The US is devoting significant resources to AI research and advanced development. The amount of investment in AI between 2011 and 2019 alone, which has been made public, totals more than $43 billion. This is a significant increase from 2011 to 2019, with dedicated funding in 2011. However, in 2011, the dedicated funding was only just over US$280 million, and in 2019 it was just over US$180 million. The total amount of dedicated funding for the period from 2011 to 2019 totals more than US$43 billion. This is a significant increase from $16.5 billion in 2011 [44]. More recent data is not publicly available, but based on the dynamics of recent years it can be assumed that today the volume of state support for the industry exceeds USD 20 billion per year. The amount of state support to the industry now exceeds USD 20 billion per year.

- *International cooperation:* The US actively engages with other countries and organisations in the field of AI to share knowledge, expertise and technology, and to bring in foreign experts and scientists.

- *Openness policy and global talent attraction:* The US has an open policy to attract talent from around the world, saturating in-demand areas in AI with a wide range of specialists and scientists, creating a high density of professionals for 'fan' or integrated research.

- *A strong IT community:* The US has a mature IT community that fosters its own computing architectures and systems, and provides an innovative environment for AI development.

Given these and other factors, the US still has an objective advantage in AI development and integration over Russia and, with the exception of China, all other countries at the moment. However, it should be understood that AI development is a dynamic and complex process, and other countries are also actively working on their own programmes and initiatives in this area, trying to catch up with the leader. China, for example, is making great strides in AI, thanks to its manufacturing capacity, active investment and political support. One of the key factors driving development is the huge domestic market in China, which has facilitated the rapid development and adoption of AI technology. Large investments and the creation of a favourable research environment also play an important role in China's progress in this area.

It is important to note that China is actively pursuing global leadership in AI. A "digital silk" road strategy is being pursued at the state level to expand its global influence and international dominance, and to attract other countries to use Chinese computing resources and technologies. This approach could play an important role in reshaping the global AI power balance.

The technological AI race between the US and China is driven by the mutual desire of both countries to become the undisputed world leader. Overall, the development of AI is a global process, and competition between countries and regions will continue and intensify. States seek to use their advantages, such as technological expertise, resources and political support, to gain a foothold in the group of world leaders.

More circumstantial factors are emerging indicating that China could overtake the United States in AI technology in the foreseeable future, particularly in government sector. First, China has vast amounts of data that can be used to develop and train various AI models. Its huge population and active use of digital products form a huge, unparalleled pool of data that can be used to train machine learning algorithms. This gives China a competitive advantage in the development and application of AI in public administration. Second, China has made significant efforts to build a dedicated expert community. Local universities and research centres are actively working on AI research and actively publishing their findings. China also invests in training AI experts and, similar to the US, attracts highly skilled people from other countries. Taken together, all this contributes to the development of expertise and human resource capacity.

Third, Chinese government policy actively supports and encourages the development of the domestic AI industry. Under the "Made in China 2025" strategy and the "Next Generation Innovation Plan", China aims to become a global leader in AI by 2030. To achieve this goal, the government is providing financial support for relevant research and development and creating an enabling environment for innovation and entrepreneurship. Finally, China is demonstrating a commitment to the comprehensive application of AI technology in public administration. The public sector is open to adopting new technologies and seeks to improve the efficiency of its services in decision-making with the help of AI algorithms.

In light of these factors, there is a growing consensus among specialists and experts that China is well-positioned to overtake the United States in AI within a decade, especially for the purposes of government. The government's aligned support, access to large amounts of data and talent make China one of the leading AI players.

By mid-2023, the following global trends in the use of AI in public administration can be discerned:

- *Strengthening public interest:* National governments are increasingly aware of the importance of AI technology in improving the efficiency of public administration. This is evident in the ongoing development of AI strategies, the allocation of financial resources for research and development in this area, and the establishment of specialised bodies and institutions to coordinate and apply AI in government structures.
- *Developing automation and process optimisation:* AI has been successfully applied in public administration to automate and optimise various processes. Machine learning and data analysis algorithms help improve forecasting, decision-making,

planning and monitoring of public programmes and projects. This contributes to increasing the efficiency of public authorities and improving the quality of services provided to the population.

