

THE IMPORTANCE OF ARTIFICIAL INTELLIGENCE IN THE WORLD AND THE PROBLEMS RELATED TO IT

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The actual issue of the twenty-first century is determining the essence, importance, application areas of digital technologies and their impact on the economy. Digital technologies are a discrete (intermittent) system based on information coding and transmission methods, which allows multi-planned tasks to be performed in the shortest possible time; Technologies are used to collect, store, process, retrieve, and transmit data in electronic form. Software and hardware tools and systems depend on their functionality. They are in demand in all sectors of the economy as creators of new markets and transformers of business processes.

The components of the technology are the devices, but the main thing is through which these transformations are carried out. Innovation is what makes technological progress happen. High technologies (Hi-Tech) are used in all spheres of human activity today. Its use in the economy causes special changes. Its development trends are changing. With the help of technology, the prosperity and competitiveness of the country increases. It increases the inflow of investments and facilitates the launch of new start-up businesses.

Fast and accurate information delivery is impossible without digital technologies. These technologies are driving the forms of business management that are being introduced worldwide and whose goal is to reduce costs, simplify the service field, make it faster and more flexible, and replace manual work.

The most important technologies of the fourth industrial revolution are the Internet of Things, 3D printing, artificial intelligence, machine learning, robotics, big data, and others. However, today we will briefly review the stages of artificial intelligence's development worldwide.

Key words: *artificial intelligence, digital technologies, industrial revolution.*

1. INTRODUCTION

Artificial intelligence (AI) is a branch of computer science that aims to create an intelligent computer machine/program that can understand human intelligence. Determining the level of intelligence depends on what task we set out to solve.

The Council of Europe defines artificial intelligence as: *"a set of sciences, theories, technologies, the purpose of which is to reproduce human cognitive skills by a machine"*. Given the current level of development, artificial intelligence means delegating complex intellectual tasks performed by a human to a machine."

Artificial intelligence works like human intelligence, but notably it lacks creativity and inspiration. Its use in routine processes is quite simple. To perform similar tasks, artificial intelligence algorithms are being created, which can be predicted, and guessed.

AI has the potential to transform a wide range of industries, however, there is still much uncertainty about the exact impact of AI.

As for the use of artificial intelligence in business, it helps to increase financial well-being.

PricewaterhouseCoopers (PwC) predicts in a report that by 2030

artificial intelligence will bring \$15.7 trillion in financial benefits to the global economy. In Thailand, mobile operator AIS opened its first store without staff. The robot "Lisa" works there, which is controlled by artificial intelligence and provides general information to the user.

Studies show that the use of artificial intelligence in healthcare could potentially generate \$150 billion in annual savings for the US healthcare economy by 2026. Robots, AI, machine learning, and automation will replace 16% of US jobs by 2025. The impact of AI technologies on business will help increase labor productivity by up to 40%.

Artificial intelligence, like other technologies, has positive characteristics as well as negative ones, which are discussed in the world. For example, the English astrophysicist Stephen Hawking believed that the destroyer of humanity is artificial intelligence. His abilities are so great that he can replace a person. And with this, humanity has reached the *"point of no return"*. He believed that the use of artificial intelligence for military purposes was unacceptable. To control this technology, it is necessary to create "some form of world government".

A good example of his point being ignored is the USA and Russia, which are striving to create weapons controlled by artificial intelligence, of course for military use. This event is already called a technological singularity.

The Summit on Responsible Artificial Intelligence in the Military Domain (REAIM) was held in The Hague in 2023. A document (Call to Action) was adopted within the summit, which defines what dangers the uncontrolled use of AI may contain. It calls on states to develop a national legal framework for artificial intelligence.

At the summit, the USA presented a political declaration on the responsible use of artificial intelligence in the military dimension. The purpose of the declaration is to build an international consensus on how militaries can responsibly use AI during military operations. It also aims to help states develop and use this technology for defense purposes while respecting international law, and ensuring security and stability.

The Declaration provides non-legally binding guidelines that describe best practices for the responsible use of AI in the defense context. This means, among other things, that military

AI systems are auditable, have explainable and well-defined uses, are subject to comprehensive testing, and can be deactivated in the event of malfunction. The US State Department believes that the mentioned declaration may become the basis for the development of international norms and principles for the responsible use of AI in the military dimension.

Notably, the US National Artificial Intelligence Act, initiated in 2020 and enacted into law in 2021, defines *artificial intelligence* as „*An automated machine-based system that can make predictions, recommendations, or decisions for human-defined objects to influence real or virtual environments*”.

