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[DOI: 10.24412/2520-6990-2021-17104-83-91](https://doi.org/10.24412/2520-6990-2021-17104-83-91)**ARTIFICIAL INTELLIGENCE IN BUSINESS:  
THREATS, BENEFITS, TRENDS****Юрчук Н.П.**

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**ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ В БИЗНЕСЕ:  
УГРОЗЫ, ПРЕИМУЩЕСТВА, ТРЕНДЫ****Abstract.**

The article analyzes the essence of artificial intelligence, the principles of its use. The state of the market of artificial intelligence systems is studied. It is noted that in Ukraine the order of the Cabinet of Ministers approved the Concept of development of artificial intelligence in Ukraine until 2030. Emphasis is placed on the areas of practical application of artificial intelligence in modern conditions. The threats of using artificial intelligence in the digital economy are considered in detail. Possibilities and advantages of using artificial intelligence systems in business are highlighted. The main trends in the development of artificial intelligence systems are analyzed.

**Аннотация.**

В статье проанализировано сущность искусственного интеллекта, принципы его использования. Исследовано состояние рынка систем искусственного интеллекта. Отмечено, что в Украине распоряжением КМУ одобрена Концепция развития искусственного интеллекта в Украине до 2030 года. Акцентировано внимание на сферах практического применения искусственного интеллекта в современных условиях. Детально рассмотрены угрозы использования искусственного интеллекта в цифровой экономике. Выделены возможности и преимущества использования систем искусственного интеллекта в предпринимательской деятельности. Проанализированы основные тенденции развития систем искусственного интеллекта.

**Keywords:** artificial intelligence, business, digital technologies, management, digital economy.

**Ключевые слова:** искусственный интеллект, бизнес, цифровые технологии, управление, цифровая экономика.

**Introduction.** In the context of globalization and digitalization, one of the factors of further development of the world economy is the development of artificial intelligence. The use of artificial intelligence allows you to process big data, optimize business processes, make management decisions, and more.

Business leaders are increasingly turning to artificial intelligence (AI) as a means of improving business functions and the ability to remain competitive in an ever-changing market. Others may want to emulate them, but the question arises about the use and implementation of artificial intelligence in business in line with the improvement of financial and economic activities [1].

The potential application of artificial intelligence in business is very large. Therefore, the relevance of the research topic of the use of artificial intelligence in business is not in doubt.

**Analysis of recent research and publications.**

Consulting, technological, financial companies, Ukrainian and foreign researchers are engaged in the study of artificial intelligence: Averkyna M., Sydor-chuk L., Yurchenko YU., Ramazanov S., Shevchenko A., Kuptsova YE., Todorov Georgi, Pohorelenko A., Brundage Miles, Avin Shahar, Clark Jack, Toner

Helen, Eckersley Peter, Garfinkel Ben, Dafoe Allan, Scharre Paul, Zeitzoff Thomas, Filar Bobby, Anderson Hyrum, Roff Heather, Allen Gregory, Steinhardt Jacob, Flynn Carrick, hÉigeartaigh Seán, Beard Simon, Bel-field Haydn, Farquhar Sebastian, Amodei Dario, Teg-mark Max and others.

However, despite significant developments in the field of artificial intelligence, the issue of threats to artificial intelligence, the benefits of using artificial intelligence in business and areas for its further development needs further study.

**Goals setting.** The aim of the study is to analyze the existing threats to the use of artificial intelligence, the benefits of using artificial intelligence systems in business and trends in its further development.

**Presentation of the main material of the research.** Those who will supply intellectual and material capital will benefit the most in the new reality. Therefore, technology is one of the main factors in reducing jobs and reducing incomes, even in countries with a high level of development: the demand for highly skilled labor is growing, and for medium-skilled labor is falling. As a result, the labor market will be characterized by high needs for highly qualified and unskilled

personnel, in the practical absence of the middle segment, at least in many high-tech industries.

Preference will be given to talented, proactive, innovative participants who, thanks to global digital platforms for research, development, marketing, sales and distribution, can more quickly than ever displace long-established and well-established market participants, improving quality, speed or reducing the cost of providing products. consumption of goods [2].