- *Enhancing security and cyber security:* AI plays an important role in ensuring cyber security and preventing cyber threats in government infostructures. Automated anomaly detection, analysis of network traffic and user behaviour enables rapid detection and prevention of cyber attacks. AI is also used to develop systems and algorithms for encryption, data protection and vulnerability detection, which increases the level of cyber protection of government information resources.
- *Decision support:* AI provides government agencies with tools and analytical platforms to support decision-making based on big data. Machine learning and text analysis algorithms help to automatically process and analyse vast amounts of information, highlight key facts and trends, and predict possible scenarios. This helps decision-makers and civil servants make more informed and objective, data-driven decisions.
- *Ethics and transparency:* The development and use of AI in public administration is increasingly focused on ethics and transparency. States are developing regulations and legislation to regulate the use of AI and to protect the rights of citizens. The innovations serve as a basis for implementing mechanisms for verification and openness of AI algorithms in order to ensure the reliability and explainability of the decisions made.
- *International cooperation and experience sharing:* States actively cooperate internationally, sharing experiences and transferring best practices in the use of AI in public administration. This accelerates the adoption of advanced technologies, the development of standards and a collaborative approach to addressing the global challenges posed by the application of AI in public administration.
- *Development of government platforms and digital ecosystems:* The use of AI in government facilitates the development of government platforms and digital ecosystems. National governments are driving the creation of a digital infrastructure that connects different public bodies that provide citizens and businesses with convenient access to services, services and relevant information. AI plays an important role in automating and integrating data, analysing information and improving interaction between government and its actors. Ultimately, it contributes to improving public services, the efficiency of bureaucratic processes and stimulates innovation in the public administration sector.

These global trends clearly demonstrate that the use of AI in government is an important and indispensable element of modern policy and strategic development for countries seeking to make the most of the digitalisation of their economic and social activities. At the same time, states must pay attention to ethical aspects and in-depth legal frameworks, ensure security and transparency of the use of AI, and actively cooperate with international partners to achieve joint goals in the area of public administration.

Risk projections and recommendations for the sustainable development of AI in public administration.

Introducing AI into public administration is a complex and multifaceted process that is fraught with risks and challenges. To ensure sustainable development and maximise the potential of AI in government systems, it is necessary to carefully analyse these risks and develop appropriate measures to "sterilise" potential risks and threats at an early stage. In this context, a number of 'heightened focus' issues can be identified that encompass global trends in the use of AI in public administration and emphasise the importance of risk analysis:

- *Ethical issues and regulatory frameworks:* The introduction of AI into public administration means that ethical principles and regulatory frameworks must be developed that ensure fairness, transparency and at least consideration of the fundamental rights of citizens. The use of AI in public processes needs to be actively discussed and regulated in order to minimise the potential negative consequences and to ensure compliance with ethno-cultural and other values of a particular society.
- *Transparency and explainability of AI algorithms:* It is important to develop methods for verifying and explaining AI decisions in public administration. Ensuring that AI algorithms are transparent and explainable helps to prevent potential mistakes and distrust by citizens, and ensures that accountability measures can be monitored and enforced.
- *Protection of personal data:* The introduction of AI in public administration increases the risk of breaches of privacy and security of personal data. Strict measures should be developed to protect them, ensuring data security, confidentiality and compliance with the relevant legal provisions in force in society.
- *Equality and exclusion of bias:* It is important to ensure that AI systems used in public administration do not create or reinforce social inequalities and biases about different social and ethnic groups. Differences in data should be taken into account and objectivity and fairness in the development and application of AI algorithms should be ensured.
- *Citizen participation and public consultations:* Introducing AI into public administration should be an open and transparent process involving citizens and other stakeholders (business, experts, academia, human rights activists). It is important to include the general public in the dialogue and to take into account their opinions and suggestions when developing and implementing AI systems.
- *Social scoring:* The use of AI in public administration may lead to social scoring systems that rate and classify citizens on various dimensions. The use of such algorithms should be limited, in favour of systems that protect privacy, prevent unacceptable interference with privacy and ensure fair use of this data (more details below).

- *Training:* Introducing AI into public administration requires the training of competent personnel who are capable of understanding and using the potential of AI in accordance with the normative and ethical principles specific to a given society. Educational programmes and initiatives need to be developed to educate civil servants and train AI professionals (more details below).
- *Bridging the digital divide/ inequality:* The introduction of AI in public administration should aim to bridge the digital divide, taking into account the differences in the availability and capacity to use AI technologies between different regions and social groups. Equal access to AI solutions and appropriate support should be ensured for all citizens while respecting (preserving) their traditional ways of life.
- *International cooperation:* International cooperation and exchange of best practices should be promoted for the effective use of AI in public administration. Countries should actively share knowledge, best practices and standards, and cooperate in developing ethical and regulatory principles for the use of AI.
- *Sustainable development:* When introducing AI into public administration, the focus should be on sustainable development. The development and use of AI technologies should aim to achieve long-term goals such as economic well-being, social justice and environmental security.