For years, AI was an isolated phenomenon that was used on a limited theoretical level in narrow circles. Along with the development of technologies, AI has gained special relevance. Since global aggressive forces are actively looking for easy and cheap means to influence the national security systems of opponents, in recent times, the use of AI for malicious purposes is increasing.

Based on the above, Western states are trying to pay significant attention to the phenomenon of AI

and to develop international legal norms that will bring the actions of states regarding the use of AI into a certain legal framework. That is why the REAIM summit and the political declaration initiated by the USA were an important step forward in the mentioned direction. In addition, it should be emphasized that according to the National Cyber Security Strategy of Georgia, Georgia considers AI only in the context of cyber security.

2. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE ECONOMY

Regarding the contribution of artificial intelligence to the economy, there is still much uncertainty about the exact impact of this technology on economic growth, especially in the context of gross domestic product (GDP).

The impact of artificial intelligence on the economy is still being researched worldwide. However, few studies have attempted to evaluate the benefits of the technology. A study by Brynjolfsson and McAfee found (Brynjolfsson, 2014) that artificial intelligence has the potential to increase economic growth by up to 1.7% per year in the United States alone.

Other studies have shown that artificial intelligence can lead to significant increases in productivity in a wide range of industries, from manufacturing to healthcare (McKinsey Global Institute (MGI), 2018), but as mentioned there are concerns around the world that the use of AI can have negative effects.

A McKinsey Global Institute study suggests that artificial intelligence could add \$3.5 trillion to \$5.8 trillion to the global economy by 2030. Research suggests that AI could boost productivity and create new jobs, particularly in healthcare, retail, and manufacturing. AI can also lead to income inequality (McKinsey Global Institute, 2017).

The study by Wagner, Schoenherr, and Pfohl builds on an analysis of the existing literature and examines the impact of AI on GDP in 42 countries. The authors use the data using regression analysis to estimate the impact of AI on GDP and control for other factors that may affect GDP.

Research shows that AI has a positive impact on GDP and that the impact is stronger in high-income countries. Research also suggests that education and research and development (R&D) are essential to maximizing the benefits of artificial intelligence. The results of the

mentioned research show the positive impact of artificial intelligence on GDP (Schoenherr, 2020).

The authors found that a 10% increase in investment in AI (as measured by the number of AI patents per capita) is associated with a 0.3% increase in GDP. The authors also found that the impact of AI on GDP is stronger in high-income countries and the service sector than in other sectors. Research has found that AI has a positive impact on labor productivity. The positive effect of AI on GDP is more pronounced in countries where higher education is at a high level and attention is paid to the research and development part (Schoenherr, 2020).

Studies have been conducted on countries such as the USA, China, Japan, Germany, Great Britain, and others.

It is worth noting here the research conducted by Georgian scientists, which calculates the impact of artificial intelligence on GDP. They use regression analysis to calculate all this and propose the following formula:

$$GDP_t = GDP_{(t-1)} * (1 + g_t),$$

where:

- GDP_t : gross domestic product at time t;
- $GDP_{(t-1)}$: gross domestic product (t-1) in time;

- g_t : GDP growth rate at time t, which is a function of AI adoption, productivity growth, innovation, job mobility, and income inequality.

Here, the GDP growth rate (g_t) can be broken down as follows: $g_t = f(AI_t, P_t, I_t, J_t, Y_t)$, where:

- AI_t : AI adoption index at time t, representing the level of AI integration in the economy;
- P_t : productivity gains at time t as a result of adopting AI;
- I_t : innovation index at time t, indicating the extent to which artificial intelligence drives the creation of new industries and technologies;
- J_t : index of job change at time t, reflecting the negative impact of artificial intelligence on employment;
- Y_t : index of income inequality at time t, which accounts for the effects of artificial intelligence on income;

The relationship between these variables can be specified as follows:

$$P_t = \alpha_1 * AI_t;$$

$$I_t = \alpha_2 * AI_t;$$

$$J_t = \beta_1 * AI_t;$$

$$Y_t = \beta_2 * AI_t.$$

- α_1 and α_2 are positive parameters representing the impact of AI adoption on productivity growth as well as innovation.
- β_1 and β_2 are negative parameters representing the impact of AI adoption on job change and income inequality.

