CHALLENGES AND PROSPECTS FOR MANAGING THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN UZBEKISTAN

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Abstract

This article discusses the institutional framework for managing the development of artificial intelligence technology, as an important sector of the digital economy, as well as indicators for assessing the government's readiness for AI technology. The analysis of the management structure of the development of AI technology is given, the challenges and difficulties with a proposal for their solution are identified.

Keywords: artificial intelligence, infrastructure, living standards, digitalization, data, robotization .

Introduction

Recent advances in the field of digital technologies of artificial intelligence (hereinafter referred to as AI) show that the digitalization of the economy using AI technologies is becoming a driving force for increasing management efficiency and improving technological processes in enterprises, creating new and expanding existing jobs in various sectors of the economy, which ultimately ultimately leads to an improvement in the quality of life of the population.

Today, AI has become one of the main areas of development in all developed countries of the world, and now more than 30 countries have developed national AI development strategies such as the UK, Estonia, Canada, Singapore, China, France and others.

The rapid development of AI technologies is based on the availability of cloud services, as well as a significant increase in public and private investment in this area.

According to international experts, from 2014 to 2017, investments in AI technologies reached $40 billion, and in 2018 this figure reached $21.5 billion; experts estimate that by 2024 this figure will reach almost $140 billion.

According to IT market research, IDC predicts that spending on AI systems will grow by 38 percent annually in the coming years, exceeding $79 billion in 2022 [1].

According to published reports from the World Economic Forum, in the near future, about 75 million jobs will disappear, and AI will take over 52% of the share of all jobs [2].

Taking into account this trend and in order to create favorable conditions for the accelerated implementation of artificial intelligence technologies and their widespread use in the country, on February 17, 2021, the Decree of the President of the Republic of Uzbekistan "On measures to create conditions for the accelerated implementation of AI technologies" No. PP-4996 was adopted.

This document laid the legal foundation for the further development of AI technologies and determined its main directions. Also, the resolution approved the Program of Measures for the study and implementation of AI technologies in 2021–2022, which provides for the implementatian of about 24 measures.

Also, according to the resolution, a list of 9 pilot projects for the implementation of AI technologies was approved, which will be implemented in 2021–2022 in agriculture, banking and financial sectors, transport, healthcare, pharmaceutical industry, energy, taxation and in the development of e-government.

At the same time, the Research Institute for the Development of Digital Technologies and AI was created under the Ministry for the Development of Information Technologies and Communications, which is engaged in fundamental and applied scientific research in the field of AI, establishes cooperation and jointly implements projects with leading foreign innovation and scientific institutions, as well as issues of implementing AI technologies in economic sectors.

It is important to note for the further development of a favorable environment for the development of AI technology by the Decree of the President of the Republic of Uzbekistan dated August 26, 2021 No. PP-5234 "On measures to introduce a special regime for the use of AI technologies." The document is aimed at creating a favorable and optimal ecosystem for the development of innovative business models, products and methods of providing services based on AI technologies, their implementation and application in practice.

The special regime implies the creation of the necessary organizational and legal conditions for legal entities and scientific organizations carrying out activities within its framework related to the conduct of experimental work based on AI technologies, the development of software products and the provision of services, the provision of privileges in legal relations arising in the process testing and implementation of software products.

Literature Review

The future of life lies in digitalization , in particular artificial intelligence, robotics, and nature-like technologies, says T.G. Shevchenko [3]. In his opinion, the digital economy needs to change the format of education and therefore the main task should be to teach how to learn, how to think. Therefore, it is necessary to use the new digital capabilities of AI for educational purposes. To do this, first of all, it is necessary to train qualified specialists in the field of digitalization , including focusing on AI.

Currently, there is no clear definition of the term "artificial intelligence" (AI) in the literature. Different experts give different definitions, which can differ radically both in the interpretation of the term and in its semantics, for example :

Artem Permyakov: artificial intelligence today is generally understood to mean the entire set of methods by which intelligent systems are created: machine learning, neural networks, natural language recognition technologies, voice processing, computer vision, etc.

Andreas Kaplan and Michael Haenlein believe that artificial intelligence is "the ability of a system to correctly interpret external data, learn from such data, and use the acquired knowledge to achieve specific goals and objectives through flexible adaptation" [4].

