

TRENDS IN THE DEVELOPMENT AND IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES INTO THE ECONOMY

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Abstract

The definitions of the concept “artificial intelligence” are considered. The impact of artificial intelligence technologies on global economic growth, the labor market, and the financial sector is explored. Both positive aspects and threats caused by their introduction into the economy are analyzed.

Keywords: artificial intelligence; global economic growth; employment; financial sector.

Introduction

The global community has entered a period of digital transformation that is radically changing all areas of people's lives and activities. One of the key areas of digitalization is the development of artificial intelligence technologies. They are a variety of applications (programs) for computers that “understand” human language and perform the functions of virtual personal assistants, can play games against people, etc. Artificial intelligence also includes computer robotics that see, hear and respond to sensory stimuli. The introduction of a family of technologies based on the principles of artificial intelligence makes it possible to reduce the gap in information provision and the receipt of various social services, and in some cases, to surpass human capabilities in various fields of activity. For example, computer vision systems, becoming more and more accurate, are better than humans at detecting given objects among a mass of similar ones. Speech recognition systems are able to analyze telephone conversations and voice recordings at a level consistent with human abilities.

Spreading new digital technologies are increasingly influencing modern civilization. Artificial intelligence technologies are changing processes in industry, energy, education, healthcare and banking, and also affecting population mobility. It is predicted that AI technologies will lead in the future to significant economic shifts caused by increased productivity through the use of machines that are capable of performing new functions (self-driving cars, advanced robots, smart assistants to support people in their daily lives, etc.). Presumably, this accelerates the transition of the world economy to the path of sustainable development. This article is devoted to the study of the impact of the introduction of artificial intelligence technologies on global economic growth, the labor market (employment) and the financial (banking) sector.

Artificial intelligence as a scientific category and modern technology

Artificial intelligence is a vague concept that still does not have a generally accepted definition. The term “artificial intelligence” (AI) was first used by an American specialist - the founder of



computer science as a science - J. McCarthy in 1956 at the Dartmouth Conference of Cognitive Scientists, the goal of which was to create intelligent machines that work and make decisions like people. He defined AI as “a way to make a computer - a controlled robot or program that can think as intelligently as a person” (cited from [Vislova, 2020, p. 19]). The British mathematician A. Turing considered the “true” sign of computer intelligence to be a state when the person asking the question cannot distinguish between human answers and computer answers (cited from [Diamandis, 2015]). American researchers in the field of computing - Bar and Feigenbaum - define AI as a field of computer science that develops intelligent computer systems that have the capabilities of the human mind (understanding language, learning, the ability to reason) (cited from [Ilyin, Panchenko, Kovaleva, 2018]) .

Research by the Facebook-funded Analysis Group, Inc. defines AI as computing devices and systems designed to be intelligent, including technologies that mimic human abilities to learn, infer, and understand complexity. content, dialogue with people, and also improve cognitive abilities or replace people in performing both routine and complex tasks. The range of AI development determines the extent of its impact on the global economy: a more limited economic impact - so-called weak AI - or a solution to a wide range of problems, including the creation of robots with human mental abilities, which corresponds to a significant economic impact - strong AI (strong AI) [Global economic impacts..., 2016]. Another study defines AI as an artificially created intelligence (human-like) that can learn, reason, plan, perceive, or process natural language. AI is divided into “narrow” (narrow AI) and “general” (general AI). The first is designed to perform tasks in a specific area (for example, language translation). The second is hypothetical and domain-independent, but can learn and perform tasks in any domain. Currently, narrow AI is mainly used, which ensures the development of new algorithms and models in the field of computer information science and is defined as machine learning.

Uzbek scientists are currently paying more and more attention to the theory and practice of developing AI technologies. First of all, by such methods as machine learning when solving problems of image processing and pattern recognition; collective interaction of robots when solving group problems; cognitive computer models with natural language understanding, scientific research support systems; AI for information security. The most noticeable contribution to solving the problems of using AI is from the following specialists: S.N. Vasiliev – logical methods in control theory; S.Yu. Zheltov – information processing in complex control systems; Yu.I. Zhuravlev – theory of pattern recognition; N.V. Vapnik – theory of machine learning [Sokolov, 2019, p. 368–369]. In the “Strategy for the Development of the Information Society in the Russian Federation for 2017–2030,” AI is characterized as software systems and algorithms, the main feature of which is the ability to solve certain problems in the same way as a person does.

According to some estimates, the global economic impact associated with the use, development and implementation of AI in the period 2015–2025. can reach amounts from 1.49 to 2.95 trillion dollars [Markoff, 2015]. It is predicted that during this period, AI will become most widespread in the following areas:

- automatic construction of analytical models using algorithms that allow machines to work without human assistance. Possible areas of application are predicting cause-and-effect



relationships based on biological data, developing new drugs and anti-fraud products, unmanned vehicles;

- improving natural language processing, allowing computers to analyze, understand and generate language to interact with people. Areas of application - decoding conclusions dictated by doctors, automatic compilation of articles and translations of texts and speech;
- creation of virtual personal assistants that remind and schedule appointments for users, maintain their personal financial accounts and search for providers of various services;
- the spread of computer vision, which transforms objects, scenes and actions into images. Such applications include providing object descriptions for the blind and creating car safety systems that detect pedestrians and cyclists, as well as area maps (navigators).