The analysis of risks and threats, as well as focused work on developing appropriate strategies and preventive measures, will enable the effective management and sustainability of the implementation of AI in public administration in an ethical, transparent and citizen-centric manner.

It seems particularly important to emphasise the current "overuse" of rating systems (including social scoring for citizens) in public administration mechanisms. In our view, the introduction of social scorings into the apparatus of public administration may carry many fundamental risks.

There are a number of dangers associated with the use of social ratings in public administration, among the main ones:

- *Violation of privacy and confidentiality rights:* the introduction of social scorings can potentially violate citizens' privacy and confidentiality rights, as it requires the collection and processing of large amounts of personal data.
- *Worsening discrimination and inequalities:* the use of social scorings can lead to increased discrimination and inequalities, as such systems may be subject to bias and inaccurate treatment of social, economic or ethnic differences.
- *Errors and inaccuracies in assessment:* Social scoring systems can suffer from errors and inaccuracies in citizens' assessment, especially when algorithms are based on large amounts of data subject to distortions or misinterpretations.
- *Lack of transparency and explanability*: Social scoring systems can be opaque and unexplainable, making it difficult for citizens to understand the reasons and mechanisms of their ranking status. In turn, this increases distrust in the system as a whole and also generates distrust in state structures, leading to increased social tensions and loss of control over social processes.

- *Lack of fairness and subjectivity in assessment:* Social scorings can be subjective in their assessment and may not reflect the actual performance and quality of public servants, leading to distortions and unfairness in the entire system.
- *Digital security risks:* the implementation of social scorings requires the storage and handling of large amounts of sensitive information, which exponentially increases the risks of theft, leakage or malpractice, especially in the context of insufficiently protected digital infrastructure.
- *Negative impact on freedom of expression and opinion:* Social scoring systems can have a negative impact on citizens' freedom of expression and opinion, as people will fear negative consequences for their rating status when expressing critical or different views from the 'benchmark'.
- *Creating a manipulative environment and mass control of behaviour:* Social scoring systems can create a manipulative environment and control the behaviour of citizens, as a system of rewards and punishments can be used to shape desirable or suppress undesirable behavioural patterns.
- *Undemocratic nature of the system:* the introduction of social scorings can be undemocratic, as citizens will be forced to submit to the rating system without being able to influence its rules or functioning.
- *Lack of appeal and error correction mechanisms:* Social scoring systems may not provide for effective appeal and error correction mechanisms in case of incorrect or unfair assignment of rating status, which will increase the anxiety of citizens with a lack of trust in the operation of the entire system.

The introduction of AI into public administration may also face a number of difficulties related to the 'inertia' of previous experience of officials. Some of the main difficulties in this context may be

- *Lack of technical literacy:* Many categories of civil servants working in a "paper logic" and paper-based environment may have difficulty learning new technologies and understanding how AI algorithms work. Lack of experience in using modern computing tools will negatively impact their ability to work effectively with advanced AI systems.
- *Resistance to change:* Some officials, particularly those who are not ready to adopt new technologies due to their established habits and age, may find it difficult to accept and adapt to algorithmic government and AI processes in general. Resistance to change can significantly hinder the successful implementation of AI in the public sector.
- *Lack of education and training:* It is likely that some managers may lack the necessary knowledge and skills to interact with AI systems. Lack of training and education can make it difficult to understand the principles and potential of AI, and hinder the development and implementation of effective strategies for its use.

- *Mentality and outdated ways of working:* Retrograde mentality and 20th century ways of working can be an obstacle to the successful implementation of AI in public administration. Some officials may adhere to rigid hierarchical structures and bureaucratic processes that are partially or even completely inconsistent with the flexibility and innovation that underpins modern AI.
- *Misunderstanding of the benefits and opportunities of AI:* Some categories of managers may not sufficiently understand the benefits and opportunities that AI offers. They may consider it unnecessarily risky and complex, which may also lead to an underestimation of the potential of algorithmic systems and limit the effective use of AI in public administration.

However, it should be noted that not all civil servants face these challenges. Some are actively engaged in the digital transformation process and are keen to adapt to new technologies, recognising their potential to improve the efficiency and quality of public administration.