Substituting these relationships into the GDP growth rate equation, we get the following model:

$$g_t = f(\alpha_1 * AI_t, \alpha_2 * AI_t, \beta_1 * AI_t, \beta_2 * AI_t)$$

As a result, they found that AI has both positive and negative effects on GDP growth. While the adoption of AI leads to increased productivity and innovation, it also promotes job changes and income inequality, which may not bode well for long-term economic growth.

3. CALCULATION OF THE ARTIFICIAL INTELLIGENCE IMPACT ON THE GROSS DOMESTIC PRODUCT (GDP)

Based on the research in the world, we developed a methodology (approach) mathematical model (regression analysis) that takes into account several key variables such as AI investment, AI adoption, and AI quality, which calculates the impact of artificial intelligence on GDP.

$$GDP = \alpha + \beta_1 AI \text{ investment} + \beta_2 AI \text{ intake} + \beta_3 AI \text{ quality} + \varepsilon$$

where GDP is the dependent variable, AI investment, AI adoption, and AI quality are the independent variables, and ε is the error term.

Investment in AI refers to the amount spent on research and development, as well as the implementation and maintenance of artificial intelligence technologies. The level of investment in AI can have a major impact on the development and use of these technologies, as well as their quality and capabilities.

AI adoption refers to the extent to which AI technologies are used by businesses, organizations, and individuals in a given country. The level of adoption can be influenced by factors such as the availability of financing, the regulatory environment, and the overall level of technological development in a country.

AI quality refers to the efficiency, reliability, and accuracy of artificial intelligence technologies. The quality of AI can be affected by a variety of factors, including the quality of the data used to train and test AI algorithms, the sophistication of the algorithms themselves, and the

level of expertise of the researchers and engineers working on the AI development.

Together, these variables can help explain the relationship between AI and GDP because, as we have seen, countries that invest more in AI are more likely to adopt AI technologies and produce higher-quality AI, so they will reap greater economic benefits from this. From technologies. However, as we know, everything has both positive and negative sides. We have seen that certain factors affect GDP in different ways.

However, as for the mathematical model proposed by us, it is worth noting the fact that the compilers of the formula are currently incomplete in the world. When their indices appear on the financial markets after that, it will be possible to calculate the mentioned formula better. Therefore, it is necessary to continue research in this direction.

Therefore, in time (when the compilers exist), this research will be of great importance to policymakers trying to promote economic growth through investments in artificial intelligence. As we've seen from research, increased investment in AI can lead to significant gains in GDP, especially in industries with

high potential for automation and productivity growth. However, we also saw that the impact of AI on GDP varies across countries, highlighting the importance of developing a tailored approach to AI investments based on a country's unique economic and social context.

However, there is still much uncertainty about the potential impact of technology on employment. Its implementation may lead to job cuts, but on the positive side, it may lead to new jobs and new industries.

4. CONCLUSION

Given the dynamics of the world and Georgia's vulnerability to network-based technologies, it is important that relevant government agencies pay more attention to the phenomenon of AI in the context of national security. However, it is important that national-level strategic documents properly reflect AI and the future threat from it.

REFERENCES

- [1] Brynjolfsson, E., & McAfee, A. (2014). The second machine age: Work, progress, and prosperity in a time of brilliant technologies. <https://psycnet.apa.org/record/2014-07087-000>
- [2] Notes from the AI frontier: modeling the impact of AI on the

- world economy <https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx>
- [3] Schoenherr, T., Wagner, S. M., & Pfohl, H. C. (2020). The impact of artificial intelligence on GDP: Evidence from 42 countries. *Technological Forecasting and Social Change*, 159, 120204
- [4] Gondauri D., Batiashvili M. The impact of artificial intelligence on GDP: A global analysis, *International Journal of Innovative Science and Research Technology*. 2023. <https://ijisrt.com/assets/upload/files/IJISRT23APR1794.pdf>
- [5] National Artificial Intelligence Act: <https://www.congress.gov/116/bills/hr6216/BILLS-116hr6216ih.pdf>
- [6.] <https://www.coe.int/en/web/human-rights-rule-of-law/artificial-intelligence/glossary>
- [7] <https://www.pwc.com/gx/en/issues/data-and-analytics/artificial-intelligence.html>
- [8] <https://www.marketer.ge/ais-shop-without-seller/>
- [9] <https://blog.zoominfo.com/statistics-about-artificial-intelligence/>
- [10] <https://www.government.nl/ministries/ministry-of-foreign-affairs/news/2023/02/16/reaim-2023-call-to-action>
- [11] <https://www.state.gov/political-declaration-on-responsible-military-use-of-artificial-intelligence-and-autonomy/>