CHAPTER 1.
ARTIFICIAL INTELLIGENCE: DEFINITION, HISTORY OF DEVELOPMENT, USING

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1.1. ARTIFICIAL INTELLIGENCE: DEFINITION, HISTORY, USES

Introduction. In recent years, the problem of the development and use of technologies based on artificial intelligence has become more relevant. Artificial intelligence is developing rapidly and is becoming increasingly widespread in human activity, as a result of using advantages in business and everyday life of people. Although artificial intelligence began to attract special attention in the early 1920s, the history of artificial intelligence, according to J. McDonald, can be traced back to the development of computers after World War II, when at the Dartmouth Conference in 1956, researchers from various fields came together to study "thinking machines." This is considered to be

the beginning of the development of AI as a separate field of study. The term "artificial intelligence" was first used at the Dartmouth Conference (McDonald, 2024).

Presentation of the main research material. Artificial intelligence gained particular attention from scientists and the public after the IBM Deep Blue supercomputer defeated Garry Kasparov in 1997 and the IBM Watson computer in 2011 on the American game show Jeopardy. These events demonstrated that computers could work with large amounts of data and artificial intelligence software and outperform humans at complex tasks.

The next step was the development of artificial intelligence systems by large companies to perform tasks that humans cannot perform due to the complexity and scale of the data. Programs use artificial intelligence in scientific research, disease diagnosis, drug research, vaccine and medical product development and preclinical studies, in creativity and digital media.

In recent years, the creative technologies of artificial intelligence have improved significantly. For example, in 2023, a museum in The Hague exhibited in its gallery the painting "Girl with Shining Earrings", made by artificial intelligence. German artist Boris Eldagsen won the 2023 Sony World Photography Award for his image entitled "Pseudnomnesia: Electrician", but refused the prize, providing information that the image was created by artificial intelligence. Also in 2023, artificial intelligence began to be used to create musical works. The Grammys announced that music created with the help of artificial intelligence will be eligible for participation in the competition and for awards. According to Stuart Russell and Peter Norvig, the origins of artificial intelligence lie in the study of such areas of knowledge as philosophy, mathematics, economics, neuroscience, psychology, computer engineering, control theory and cybernetics, and linguistics (Russell & Norvig, pp. 5–16).

The stages of the history of artificial intelligence are shown in Table 1.

Table 1

Stages in the history of artificial intelligence development

Development period	Scientists/ organizations	Characteristics of the period
1	**2**	**3**
1943–1955 The birth of artificial intelligence		
1943	Warren McCulloch, Walter Pitts	Proposed a model of artificial neurons, which is built on knowledge of the basic physiology and function of neurons in the brain; formal analysis of propositional logic by Russell and Whitehead; Turing's theory of computation
1949	Donald Gebb	Proposed a simple update rule for changing the strength of connections between neurons (Hebbian rule)
1949	Edmund Callis Berkeley	Publishes the book "Giant Brains, or Thinking Machines"
1950	Marvin Minsky, Dean Edmonds	The first neural network computer SNARC was created
1950	Alan Turing	Published the work "Computer Science and Intelligence", which proposed a machine intelligence test called "Imitation Game"
1952	Arthur Samuel	Developed a checkers program for the IBM701 (the first attempt at evolutionary computing)
1954	Belmont Farley, Wesley Clark	The first artificial neural network was launched
1955	John McCarthy	Held a seminar at Dartmouth on the topic of "artificial intelligence", where the term was first used

Table 1 (continued)