Consequently, in light of the continuous development and implementation of AI in public administration, it is necessary not only to actively train a workforce that is able to meet the challenges in this area, but also to give priority to innovative managers to fill positions. Strategies for the development of AI should pay particular attention to training and promotion, as this is the bottleneck at the moment and probably in the next 5-7 years.

An analysis of current trends in AI training, retraining and employment should highlight a number of emerging professions that could play an important role in introducing AI into public administration and making it more effective:

- *AI Ethics Officer:* This person is responsible for ensuring that the development and use of AI systems is ethical, transparent and consistent with citizens' values and rights.
- *AI Regulatory Policymaker:* This person develops regulations and legislation related to the use of AI, including privacy, bias and accountability issues.
- *AI systems integrator:* This specialist is responsible for integrating AI algorithms into existing information systems and ensuring their continuous, efficient and interconnected operation.
- *AI cybersecurity specialist:* This area includes specialists responsible for protecting AI systems and big data locations from cyber-attacks and information leaks.
- *AI-enabled user interface developer:* This person is responsible for creating the user interface and experience of AI systems to ensure that they are intuitive and user-friendly.
- *AI Education and Training Specialist:* This specialist develops and delivers education programmes for government officials and other stakeholders on the use of AI in specific products and services.

- *AI legal and regulatory expert:* this specialist advises government officials and political functionaries on the legal and regulatory aspects of using AI, including privacy, intellectual property and data protection.

These occupations are just a few examples of the new, emerging competencies and responsibilities that may emerge as AI continues to be introduced into the business and economic activities of the state. However, it should be noted that the nature of these roles may change as the technology develops and applications expand. It is important to provide ongoing education and training in these new areas so that public administration can effectively adapt to changing requirements and global trends, as well as realise its strategic goals related to the development and implementation of AI.

Conclusion

The above analysis leads us to several important conclusions, which can serve as a basis for shaping the main directions in the implementation of AI in public administration.

First, there is an urgent need for targeted government support and regulation of AI implementation, which should be viewed as fundamental principles of national public policy in this area. The analysis indicates the importance of developing structured regulatory documents and technological standards, as well as the formation of feedback mechanisms to facilitate faster and more transparent development of the AI industry, to identify potential advantages and weaknesses, and to organize the production and commercialization of AI technologies in a qualitative manner. The National Strategy for the Development of AI, the Concept for the Development of Regulation of Relationships in the Field of AI Technologies and Robotics, as well as the Technology Standards and Roadmap are important documents that define the direction of work in this area.

Secondly, the analysis of achievements on the AI track both in Russia and abroad allows us to conclude that there is a high potential for the application of AI in the sphere of public administration. There is a significant growth in the use of AI in public institutions around the world, which indicates the possibility of improving the efficiency and quality of public administration through the introduction of AI algorithms demanded by real management needs.

However, in addition to these benefits, a number of challenges to human resource capacity building in the technology field need to be considered and addressed. Inertia of previous experience and insufficient technological literacy can be a barrier to the successful implementation of AI in public administration. This situation requires the development of special educational programmes and activities for training and retraining, as well as the creation of infrastructure and conditions to facilitate the adoption of new technologies by the public sector. It is also necessary to consider the

importance of "knowledge retention" in this area (not everything can be described by algorithms and the possibility of making responsible/final decisions should be left to humans).

AI has enormous potential and is poised to revolutionise public administration in order to increase efficiency and hold officials and organisations more accountable to the public. One of the key applications of AI in public administration is predictive or predictive analytics [53]. It is designed to help government agencies predict future trends and events, which can serve well for strategic planning purposes and the efficient allocation of available resources. For example, by analysing data from social media, AI can identify potential threats to public safety and alert law enforcement agencies [38].

Another promising application of AI in government is in the area of decision-making. AI algorithms can help government officials make informed decisions based on the analysis of a vast array of diverse data, ultimately reducing the likelihood of bias and human error. Recent advances in AI in public administration are the subject of widespread research and interest both in Russia and abroad. The rapid growth in the use of AI in government agencies around the world undoubtedly demonstrates its significant potential [72]. Thus, the application of AI in public administration can lead to significant benefits, such as increased efficiency and predictability of processes, reduced errors, and more informed decision-making. However, the introduction and use of AI requires appropriate government support and regulation, as well as ethical and legal considerations.

AI can also increase citizen engagement and satisfaction by providing more personalised, proactive services. For example, AI-powered chatbots can help citizens interact effectively with government services and provide quick and accurate responses to their requests. In addition, AI tools can simplify administrative processes, such as filing tax returns and applications for various permits, which will also have a positive impact on people's satisfaction.