According to the interpretation of the Oxford English Dictionary «artificial intelligence (also AI) - the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages» [3].

Artificial Intelligence Systems (AIS) are software and possibly hardware systems developed by humans that, in the presence of a complex goal, operate in physical or digital dimensions, perceiving the environment through data collection, interpreting collected structured or unstructured data, based on knowledge or processing the information received from this data, and choosing the best actions for achievement of the set purpose. AI systems can use symbolic rules or study a numerical model, and can adapt their behavior by analyzing the impact of the environment on their previous actions [4].

Artificial intelligence in business is an opportunity to organize and optimize activities with greater accuracy than a person could do himself. In addition, due to the integration of AI with cloud technologies, companies can easily collect, control and exchange information between internal and external stakeholders [5].

S.K. Ramazanov, A.I. Shevchenko, Ye.O. Kuptsova in [6] note that in today's unstable world, the scientific direction of AI should be based on fundamental and interdisciplinary scientific developments and

methodologies, taking into account many new challenges:

1. Artificial intelligence technologies and systems (AIS) shall be designed and constructed on the basis of the following subsystems and components:

- scientific bases, basic research and mathematical support (MS);

- technical (hardware) and technological support (TS);

- software systems, platforms and tools (PS);

- social and humanitarian (moral and ethical, cultural and ethical, philosophical and legal) support (SHS).

2. Important aspects and principles of development of future science and technologies in the field of SSI synthesis: nature-like research and technologies; designing the future. Convergence of sciences. Humanity and AI. Technological singularity (TC), TC (Raymond Kurzweil and others). Roger Penrose's theorem on AI and the quantum nature of consciousness and others. Interdisciplinarity and trans disciplinarity. Harmonization of two worlds: real and virtual, especially during their hybridization.

3. Methodology and principles of creating artificial intelligence systems. AI, as a new science in its historical formation, represents a variety of existing approaches in world and Ukrainian science to the understanding of this interdisciplinary scientific field [6].

The worldwide market revenue for artificial intelligence is forecast to grow from 2018 to 2027 (Fig. 1), although different studies suggest variations in just how much the global market size will increase by. The market research firm IDC projected that the global AI market will reach a size of over half a trillion U.S. dollars by 2024 [7].