According to the collection of the Higher School of Economics, it is said that the spread of Internet of Things technologies, big data, artificial intelligence and machine learning, and other digital technologies have led to the development of the following categories of business models:

digital platforms that provide direct interaction between sellers, buyers and supply partners, minimizing transaction costs and expanding opportunities for joint consumption of goods and services;

"as a service" - service business models based on the use of resources instead of owning them (among them Software - as -a- Service (SaaS), Infrastructureas -a- Service (IaaS), etc.);

crowdsourcing models based on attracting external resources (money, people, ideas, etc.) for the implementation of business processes - innovation, product development;

business models based on the monetization of customers' personal data, when services free for users sell their data to other consumer segments [5].

According to international experts, to effectively manage the development and implementation of artificial intelligence technology, it is necessary to apply the principles of P-O -D-U (human rights, openness, accessibility and multi-stakeholder participation) from the concept of "Internet Universality" and develop individual indicators that will help regulate the development, application, evaluation and management of AI technologies [6].

This principle provides a well-founded and coherent framework for the development, application and management of AI by all stakeholders. This framework provides improved capabilities for developing normative ethical principles for the development and application of AI, new guidance documents, and policy tools.

Analysis and Results

In 2020, Oxford Insights and the International Research Center have published the third edition of the Government AI Readiness Index index). The index measures the willingness of governments to adopt AI technologies when delivering public services to their citizens. This index measures the willingness of governments to implement AI technologies when providing public services to their citizens.

The top five rankings are occupied by the US, UK, Finland, Germany and Sweden, reflecting the fact that North America and Western Europe are the top performing regions overall in terms of AI readiness.

China ranks 19th on the list, but notes that this reflects the difference between government perceptions of AI readiness and actual implementation of AI in practice. As many international experts have noted, China has high achievements in terms of actual implementation and is a leader in the practical application of AI technologies.

The Central Asian region has the lowest scores on average. Uzbekistan is in 95th place out of 172 countries in the Index lists, with a score of 37.171 points (the maximum score is 100). Table 1 provides a comparative analysis of the indicators of several countries.

The overall score is calculated based on ten indicators: Vision, Governance and Ethics, Digital Power, Adaptability, Size, Innovation Potential, Human Capital, Infrastructure, Availability and Data Quality. Each of the indicators has its own rating on a 100-point scale. In general, our country scores below average for each indicator.

The highest of these indicators is Data Quality, it is equal to 57.23 points, but given that the Data Availability indicator has a score of only 45.02 points, then the relatively high value of the Data Quality indicator has a certain amount of subjectivity (Figure 1).

Table 1. Comparison of countries' performance in the Government Artificial Intelligence Readiness Index [1] 1 Oxford Insight -The Government Readiness Index ('20). https://www.oxfordinsights.com/government-ai-readiness-index-2020

Sphere	Direction	Indicators				
		USA	Korea	Russia	Kazakhstan	Uzbekistan
Government	Vision	100	100	100	0	0
	Control&Ethics	92,66	85,62	57,93	57,08	53
	Digital power	88,83	76,53	59,72	66,19	56,41
	possibility of adaptation	75,24	64,08	48,1	51,69	42,75
	Average	89,18	81,56	66,44	43,74	38,04
Technology	Size	81,65	44,32	16,85		9,44
	Innovation potential	79,9	73,05	49,14	41,13	39,24
	Human capital	71,11	68,43	67,84	41,66	34,41
	Average	77,55	61,93	44,61	30,02	27,67
Data/ infrastructure	infrastructure	90,41	86,13	47,24	44,49	35,18
	Data availability	89,55	92,93	76,91	74,03	45,02
	Data quality	89,16	89,71	90,34	79,19	57,23
	Average	89,71	89,59	71,50	65,90	45,81
Index AI (average)		85,479	77,695	60,847	46,554	37,171
Place in index		1	7	33	64	95

The indicators Vision, Size, and Human Capital have the lowest values. This is quite understandable, since Uzbekistan is only taking the first steps in the application of AI technologies and is currently on the initial path of AI development in the country. It is noteworthy that the Vision indicator score is 0.00, and this indicates that the country first of all needs to formulate its own vision, based on the experience of advanced countries, and lay it as the basis for the developed AI Development Strategy.