1	2	3
1955–1956	Alain Newell, Clifford Shaw, Herbert Simon	Created a theorem proving program Logic Theorist
1956 Birth of artificial intelligence		
1956	Marvin Minsky, Claude Shannon, Nathaniel Rochester	They worked on how to enable machines to use language, to use abstractions based on this, which are aimed at solving the stated problems; AI was proposed to be separated into a separate field
1957	Frank Rosenblatt	Beginning of research into artificial neural networks (perceptrons), introduction of the connectionist approach (study of the creation and change of connections between neurons in learning)
1958	John McCarthy	LISP (List Processing) is created, the first programming language for research in the field of artificial intelligence
1959	Arthur Samuel	The term “machine learning” was introduced
1959	John Holland	The first doctoral dissertation in computer science was defended, which proposed a multiprocessor computer
1961	General Motors in New Jersey	Unimate industrial robot created for assembly line operation
1965	Edward Feigenbaum, Joshua Lederberg	The first expert system (DENDRAL – chemical analysis system) was created – a form of AI programmed to reproduce the decision-making ability of human experts

Table 1 (continued)

1	2	3
1966	Joseph Weitzenbaum	The first ELIZA chatbot was created to simulate a therapist
1966	Kenneth Colby	Parry program created
1970	Marvin Minsky, Seymour Papert	It is proposed to focus artificial intelligence research on developing programs in microworlds
1972	Terry Vinograd	The SHRDLU program was written to control the arm of a robot working on a flat surface with game blocks scattered on it
1972	Stanford University	Created the MYCIN expert system for diagnosing and treating blood infections
1979	AAAI (Association for the Advancement of Artificial Intelligence)	American Association for Artificial Intelligence created
1980-present Artificial Intelligence becomes an industry (development boom)		
1980	AAAI	The first artificial intelligence conference was held at Stanford
1980	Digital Equipment Corporation	Developed the first successful commercial expert system R1 (XCON – eXpert CONfigurer), which helped configure orders for new computer systems
1981	Government of Japan	$850 million allocated for the Fifth Generation Computer project

Table 1 (continued)

1	2	3
1984	Microelectronics and Computer Technology Corporation	The CYC project has been launched – an experiment in the field of symbolic artificial intelligence
1985	AAAI conference	AARON drawing program demonstrated
1988	AI group DEC DuPont	40 expert systems deployed 100 used and 500 expert systems developed
1986 – present The return of neural networks		
1986	David Ramelhart, James McClelland	The back-propagation learning algorithm was rethought, a network of 920 neurons was trained to form the past tense of English verbs
1987	Alex Weibel	Developed a time-delayed neural network (TDNN)
1988	Wei Zhang	Applied trained CNN
1989	Jan Lecoun	LeNet was created to recognize postal codes at the post office
1991	Wei Zhang, Akira Hasegawa, Kazuyoshi Ito, Yoshiki Ichioka	CNN has been used to segment medical image objects and diagnose breast cancer
1998	Jan Lecoun	A neural network has been created that recognizes handwritten numbers on checks
1986	Michael Jordan	Networks were created in which RNNs were used to study cognitive psychology
1990	Jeffrey Elman	
1991	Jürgen Schmidhuber	Proposed neural sequencer

Table 1 (continued)

1	2	3
1985–1995	Terry Sejnowski, Peter Dayan, Geoffrey Hinton	Architectures and methods for unsupervised learning of deep generative models have been developed
2009–2012	Dena Siresan, Uli Meyer, Jonathan Muskie and others	CNN DanNet achieved performance three times that of traditional methods
2016	Ian Goodfellow, Joshua Bengio, Aaron Courville	Deep learning (a type of machine learning that gives computers the ability to learn based on existing experience) has been proposed
2018	Alibaba Language Processing AI	High-quality machine translation services offered
2014–2022	Tero Karras, Wu Zang, Hu Freeman, Tenenbaum, H. Ye, L. Liang, G. I. Lee, B. H. Huang, Gregory A. Bryant	Generative modeling has been developed – image generation using GAN (generative adversarial network)

Source: summarized and arranged by the authors from (McDonald, 2024; Turing, 1950; Salecha, 2016; Tableau; Wikipedia; Aggarwal, 2021; Copeland, 2025)

Thus, it can be concluded that an important characteristic of artificial intelligence is that it is a multifunctional technology. Artificial intelligence has a wide scope of application. It can be applied in many different ways to many different scenarios (McDonald, 2024, p. 7).