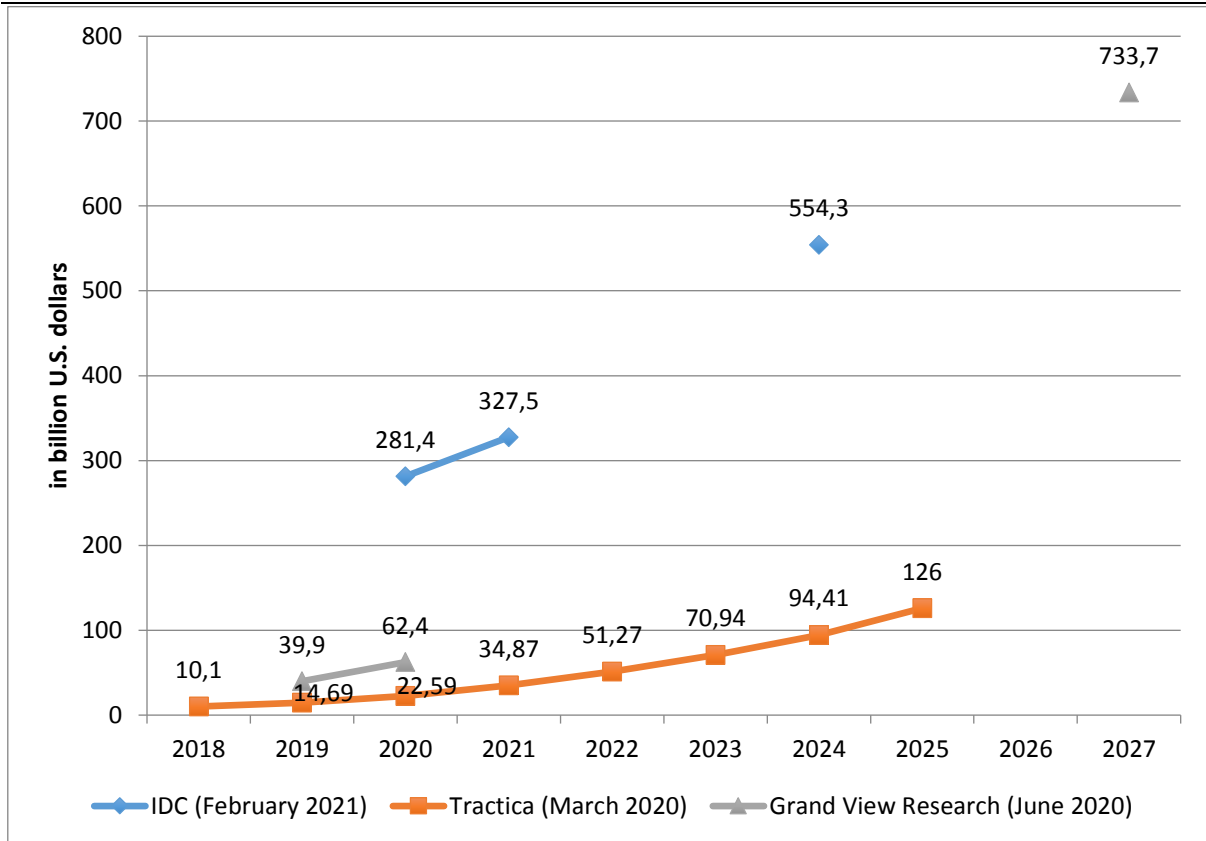


Figure 1. Market size and revenue comparison for artificial intelligence worldwide from 2018 to 2027 (in billion U.S. dollars)

Source: formed by the authors according to the data [7]

In fig. 2 shows the business expectations of the impact of artificial intelligence on the number of jobs.