Another important indicator from the point of view of applying AI technology is Human capital. According to the AI Readiness Index for Uzbekistan, this indicator is 34.31, which is very low in relation to the assessment of this indicator among the Index leaders. It is no secret that the implementation of AI technologies in the country can only be carried out with the help of trained specialists, and specialists from different fields of AI in the country can only be implemented with the help of trained specialists, and specialists from different fields.
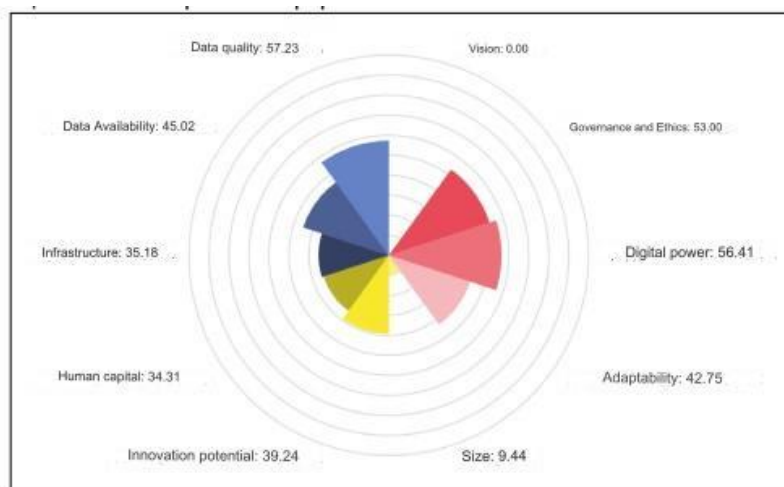

Figure 1. Government Readiness Index Indicators to AI in Uzbekistan [2]
Oxford Insight -The Government Readiness Index ('20). https://www.oxfordinsights.com/government-ai-readiness-index-2020

To implement AI technology in the industry, the appropriate infrastructure is required. When it comes to AI, the infrastructure consists of three parts: big data, telecommunications for transmitting, storing and accessing this data, and computing power for creating AI systems based on this data.

2 In order to develop the international and long-distance telecommunications network, the total capacity of the international Internet network was increased to 1,200 Gbit/s. This led to an increase in Internet speed in the country, a reduction in tariffs for Internet services for operators and providers by 25% compared to the beginning of 2020. (For 1 Mbit/s. 32.0 thousand soums (3.0 dollars).

During the current year, 24 thousand km of fiber-optic communication lines were built, which amounted to a total of 93 thousand km, which made it possible to provide high-speed Internet to more than 5.7 thousand kindergartens, 3.5 thousand medical institutions, 9.8 thousand schools, as well as 7.3 thousand objects of mahalla gatherings of citizens.

In addition, as part of the measures taken to expand mobile communication services, more than 9.0 thousand base stations were additionally installed (35 thousand in total), which made it possible to increase the coverage of populated areas with mobile communications from 96% to 98%, and with mobile Internet from 70% up to 91%, while the subscriber base increased to 27 million.

Significant improvements in telecommunications infrastructure are expected in the short to medium term.

To create and implement intelligent systems based on AI technologies, especially using technologies such as Machine Learning and Deep Learning, serious computing power is required - data centers and their cloud services. Currently, measures are being taken to expand the capacity (by more than 130 Petabytes) of Uzbektelecom JSC in the cities of Tashkent, Kokand and Bukhara.

Today, all international AI technology experts agree on one thing: data is the new oil. And their correct collection, organization of storage and provision of access are crucial for the application of AI technologies in the country. Government agencies have created huge amounts of information resources that are of great interest to AI technologies. The publication of information and information about the activities of government agencies in the form of open data will allow them to be used as data sources in the creation and development of intelligent systems, as well as services and applications based on AI technologies, both for government agencies and the private sector.

There is a special platform, the Open Data Portal data.gov.uz, for the publication of digital data. If at the beginning of the launch 24 sets of data from 4 organizations were provided on the site, then currently the site has already hosted more than 13 thousand sets of open data from 181 ministries and departments.

In order to use open data for the development of information systems, including intelligent systems based on AI technologies, the site has implemented the ability to gain access to this data via an API.