Another approach is to view the history of AI as a series of nested or derived concepts that have emerged over more than 70 years. The following concepts are considered: artificial intelligence, machine learning, deep learning, and generative AI (Fig. 1).

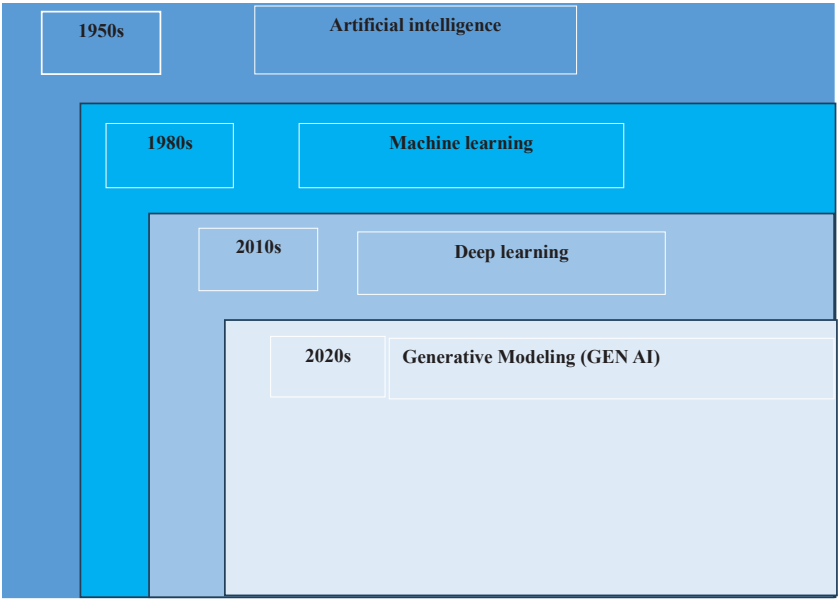

Fig. 1. Concepts of artificial intelligence development

Source: Stryker. 2025

There is no single definition of artificial intelligence in the scientific literature. To understand the concept of artificial intelligence, it is useful to define the difference between human intelligence and artificial intelligence.

Intellect – intellectus from Latin – knowledge, understanding, perception.

Ostrovska G. Y. gives the following definition of intelligence. Intelligence as an ability is usually realized taking into account other abilities (cognition, learning, logical thinking,

systematization, etc.); intelligence has the ability to develop; any activity requires a certain level of intellectual abilities of the individual (Ostrovska, 2021, p. 185).

There are many definitions of artificial intelligence in the scientific literature. The approach proposed in the paper (Russell & Norvig, p. 2) is noteworthy. The authors propose, using eight definitions of artificial intelligence as an example, to consider its definition from the perspective of four approaches. The definition of artificial intelligence is arranged along two dimensions: the definitions on the top relate to thought processes and reasoning, while those on the bottom relate to behavior. In addition, the definitions on the left measure success in terms of the accuracy of human performance, and on the right – in terms of success, compared to an ideal indicator of efficiency (rationality). The approach proposed by the author is shown in Fig. 2.

Thinking like a human	**Rational thinking**
"The exciting new effort to make computers think... machines with intelligence, in the full and literal sense." (Haugelan, 1985). "[The automation of] activities that we associate with human thinking, such as decision-making, problem-solving, learning..." (Bellman, 1978)	"The study of mental abilities using computational models." (Czarniak and McDermott, 1985). "The study of computations that enable perception, reasoning, and action" (Winston, 1992)
Act humanely	**Act rationally**
"The art of creating machines that perform functions that require intelligence, when they are performed by people." (Kurzweil, 1990). "Studying how to make computers do things that that people are currently doing better" (Rich and Knight, 1991)	"Computational intelligence is the study of the design of intelligent agents." (Poole et al., 1998). "Artificial intelligence... deals with intelligent behavior in artifacts" (Nilsson, 1998)

Fig. 2. Definitions of artificial intelligence, organized into four categories

A summary of views on the definition of artificial intelligence, based on the results of the analysis conducted by the authors, is given in Table 2.