Nevertheless, despite the many benefits of using AI in public administration, there are also a number of challenges that need to be addressed. One of the most significant challenges is the high potential for AI to reinforce existing biases and discrimination in public policies and services [41]. For this reason, it is crucial to ensure that AI is developed and deployed in an ethical and responsible manner [57]. Another concern is the potential loss of jobs due to automation. While AI can increase efficiency, it can also replace human workers in some areas. It is therefore important to provide adequate training and social support for all categories of citizens [46].

Another challenge is the need to improve the technological literacy of the public administration apparatus. Many officials have limited knowledge and experience in information technology, which can create a barrier to the adoption of advanced AI-based infosystems. Thus, it is critical to improve the technological literacy of public sector

employees to ensure the effective and responsible use of AI. To address these and many other challenges, it is important to take what is known as a holistic approach. Government agencies, industry leaders and researchers should work together to develop comprehensive ethical principles and standards to further the implementation of AI, to ensure transparency and accountability in decision-making while minimising the risks of implementation.

Based on this analysis, we can conclude that the AI industry in Russia for public administration purposes lags far behind the pace of development compared to dozens of other countries, both small (Estonia, Finland and Singapore) and large - the world's leading AI countries - China and the US. Russia is not yet even in the top 20 countries, although there is every opportunity to do so. In order to rectify this situation, firstly, it is necessary to focus on legislative and normative-technical regulation of AI, subordinated to the main goal - the image of future society, within which the main processes will be based on AI technologies. The range of laws and regulations, as well as other instruments governing the ethical and legal aspects of AI activities, needs to be expanded and detailed in the right direction. This would allow for a faster launch of a large range of new AI technologies into civil society, bringing the country closer to the window of opportunity for setting new ambitious nation-building goals.

Secondly, the development of a legal framework for AI ethics will enable wider application in the public sector and in inter-societal processes. Ethical issues have repeatedly raised issues of data protection and protection of citizens' rights. Unless there is a clearly articulated set of rules and regulations for the operation of the technology, its adoption cannot be universal.

Thirdly, more or less prominent AI activities in the country are now predominantly carried out by large companies and universities. Although the percentage of prominent actors involved in this area is very high, this also has a side effect. For example, it is difficult for smaller organisations to enter the market and, as a consequence, it is difficult to develop truly innovative products. In addition, there are sectors where AI technology is not developing at all or is developing very slowly. These include the housing and utilities sector, construction and many others. It is important not only to make AI comprehensible and accessible, but also to implement it compulsorily in all areas, ensuring that the application of the technology expands at a modern level.

Exactly the same applies to regional HEIs - and this, fourth. So far, the statistics on students rely on a dozen educational institutions, mostly located in Moscow and St. Petersburg (such as Moscow State University, MIPT, NRU HSE, ITMO, Skoltech, St. Petersburg State University). Although more and more students are being trained in AI, IT and related fields, this is still not enough for sustainable development of the AI industry at the regional level. Mechanisms for attracting high-level specialists and educators to the regions who can assist in the rapid development of technology and transfer of advanced knowledge and practical experience are essential. It is advisable to develop new training areas in AI across the country in order to meet the demand for nascent professions in this field.

Fifthly, it is necessary to continue allocating targeted funds for the development of AI technologies across the country. In today's geopolitical environment, a domestic product is needed more than ever for national security and to support the process of taking Russia to a leading role in the global technological arena. With a proper increase in targeted funding, as well as the number of qualified specialists, the production of the final in-demand AI products will be both quantitative and qualitative. In addition, the right course would be to build new and support existing laboratories, data centres, complexes and enterprises in the regions to develop and produce not only the AI technology itself, but also its support components.

Sixth, if domestic AI production meets the highest global standards, a competitive entry of Russian AI solutions and expertise into the global market would be possible under favourable geopolitical conditions, which would also have a positive impact on the pace of industry development, growth of external revenues and Russia's international image.

Seventh, the area of digital and information security should be strengthened. Very little is said about cyberattacks associated with the introduction of new technologies, and yet there are a number of new challenges inherent in AI-based products. Moreover, there are a number of foreign AI libraries, databases and analytical tools actively used by domestic developers. In the period of sanctions, there is a possible scenario of closing global data clouds for Russia, when only in-house developments will remain, as has happened (for example) in the medical chemistry industry or in supercomputing. It is important to protect existing databases and anticipate the loss of materials, as well as to create mirrors of foreign resources in advance.