Currently, the management of AI technology in Uzbekistan is carried out by two ministries (Figure 2).
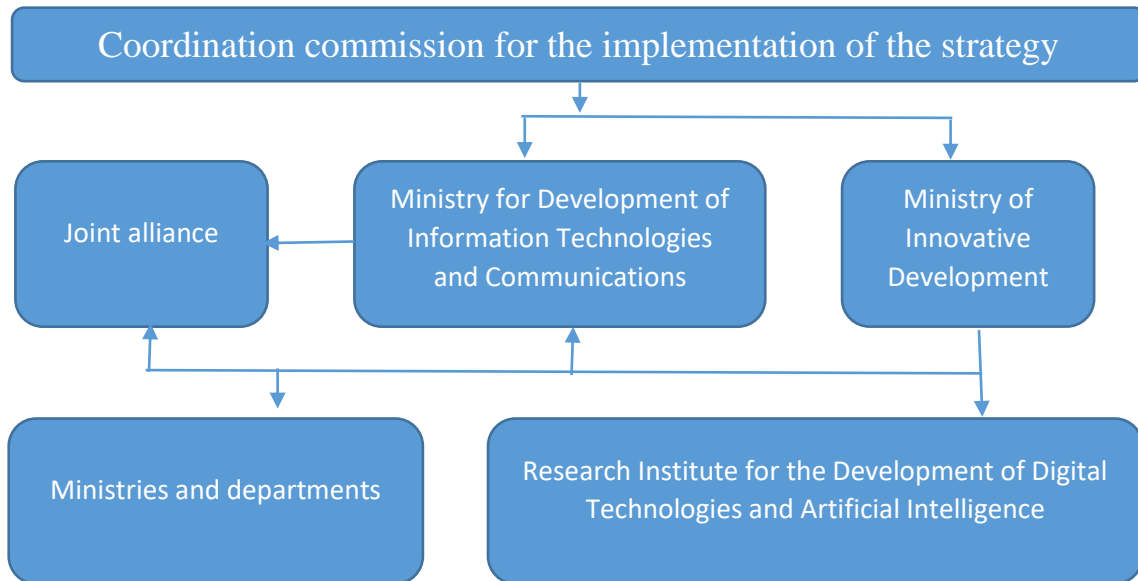
Figure 2. AI technology development management system.

Conclusions and Suggestions

Taking into account the above, based on the results of the analysis, the following challenges and problems in the development of AI technologies were identified:

▪ insufficient knowledge and skills to implement AI technologies in the country;

▪ lack of highly qualified personnel in the field of AI; ▪ lack of open source statistics for AI development;

▪ lack of teachers and professors with knowledge and skills in this field, including a small number of doctoral students;

▪ weak government support for startups in the field of AI;

▪ low quantity and quality of digital data for use within projects;

▪ relatively low security and privacy of data;

▪ insufficient infrastructure for the implementation of software products based on AI;

▪ very low level of availability of local services necessary for use in AI projects;

▪ a small volume of offers from participants in the cloud services market for processing and storing big data;

▪ lack of a unified technological approach and architecture for the development of AI;

▪ lack of enterprises working in the field of AI, weak competition, as well as slow integration of science and production;

▪ lack of practice of separate funding in departments for projects based on AI;

▪ low level of international cooperation in the implementation of scientific, technical and innovative projects in this area;

▪ lack of a strong regulatory framework for regulating AI technologies;

▪ a limited number of research institutes working in the field of AI, as well as a small number of articles published in local and foreign journals in the field of AI, including a small number of patents.

To effectively solve these challenges and difficulties in the development of artificial intelligence technology, it is proposed to determine the main directions of an integrated approach to the development of AI technology. In particular :

The first direction is the formation and strengthening of the necessary regulatory framework and expansion of the necessary telecommunications infrastructure and large volumes of data;

the second direction is improving the qualifications and skills of employees of state and economic management bodies, local governments and supporting the system of training highly qualified personnel in the higher education system;

the third direction is the creation, support and expansion of international relations in the field of research and development of AI technologies;

the fourth direction is the development of information systems and algorithms based on AI technologies, integration with existing systems and implementation, as well as organizing exports to foreign countries in the region.

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