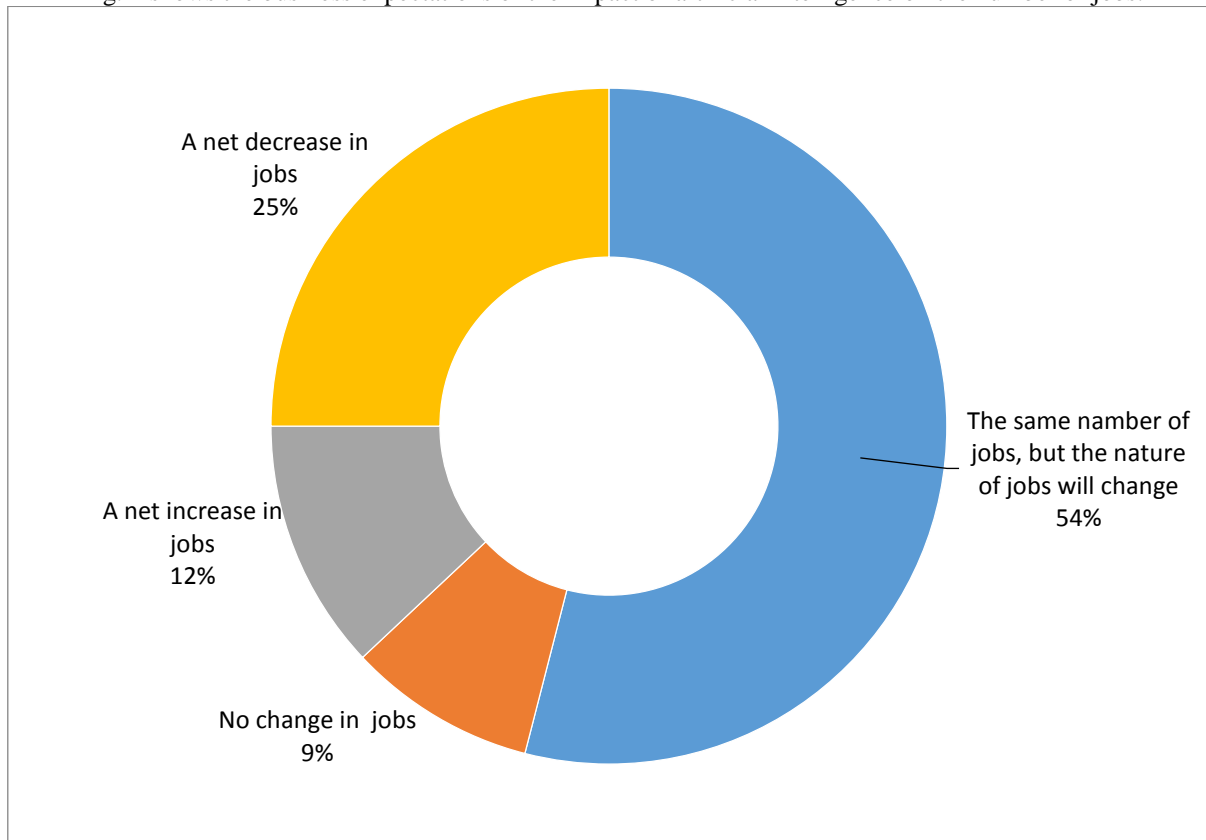


Figure 2. Global business and HR leaders on AI impact to job numbers in their organization 2020

Source: formed by the authors according to the data [7]

According to a 2020 report, 54% of surveyed business and staff leaders worldwide said that they expect artificial intelligence (AI) will have an impact on the nature of jobs in their organisation in the next three years, although the number of jobs will remain the same. Nearly 25 percent of respondents said that they expected that AI would lead to a net decrease in the number of jobs in their organizations in the next three years [7].

Georgi Todorov [8] predicts further development of artificial intelligence:

- The global AI market is predicted to snowball in the next few years, reaching a \$190.61 billion market value in 2025.
- The wearable AI market size is predicted to reach \$180 billion by 2025.
- The forecasted AI annual growth rate between 2020 and 2027 is 33.2%.
- The global AI chip market revenue is expected to reach \$83.25 billion by 2027.
- Between 2018 and 2025, the Asia-Pacific region will experience the highest compound annual growth rate.
- By 2030, China will be the world leader in AI technology, with 26.1% of the global market share.
- A lack of trained and experienced staff is an expected restriction in the AI market's growth.
- In 2019, the machine learning application industry received \$37 billion of funding in the U.S.
- By 2030, AI will lead to an estimated \$15.7 trillion, or 26% increase in global GDP.
- The \$15.7 trillion GDP estimated by 2030 will likely come from increased profitability (40%) and consumption (60%).
- A whopping 93% of automation technologists feel little prepared for upcoming challenges regarding smart machine technologies.
- The top three most significant challenges companies face when considering the implementation of AI are staff skills (56%), the fear of the unknown (42%), and finding a starting point (26%) [8].

In Ukraine, the order of the Cabinet of Ministers approved the Concept for the development of artificial intelligence in Ukraine until 2030 [9]. The purpose of the Concept is to determine the priority areas and main tasks of the development of artificial intelligence technologies to meet the rights and legitimate interests of individuals and legal entities, build a competitive national economy, improve the system of public administration. The concept defines the principles of development and use of artificial intelligence technologies, compliance with which fully complies with the principles of the Organization for Economic Cooperation and Development on artificial intelligence. Among them are:

- promoting inclusive growth, sustainable development and prosperity;

- developing and using of artificial intelligence systems only on condition that the rule of law, fundamental human and citizens' rights and freedoms, and democratic values are respected, and that appropriate safeguards are in place when using such technology;

- compliance of the activity and algorithm of solutions of artificial intelligence systems with the requirements of the legislation on personal data protection, as well as observance of the constitutional right of everyone to not interfere in personal and family life in connection with the processing of personal data;

- ensuring transparency and responsible disclosure of information about artificial intelligence systems;

- reliable and safe operation of artificial intelligence systems throughout their life cycle and implementation on an ongoing basis of their assessment and management of potential risks;

- placing on organizations and individuals who develop, implement or use artificial intelligence systems, responsibility for their proper functioning in accordance with these principles [9].