Table 2

Approaches to defining artificial intelligence

Author, source	Definition
1	2
J. McDonald (McDonald, 2024, p. 7)	Artificial intelligence is the ability of computers or other machines to exhibit intelligent behavior
John McCarthy (Jose Moya, 2024)	Artificial intelligence is the science and technology of creating intelligent machines, especially intelligent computer programs
O. A. Baranov (Baranov, 2023, p. 46)	Artificial intelligence is a certain set of methods, means, tools and technologies, primarily computer ones, that imitate (model) cognitive functions that have criteria, characteristics and indicators equivalent to the criteria, characteristics and indicators of the corresponding human cognitive functions
Paul Scharre, Michael K. Horowitz, Robert O. Work (Scharre, et al., 2018, p. 4)	Artificial intelligence is a field of research dedicated to creating intelligent machines. Intelligence measures a system's ability to determine the best course of action to achieve its goals in a wide range of environments
US Department of Defense (Summary, 2018)	Artificial intelligence is the ability of machines to perform tasks that typically require human intelligence, such as "recognizing patterns, learning from experience, drawing conclusions, and making predictions"
Cole Stryker (Stryker, 2025)	Artificial intelligence is a technology that allows computers and machines to mimic human learning, understanding, problem-solving, decision-making, creativity, and autonomy
Brian Jack Copeland (Copeland, 2025)	Artificial intelligence is the ability of a digital computer or computer-controlled robot to perform tasks typically associated with intelligent beings

Table 2 (continued)

1	2
Ogirko I. V. and others. (Ogirko I. V. et al., 2022, p. 203)	Artificial intelligence is a scientific direction within which the tasks of hardware or software modeling of those types of human activity that are traditionally considered intellectual are posed and solved
Shcherbak N. M., Utkina M. S. (Shcherbak, Utkina, 2021, p. 215)	Artificial intelligence is a computer program based on algorithms for analyzing relevant data and algorithms for making autonomous decisions based on them, in the process of achieving which it can learn from experience and improve its own efficiency through data analysis, in order to achieve the set goals
Ben Coppin (Coppin, 2004 p. 4)	Artificial intelligence is the ability of machines to adapt to new situations, cope with emerging situations, solve problems, answer questions, develop plans, and perform various other functions that require a certain level of intelligence, which is usually manifested in humans
Blay Whitby (Whitby, 2008 p. 1)	Artificial intelligence is the study of the intelligent behavior of humans, animals, and machines, and the attempt to translate such behavior into an artifact such as computers and computer-related technologies
Gary Pence (Pence, 2022)	Artificial intelligence is the use of computer algorithms that think, work, and react like humans
Herrod R. A., Papas B. C. (Herrod, & Papas, 1989)	Artificial intelligence is transforming various industries, providing new solutions, increasing efficiency, and reducing costs
Shiza Malik, Khalid Muhammad, Yasir Wahed (Malik et al., 2024)	Artificial intelligence refers to the development of computer systems that can perform tasks that typically require human intelligence, such as learning, problem-solving, perception, decision-making, and language understanding

Source: summarized by the authors

Researchers mainly include the ability to control motor activity, plan, count, verbal perception, verbal flexibility, the ability to identify and analyze, and memory as signs of intelligence (Shcherbak, Utkina, 2021, p. 215).

In contrast, research in the field of artificial intelligence has mainly focused on the following components of intelligence: learning, reasoning, problem solving, perception, and language use (Copeland, 2025).

Artificial intelligence is created with the aim of reproducing and copying the cognitive functions of the human brain. The basis for creating artificial intelligence is considered to be the imitation of the cognitive functions of the human brain by completely copying the architecture and completely copying human thought processes in order to achieve certain results (Shcherbak, Utkina, 2021, p. 215).