Eighth, it is important to continue introducing and popularising AI technology at the grassroots level, to provide transparency on the development of the field, the working mechanisms, the steps to its development and the rules for its use. The clearer something is, the safer and more intuitively pleasant it becomes. For more demand and interest in the product, outreach and education on the basics of the technology is necessary. In addition, it is important to invite citizens to familiarise themselves with annual reports and statistics, preferably from official government sources with fixed forms or compilation concepts. There is a lot of information about AI in the media right now, but the figures from different studies vary from year to year and there are not always documents available on which to rely with confidence. Proper and regular reporting would allow one to see the current level of attainment and the overall state of the industry.

It is also worth noting that the introduction of AI in public administration requires consideration of the continuity of knowledge and the preservation of lessons learned over a historical period. A smooth transition to the use of AI in this area is necessary to ensure the preservation of valuable knowledge that has been accumulated by public institutions over time. Public administration is a complex and demanding field in which decisions are based on multiple factors, including political, economic, social and technical. Over the historical period, public institutions have accumulated

a wealth of experience and knowledge that has provided the basis for the development of effective strategies, policies and procedures. When implementing AI, it is necessary to ensure that this valuable knowledge is preserved and incorporated into the design and application of AI systems.

Public administration differs from other fields, such as a number of natural sciences or technology, where it is possible to conduct repeatable experiments. In public administration, especially for large-scale projects or changes in public policy, it is not possible to redo the process from scratch. Once a city has been built or a policy has been implemented, they cannot simply be changed or recreated anew for experimentation. This is why the preservation and use of accumulated knowledge is critical when introducing AI into public administration. AI must build on this accumulated knowledge and use it to make more informed and effective decisions. A smooth transition to the use of AI ensures that valuable knowledge is retained, adapted to new contexts and improves public administration processes, rather than replacing or ignoring established methods and approaches. Thus, the continuity of knowledge and the incorporation of lessons learned are key aspects when introducing AI into public administration. This will help ensure a more harmonious and successful transition to the use of AI, taking into account the unique characteristics of public institutions and preserving the valuable knowledge that has been accumulated over a historical period.

Another important point is the need to preserve the role of people, mentors and teachers in the transition to widespread use of AI. Along with the continuity of knowledge and the preservation of lessons learned, people must remain the masters of AI-based systems.

AI can be a powerful tool for process automation and data analysis, but it cannot completely replace human expertise, intuition and creativity. Humans have unique qualities, such as ethics, morality, social responsibility and the ability to interact in complex interpersonal ways. These qualities play an important role in public administration, where decision-making and policy setting often have profound social and ethical implications. In the transition to the use of AI-based systems, it is necessary to ensure the active inclusion and training of the human professionals who will be working with these systems. People need to be aware of and understand the capabilities and limitations of AI, and be able to adapt it to the specific needs and goals of public administration. The role of mentors and teachers in this process is incredibly important. They can pass on their experience and share their knowledge and skills with young professionals, teaching them how to use AI-based systems in the context of public administration. This approach will help to retain valuable knowledge and ensure that AI is understood and consciously applied within government processes.

Public administration involves complex and multi-dimensional processes where decisions are made, policies are defined and strategies are formulated based on unique factors and contexts. These decisions and actions in public administration are unrepeatable because they are highly dependent on specific social, political, economic and cultural contexts.

Modern artificial intelligence algorithms are based on the principle of data-driven learning and assume reproducibility of results. They require large amounts of data to learn and stable conditions to achieve reliable results. However, in public administration, experiments are often unique and unrepeatable, and there is no way to repeat exactly the same conditions or obtain similar data.

This places fundamental limitations on the application of modern AI algorithms in public administration, especially in strategic planning. The use of AI for forecasting or decision-making in such situations may not be applicable or sufficiently accurate because they cannot account for the unique and unpredictable aspects of each case.

Moreover, the unpredictable results of the use of AI in public administration can have serious social, economic and political consequences. This requires a cautious approach to the application of AI and consideration of the specific characteristics and context of public administration.

Thus, while AI has potential in public administration, it must be recognised that its use is limited due to the non-repeatability of experiments and the uniqueness of situations. Rather than replacing human experience and expertise entirely, AI should be seen as a tool that complements and supports decisions and decision-making processes, while maintaining the importance of the role of humans, their mentors and teachers in public administration.

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