The priority areas for the implementation of the Concept are:

- occupation of a significant segment of the world market of artificial intelligence technologies and leading positions in international rankings (AI Readiness Index by Oxford Insights, AI Index by Stanford University, etc.);

- creating conditions for participation in the activities of international organizations and the implementation of initiatives for the formation of strategies for the development, regulation and standardization of artificial intelligence;

- introduction of artificial intelligence technologies in the field of education, economy, public administration, cybersecurity, defense and other areas to ensure long-term competitiveness of Ukraine in the international market;

- providing access to information (databases, electronic registers, etc.), its use in the development of artificial intelligence technologies for the production of goods and services;

- promoting the dissemination of research results in the field of artificial intelligence and improving their quality;

- raising the level of professional training of specialists to provide the field of artificial intelligence technologies with qualified personnel;

- protection of information space from unauthorized interference, ensuring safe operation of information and telecommunication systems;

- increasing the level of public safety through the use of artificial intelligence technologies in the development of measures for the re-socialization of convicts and the risk of re-offending;

- bringing legislation in the field of artificial intelligence technologies in line with international regulations [9].

Areas of practical application of artificial intelligence in modern conditions are shown in table 1.



Table 1

**Areas of practical application of artificial intelligence in modern conditions**

Areas of practical application	Characteristic
Machine learning	Automates the construction of the analytical model, collects, analyzes and uses statistics. Thus, it forms an idea of certain situations and how to solve them in different areas of human activity
Neural network	One of the types of machine learning needed to establish the right connection to correct tasks or make the right decisions in advance in appropriate situations
Deep learning	Able to build multi-level neural networks, which allows you to take advantage of computing power and advanced learning methods to handle more complex models with larger data sets
Cognitive calculations	Cognitive computing is used to simulate processes. On the example of a person who first interprets the image and language, and then can speak and perform certain actions independently.
Computer vision	Machines are able to recognize images and study what is happening in an image or video. This option allows machines to independently process and analyze video or images and offer their own solutions for processing and using the material
Proof of theorems	In the development of artificial intelligence an important role was played by the study of methods for proving theorems. Many different problems use the same methodological approaches used in the proof of theorems. In this case, the proof of the theorem includes not only the deduction based on hypotheses, but also the creation of intuitive assumptions about what must be proved to confirm the theorem
Image recognition	The developer of the system forms a list of features on which the quality of recognition depends a lot. The essence of recognition is to a priori obtain the feature vector for the selected individual object, and then based on the list of features, determining which of the figures corresponds to this feature vector
Machine translation and understanding of human language	Based on the semantic model of text representation, a language for internal representation of knowledge has been created. Therefore, today the systems analyze phrases and texts in the following stages: morphological, syntactic, semantic and pragmatic analysis
Game programs	One example is learning the system of chess. In chess, there are several levels of difficulty that reflect the quality of the game system and identify clear criteria for assessing the intellectual growth of the system
Machine creativity	Software systems capable of independently creating music, poems, stories, articles, diplomas and even dissertations. Additionally, many music applications have been created: sound processing systems, sound synthesis, interactive composition systems, algorithmic composition programs.
Expert systems	Used in science, business, technology, manufacturing and other areas where there is a well-defined subject area. The condition for the effective operation of such a system is the existence of an algorithm in a particular subject area

Source: [10]

The most common uses of artificial intelligence in business are shown in Fig. 3.