The use of artificial intelligence has expanded significantly. Artificial intelligence has found application in market analysis and the study of its development trends, the production of machinery and equipment, intralogistics, in production processes, the construction of supply chains, in architecture and construction, trade optimization, demand research, etc.

Artificial intelligence systems learn and act like humans, and in some cases, outperform humans. Artificial intelligence systems can analyze vast amounts of data, solve complex problems, make decisions, and perform creative tasks.

Copeland B. J. (Copeland, 2025) notes that a good expert system can often outperform any single human expert. Today, there are a large number of commercial expert systems, including programs for medical diagnostics, chemical analysis, credit authorization, financial management, corporate planning, financial document routing, oil and mineral exploration, genetic engineering, automobile design and production, camera lens design, computer system design, and airline scheduling.

Let’s consider some possible areas of use of artificial intelligence.

Using artificial intelligence in education. In schools, most learning takes place in social settings. Teachers play a major role in planning, shaping, and managing the learning sequence.

Intelligent learning systems emerged with the advent of desktop computers, offering curricula that provided immediate feedback and adapted learning paths based on student responses. These systems demonstrated the potential benefits of personalized learning, making the introduction of technology in education increasingly attractive.

Artificial intelligence is used in various fields of education and in educational institutions. The use of artificial intelligence in education has had a significant impact, including increasing efficiency, global learning, individual / personalized learning. Artificial intelligence in education has introduced more intelligent content and provided increased efficiency and effectiveness in educational management (Timms, 2016).

Intelligent learning systems emerged with the advent of desktop computers. They began to offer educational programs that provided rapid feedback, generated answers, and derived grades based on students' or schoolchildren's responses.

Artificial intelligence systems have demonstrated the potential benefits of personalized learning, making the implementation of technology in education increasingly attractive.

Artificial intelligence offers innovative solutions in the field of personalized learning, adaptive learning platforms, intelligent learning systems, automated assessment and feedback, and administration of the learning process.

As AI advances, new ways to use it in education are emerging. One way to use AI could be to observe students working in small groups to determine when the group is "in sync" or "out of focus."

To further implement AI in education, researchers should focus on the need to recognize the social role of technology in learning. Educational cobots, if well designed, will play a leading social role in the classroom as teacher assistants (Timms, 2016).

The trend of digitalization of education involves the active use of artificial intelligence in the educational environment, which makes it possible to use modeling in the educational process, tools for generalizing information, its dissemination and assimilation.

Methodically balanced use of artificial intelligence tools and open science cloud services can significantly diversify and improve the visualization of educational material, given that the role of distance and blended learning has increased in Ukraine due to stabilization or emergency power outages (Mar'enko, Kovalenko, 2023).

Using artificial intelligence in libraries. Artificial intelligence is widely used in library services, transforming them with the help of modern information technologies.

Currently, the most common way that library visitors encounter AI is through search engines, which use AI to detect spam, improve the accuracy of query rankings, customize query responses based on previous user activity, develop natural language answers to questions, and search for images. AI makes the search engine process more accurate and less dependent on human attention (Pence, 2022).

The main obstacle to the widespread adoption of AI in library activities is the limited budget. However, even with limited library budgets, there are free resources that allow libraries to introduce users to advanced AI-based search methods. Machine learning is being used to create a new class of literature search programs called literature mapping tools, such as ResearchRabbit, Connected Papers, and others (Tay, 2021).

Artificial intelligence can be used to create literature maps, to show connections between similar works. Applications can also suggest additional articles of possible interest and allow for literature tracking to recommend related articles as they are published.

Libraries now offer many more types of resources than books, magazines, newspapers, etc. The list of resources is expanding to include films, tapes, databases, e-books, digital image collections,

musical works, and digitized audio files. Library users are increasingly accessing library resources from external locations (Tynan, 2019).