The emergence of new functions and services based on machine learning and AI models significantly affects the socio-economic development of countries, regions and the global community as a whole.

The impact of artificial intelligence on economic growth

The McKinsey Global Institute estimates that AI could generate an additional \$13 trillion in global GDP growth by 2030, representing an additional 1.2% average annual GDP growth. If these predictions come true, the impact of AI would be comparable to that of other universal technologies in the history of the world community. For example, the introduction of steam engines in the 1800s increased labor productivity by about 0.3% per year, robots in the 1990s by about 0.4%, new information and communication technologies (ICT) in the early 2000s – by 0.6%.

Experts studied the five most common AI technologies: computer vision, natural language, virtual assistants, robotic process automation and advanced machine learning. The source data included the results of surveys of approximately 3 thousand firms in 14 different industries, as well as economic indicators of a number of international organizations. Calculations have shown that by 2030, about 70% of companies will be able to implement at least one type of AI technology and at least 50% of them will fully master all five.

Other researchers have used the S-curve pattern to calculate the impact of AI on economic growth. It involves a slow start (due to the significant costs and investments associated with learning and deploying new technologies) and then an acceleration due to the cumulative effect of the improving capabilities of innovation and competitive success. The economic impact of AI technologies is accelerating over time. However, their contribution to economic growth by 2030 could be three or more times higher than in the next five years. This slow burn pattern can be interpreted as evidence that the impact of AI in the long term is limited. However, the study authors have a different opinion. They believe that the magnitude of the benefits for firms that adopt these technologies early will grow in subsequent years at the expense of firms that do not adopt them or adopt them to a limited extent.

Many developed countries are already forced to intensify the implementation of AI technologies in order to increase labor productivity growth, as their GDP growth rates tend to fall (which is largely due to the problem of aging populations). Moreover, high wages in these countries increase incentives to replace labor with machines. Countries that are leaders in the implementation of AI technologies are converting their achievements in this area into material advantages. In particular, economically developed countries, through the development and



implementation of AI technologies, can receive an additional 20 to 25% of net economic benefits by 2030.

Developing countries typically have other opportunities to improve production efficiency, including borrowing advanced technological practices and restructuring sectors of their economies. Consequently, they have less incentive to promote AI technologies that provide relatively lower economic benefits. It is believed that from the introduction of AI technologies, these countries could receive an additional 5 to 15% of net economic benefits by 2030 [Solving the productivity puzzle, 2018]. However, some developing countries are exceptions to this rule (eg China).

A number of countries have already announced their initiatives and plans to stimulate the use of AI technologies in the economy. Here are just a few examples as of the end of 2018. EU Member States have announced their intention to cooperate more actively in the field of AI to ensure Europe's competitiveness in these technologies and together to address the social, economic, ethical and legal challenges arising from their implementation. By 2020, \$24 billion had been invested in AI research. The European Commission called on EU countries to increase private and public investment in AI development, announcing growth in AI research to €1.5 billion in 2020, or by 70 % compared to the previous year [Assessing the Economic..., 2018]. A number of European countries have launched national initiatives. Thus, the French government announced it will double the number of people involved in AI projects and invest \$1.85 billion in funding research and startups in this area over five years (2018–2023). The UK has published a comprehensive plan to strengthen the AI foundation as part of an “AI sector deal” and has stated its aim to be a leader in the ethical implementation of these technologies. The international research institute CIFAR in Canada leads the “pan-Canadian artificial intelligence strategy”, based on research from three institutes - the main centers for the development of AI technologies in the country (in Edmonton, Toronto and Montreal) [Assessing the Economic..., 2018]. The US government provides priority funding for research in the field of AI and computing infrastructure. Investment in unclassified R&D in AI and related technologies alone grew by more than 40% from 2015 to 2018.

China is paying close attention to promoting AI technologies. As part of the 13th Five-Year Plan (2016–2020), it was planned to create a domestic AI market of 1 trillion yuan (\$150 billion) by 2020, and in the future, to become the world's leading AI center by 2030. National private businesses are also actively promoting AI technologies. Three Chinese internet giants - Alibaba, Baidu and Tencent - along with iFlytek (which specializes in voice recognition technologies), have joined a "national team" to develop AI in areas such as autonomous vehicles, smart cities and medical imaging. The South Korean government created the Presidential Committee for the Fourth Industrial Revolution in 2017 and announced it would invest \$2 billion by 2022 to expand AI research and development. Singapore has launched a national initiative to expand the use of AI technologies by forming partnerships between government agencies [Assessing the Economic..., 2018]. The Japanese government has made the development of AI and robotics a top priority in its economic revival strategy and increased spending on AI by 900 billion yen (\$8 billion) by the end of 2020.

Finnish economists note that if economic growth is achieved only through current activities (excluding the influence of AI), then the country's annual GDP growth by 2030 will be 0.8%,



and net employment will decrease by 0.5%. These figures will be fundamentally different if we take into account the introduction of AI technologies into the economy and the development of new directions. In this case, the average annual growth rate of Finland's GDP per capita will be 3% until 2030, and net employment will grow by 5% or more.

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