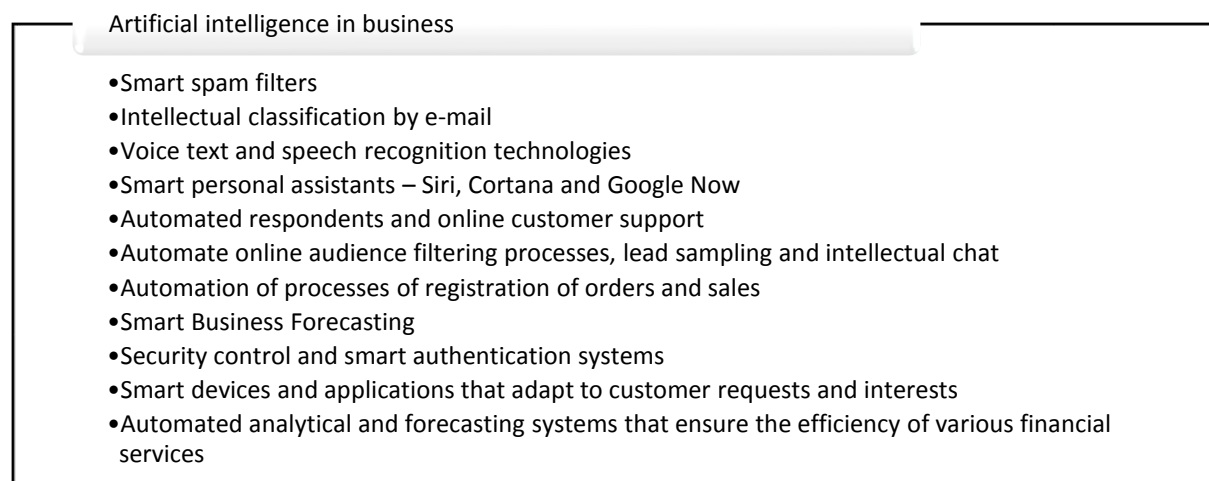


Figure 3. The use of artificial intelligence in business management

Source: summarized by the authors for [11]

AI is a dual-use area of technology. Artificial intelligence systems and knowledge of how their design can be set aside for both civilian and military purposes, as well as more broadly, in favor of useful and harmful purposes. Because some tasks that require intelligence are benign and others are not, artificial intelligence is a dual use in the same sense as human intelligence. It may not be possible for AI researchers to simply avoid producing research and systems that may be aimed at harmful targets (although in some cases special caution may be exercised based on the nature of the particular study in question:

- Interventions. Many tasks that it would be beneficial to automate are themselves dual-use. For example, systems that examine software for vulnerabilities have both offensive and defensive applications, and the difference between the capabilities of an autonomous drone used to deliver packages and the capabilities of an autonomous drone used to deliver explosives need not be very great. In addition, foundational research that aims to increase our understanding of AI, its capabilities and our degree of control over it, appears to be inherently dual-use in nature.

As AI capabilities become more powerful and widespread, we expect the growing use of AI systems to lead to the following changes in the landscape of threats:

- Expansion of existing threats. The costs of attacks may be lowered by the scalable use of AI systems to complete tasks that would ordinarily require human labor, intelligence and expertise. A natural effect would be to expand the set of actors who can carry out particular attacks, the rate at which they can carry out these attacks, and the set of potential targets.

- Introduction of new threats. New attacks may arise through the use of AI systems to complete tasks that would be otherwise impractical for humans. In addition, malicious actors may exploit the vulnerabilities of AI systems deployed by defenders.

- Change to the typical character of threats. We believe there is reason to expect attacks enabled by the growing use of AI to be especially effective, finely targeted, difficult to attribute, and likely to exploit vulnerabilities in AI systems [12].

Most researchers agree that a superintelligent AI is unlikely to exhibit human emotions like love or hate, and that there is no reason to expect AI to become intentionally benevolent or malevolent. Instead, when considering how AI might become a risk, experts think two scenarios most likely:

1. The AI is programmed to do something devastating: Autonomous weapons are artificial intelligence systems that are programmed to kill. In the hands of the wrong person, these weapons could easily cause mass casualties. Moreover, an AI arms race could inadvertently lead to an AI war that also results in mass casualties. To avoid being thwarted by the enemy, these weapons would be designed to be extremely difficult to simply “turn off,” so humans could plausibly lose control of such a situation. This risk is one that’s present even with narrow AI, but grows as levels of AI intelligence and autonomy increase.