In industry, the use of artificial intelligence is ensured through robotization and automation of processes, which optimizes production processes, costs, minimizes inventory. Provides equipment diagnostics for emergency conditions, reduces downtime, and finds optimal solutions in the design, organization, and management of processes.

The use of artificial intelligence in industry. Artificial intelligence is revolutionizing various industries, including food processing, drug development, e-commerce, and chemical industries, by offering intelligent solutions. This leads to reduced energy consumption, increased cost efficiency, reduced operational risks, and improved performance indicators (Malik, at all, 2024).

Artificial intelligence is seen as an element of the fourth industrial revolution, which has an impact on improving life and allows for the automation of processes.

According to a survey conducted by MIT Technology Review Insights, as of 2020, manufacturing is the second largest industry for the adoption of artificial intelligence.

Today's industries face global competition, unpredictable changes in the external environment and customer needs, as well as ever-growing environmental problems.

These challenges are forcing manufacturers to shift their focus to improving and implementing effective communication products so that they are available to consumers within a specified timeframe with less cost (Ahmed at all, 2022). The best possible solution lies in artificial intelligence, which maximizes its beneficial effects and minimizes the risks and threats associated with the application of artificial intelligence in industries.

Overall, AI is transforming industries by providing innovative solutions that improve productivity, efficiency, and customer service. AI helps researchers, managers, and developers evaluate, analyze,

integrate, and deploy the most robust AI technologies in their respective industries (Peres, 2020).

Artificial intelligence allows you to optimize processes, increase productivity and provide increased security. Artificial intelligence solves problems of confidentiality, data, regulatory compliance, and quality control.

In the near future, one of the challenges will be the integration of artificial intelligence into global industries.

According to (Malik, 2024), this will help researchers find alternative solutions to gather sufficient knowledge and information, as well as decision-making authority for future investments and developing a big picture related to AI-based applications for sustainable development of industries.

Artificial intelligence helps manage and optimize business processes in industry, develop new products, and scale operational processes.

Arkady Sendler (Sendler, 2023) identifies seven ways in which artificial intelligence is changing manufacturing: predictive maintenance, quality assurance, defect inspection, warehouse automation, assembly line integration and optimization, AI-based product development and design, and the use of robotics.

The use of artificial intelligence in pharmacology and the healthcare sector. Artificial intelligence is widely used in drug discovery and development programs.

In pharmacology, artificial intelligence has begun to be used to search for new possible combinations of components and compounds that would have a targeted therapeutic effect by processing large amounts of information.

The development of artificial intelligence has found application as an important tool for more efficient and accurate drug development.

According to scientists, it usually takes more than 10 years to develop a new drug. In addition, it is an expensive process. According to biotechnologists, artificial intelligence can significantly

speed up this process and make it cheaper, since artificial intelligence predicts the possible effects of potential compounds on the human body and automatically filters out ineffective ones.

Artificial intelligence simplifies the drug development process by eliminating large clinical trials through the use of simulation and modeling alternatives that allow scientists to study molecules comprehensively (Hamid Yeganeh, 2019). It allows for the production of industrial drugs with improved quality control, end-product characterization, fixed and variable operating conditions according to defined conditions (Lee, Yoon, 2021, p. 271).

The most significant issues associated with the widespread use of artificial intelligence and digital devices in pharmacology include issues of privacy, cybersecurity, data integrity, data ownership, the problem of data exchange between different organizational units, issues of medical ethics, liability for medical errors, and risks of system failures (Yoon, & Lee, 2021; Abomhara, & Køien, 2015).

The development of artificial intelligence and its use in healthcare has made it possible to consider patient health as the result of taking into account the influence of many factors, namely: healthy nutrition, physical activity, management of emotional and psychological state, disease prevention, diagnosis and treatment of diseases.

In addition, online services allow the population to conduct their own health research. Digital devices are used to supplement the skills of medical personnel.

The development of new technological applications using artificial intelligence creates the need for retraining of medical personnel. Artificial intelligence allows for innovation in the field of healthcare and pharmacology.

Artificial intelligence occupies a special place in the provision of home medical care, conducting operations, organizing the work of family doctors, organizing document flow and storing information.

Artificial intelligence in pharmacology allows you to automate processes that were previously performed manually.

Using artificial intelligence in marketing. Artificial intelligence has found wide application in marketing. With the help of artificial intelligence, customer service is developing. Artificial intelligence is necessary for a deep analysis of each client and the study of his tastes. Own knowledge of consumers and their consumer preferences ensures the effectiveness of a marketing strategy using artificial intelligence.

Artificial intelligence allows for the customization of customer service and the optimization of supply chains. Scientific articles identify understanding customer needs, improving operational efficiency, and stimulating innovation as priorities when implementing artificial intelligence.

This is because in these areas, artificial intelligence dominates human capabilities in terms of analysis and execution time. It is noted that one of the most significant advantages of artificial intelligence is its ability to quickly and efficiently analyze large amounts of data, which, of course, would take a lot of time for a person, while artificial intelligence ultimately allows companies to provide services and products personalized for each client individually (Khabibulin, 2024).

To optimize marketing activities, artificial intelligence can perform demand forecasting, as it operates on large databases, allowing it to better understand customer needs, optimize inventory and supply chains. Artificial intelligence plays a crucial role in product development, allowing companies to anticipate trends and possible changes in consumer preferences. According to research by B. Marr (Marr, 2022), companies that invest in product development based on artificial intelligence benefit from faster production cycles and the creation of more targeted products.

Artificial intelligence has defined significant changes in the way we communicate with customers, the methods and techniques that companies use to achieve their goals, and the acquisition of competencies necessary for marketers to perform their functional duties.

In marketing activities, artificial intelligence is used to implement content marketing, send emails, support customers using chatbots, perform predictive analysis and behavioral analysis to create effective segmentation of the target group, which allows for high-quality prediction of consumer behavior and determination of pricing policy (Nazmuz, 2022).

Of particular interest is the determination of the impact of artificial intelligence on advertising. This issue is being studied by practitioners and scholars at both the micro and macro levels. The use of artificial intelligence in advertising determines target segments and the best appeal option.

In addition, artificial intelligence is used in the formulation of marketing strategy. Thus, the article (Mahabub Basha, 2023, p. 999) notes that before the introduction of artificial intelligence in marketing, the main focus in strategy planning was on increasing marketing resources and expanding the product range. After the introduction of artificial intelligence, marketing managers focused on business analytics, which made it possible to better understand marketing, sales and operations trends. Thus, predictive models were created based on data to predict future strategies.

The main problems of integrating artificial intelligence into marketing are technical compatibility in the integration process, staff training, technical capabilities, database formation, and consideration of the ethical consequences of using artificial intelligence when collecting personal information.

Using artificial intelligence in research.

The European Union recommends that universities, national sponsors and states promote artificial intelligence research:

– include artificial intelligence for research – strengthening fundamental research in the field of artificial intelligence and increasing its use in interdisciplinary research;

– developing and strengthening skills in using artificial intelligence in research and encouraging talent;

– optimization of the creation and use of computing infrastructure and data, which is determined by the importance of data exchange capabilities;

– ensuring the availability and access to resilient computing infrastructures (The Guild, 2024).

The use of artificial intelligence for research involves the development of interdisciplinary tools that encompass big data, machine learning, statistics, mathematics, computer science, language technology, logic, and computer vision.

The development of the use of artificial intelligence in research in the social sciences and humanities, and the arts also plays a significant role in improving our understanding of processes.

However, the issue of responsible use of artificial intelligence and its compliance with human rights remains relevant.

Scientists emphasize the need to develop artificial intelligence to deepen knowledge to promote multilingualism and multiculturalism, increasing investment in mono-, inter-, and transdisciplinary research.