2. The AI is programmed to do something beneficial, but it develops a destructive method for achieving its goal: This can happen whenever we fail to fully align the AI’s goals with ours, which is strikingly difficult. If you ask an obedient intelligent car to take you to the airport as fast as possible, it might get you there chased by helicopters and covered in vomit, doing not what you wanted but literally what you asked for. If a superintelligent system is tasked with a ambitious geoengineering project, it might wreak havoc with our ecosystem as a side effect, and view human attempts to stop it as a threat to be met.

As these examples illustrate, the concern about advanced AI isn’t malevolence but competence. A superintelligent AI will be extremely good at accomplishing its goals, and if those goals aren’t aligned with ours, we have a problem. You’re probably not an evil ant-hater who steps on ants out of malice, but if you’re in charge of a hydroelectric green energy project and there’s an anthill in the region to be flooded, too bad for the ants. A key goal of AI safety research is to never place humanity in the position of those ants [13].

In fig. 4 shows the main threats to the use of artificial intelligence.

## The main threats to artificial intelligence

Unemployment rising  
 Preservation of socio-economic inequality between different segments of the population and nations in the world  
 Algorithmic bias  
 Violation of privacy  
 Loss of a person's sense of uniqueness  
 Manipulation of people  
 Deepfakes  
 Global armed conflicts

Figure 4. The main threats to artificial intelligence

Source: systematized by the authors

At the same time, it is necessary to highlight the significant advantages of using artificial intelligence systems in business (Fig. 5).

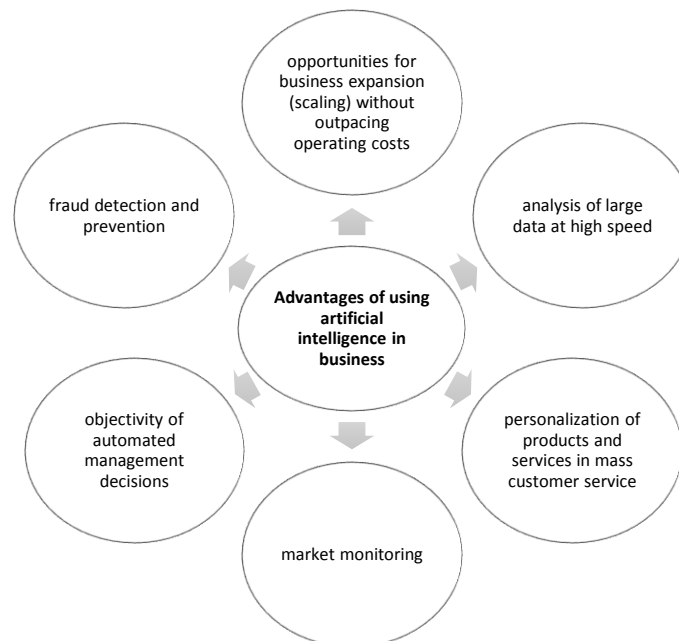


Fig. 5. Advantages of using artificial intelligence systems in business

Source: systematized by the authors

Gartner experts believe that in the coming years, leading data and analytics companies will need to pay increasing attention to the impact of AI on business process transformation, and they will work to make technology more flexible and software more versatile. All approaches need to be adjusted depending on changes in business models. This will help maintain competitiveness in any sector of the economy.

The task of technical professionals today is to understand technological trends and prioritize based on the needs and values of the business. The most common problem in working with foreign investment and ana-

lytical applications is the problem of sorting, processing, storing and protecting data. It influences the growing popularity of the use of intelligent software and creates unprecedented conditions for the development of new opportunities. Developers are actively working on more advanced methods of data processing, as well as advanced functionality of cloud services and applications. This task aims to create learning opportunities for AI, using the maximum amount of data [14].

Gartner highlights the main trends of the year in the development of machine learning and artificial intelligence.

1. Advanced analytics. Extended analytics is expected to become the dominant factor for business forecasting and data processing based on ML platforms in the next decade. And one of the top specialties of the future will be a data specialist and business analyst.

2. Data management. It means not only data management, but also their quality, integration and development of data management systems. It is used to automate manual tasks and to increase productivity in existing processes. Thanks to high-quality automation, even employees without technical skills will be autonomous and will be able to use special analytical platforms for their tasks. It is expected that by the end of 2022, manual data management tasks will be reduced by 45% due to ML and automation.

3. Universal AI. It is expected that by 2022, about half of large new business systems will use universal artificial intelligence that uses real-time contextual data. This AI automates the most complex data for a person and ensures the implementation of solutions through advanced analytics.

4. Explanatory AI. Works on ML platforms, automatically generates explanations of business models and business functionality in the most accessible, intuitive language.

5. Graphic analytics. In a few years, all companies using modern technology will use this tool. It is a set of solutions that examines the relationship between data and objects that are of interest to a particular business process.

6. Data Fabric. Allows access and exchange of data in a distributed environment, therefore, to form a single data management structure that provides access and processing.

7. Conversational analytics / NLP. Technology analyzes complex data and conducts analytics, focusing on the specifics of the business. It is expected that in the next few years, 50% of analytical queries will be generated using NLP.

8. Commercial AI and ML. In the coming years, about 75% of AI and ML-based implementations will be created not as commercial solutions, but as a product of open source platforms. The software will become more accessible and «transparent», but also more secure.

9. Blockchain. Blockchains cannot replace existing data management technologies, but the demand for them will grow due to the easy integration of this technology (even with a fairly high cost of the integration process).

10. RAM servers. Reduce costs and neutralize the complexity of implementing digital architectures with IMC support. Non-volatile memory is a new level of memory between DRAM and NAND flash memory for high-performance workloads. The technology speeds up the availability and download time of programs, but at the same time is not prohibitively expensive.

The introduction of artificial intelligence is not just accelerating, it is becoming critical. And companies still lack experience in implementing industrial AI, and in the meantime, the issue of its implementation will actually be a matter of business survival. This is a

new industry category that will become mandatory in the future [14].

The company's specialists Everest [14] are the following factors that ultimately lead to a wider recognition of the category AI and industrial implementation of this technology in the current year:

1. Growing attention to industry challenges. In capital-intensive industries, more and more money has recently been invested in platforms and tools for artificial intelligence and machine learning, which allows the creation of new usage scenarios and applications based on AI. But these investments have not yet led to significant results for business, especially for industrial organizations. The main shift in the new year for organizations is that they will understand how AI can be used to solve industry-related problems.

2. Lowering the barrier to AI implementation. The lack of experience in artificial intelligence and in-house data skills among industrial organizations has long been one of the most serious obstacles to the wider introduction of industrial AI. The situation will change in 2021, as more and more companies deploy targeted embedded industrial AI applications that combine data science and AI with special software.

3. The ratio of data values and data volume. The average enterprise does not use 60% to 73% of the data collected. Companies, especially in capital-intensive industries, will need to move from mass data collection to more strategic industrial data, data integration, mobility and business-wide accessibility.

4. Productivity growth in capital-intensive industries. The biggest factor in the growth of industrial AI will be its impact on productivity. Industrial AI allows the implementation of next-generation solutions without relying on large-scale experience in data science. In practice, this will be expressed in the process of creating semi-autonomous and autonomous processes for collecting, aggregating and processing data in real time, and then their introduction into intelligent programs [14].

**Conclusions.** Today, artificial intelligence is actively developing, penetrating into all spheres of public life. Modern trends in the development of artificial intelligence allow the use of its technologies in various fields, not only by corporate or high-tech companies, but also in medium, small business, social, inclusive projects, everyday life. Doing business in the digital economy using artificial intelligence systems will allow you to expand your business (scaling) without outpacing operating costs, perform big data analysis at high speed, personalize products and services in mass customer service, monitor market conditions, increase the objectivity of accepted automated management decisions, detect and prevent fraud in business.

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