To ensure the openness of AI models, code (in the sense of open source) and data used, it is crucial for their verification, adoption in academic communities and acceptance. This also requires responsibility on the part of the producers. This implies the presence of clear documentation (Chinimilli, & Sadasivuni, 2024).

Increasingly, research is incorporating the results obtained by artificial intelligence. However, scientists' opinions on the use of artificial intelligence differ. There are those who advocate the use of artificial intelligence and predict that the development of its potential will improve the evidence base of research.

Another group of scholars is concerned about the growing use of artificial intelligence, focusing on the risks that accompany this process and possible problems with academic integrity.

The use of artificial intelligence in Ukraine is developing at a rapid pace. Over the past ten years, the number of AI/ML specialists has increased 5 times and is 5,200 professionals as of January 2024.

At the same time, 36% of all AI/ML specialists are young people aged 21–25.

The most common professions (63% of all specialists in the industry) among specialists are Data Scientists and ML Engineers.

Ukraine currently ranks second in the number of AI companies among Central and Eastern European countries. At the end of 2023, there were 243 AI companies in Ukraine, a number that has grown 2.5 times over the past decade (Government Portal, 2024).

Conclusions. The use of artificial intelligence, despite its significant positive aspects, is also characterized by certain disadvantages. Artificial intelligence in society requires "guardrails" for its proper use, which can range from formal regulations to codes of conduct and recommendations for best practices (McDonald, 2024, p. 6).

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1.2. USE OF AI IN MANAGING INNOVATIVE ECONOMIC DEVELOPMENT: WORLD EXPERIENCE

Introduction. In recent decades, the greatest development has been achieved by countries focused on structural transformations and the development of high technologies. The innovative development of such countries contributes to increasing competitiveness, creating new technologies, goods and improving the business environment, which allows reducing the consumption of natural resources and anthropogenic impact. Ukraine needs to move to an innovative development model that will reduce economic dependence and promote social and environmental changes. To do this, it is necessary to implement the experience of economically developed countries in innovation management and increase export potential, ensuring stable economic growth and a place in the EU [1, p. 150].

Therefore, domestic and foreign scientists focus on the feasibility and necessity of using artificial intelligence to ensure economic development, namely: Andrushkiv B. M., Cherep A. V. [2; 13], Golovkova L. S., Kyrych N. B. [2], Cherep O. G. [2; 3], Dashko I. M. [3; 13], Mykhailichenko L. V. [3], Derba V. S. [4], Hryshko V., Zinchenko I. [5], Zhang M., Chen Y. [6], Kuchmiyova T. S. [7], Muzychenko T. O., Skorba O. A., Shevchuk A. A. [8], Masoud R., Basahel S. [9], La Torre D., Colapinto C., Durosini I., Triberti S. [10], Singh N.,

Chouhan S. S. [11], Chernyshova O. O., Domashenko S. V., Domashenko D. G. [12], Ogrenych Yu. O. [13], Yavorska O. H. [14].

Presentation of the main research material. The basis of effective innovative development of the economy is a management system that includes coordination of interests of producers, consumers and the state. This system is implemented through the formation of innovation policy, which changes depending on the stages of development of the country's economy. L. Fedulova [15] identifies the following main types of innovation development policy, in particular, the policy of "technological push", which involves the determination of priority areas of development of science and technology by the state with a large participation in financing and implementation of programs; the policy of "market orientation", where the role of the state is reduced, stimulating the innovation process through tax breaks and promoting market initiative; the policy of "social orientation", which provides social control over the consequences of scientific and technological progress and involves public participation in determining development directions; a comprehensive policy of innovation development, which covers changes in the economic structure and requires new forms of organization and regulation.

The use of artificial intelligence (AI) as a key tool for ensuring development and change to ensure increased competitiveness involves a focus on skills and competencies and the use of innovative technologies. The transition from human to machine decision-making will ensure the selection of the most optimal innovation processes that are aimed at innovative development. Multiple goals are the prevailing reality of organizational life, so the use of AI is aimed at taking into account complex decision-making situations that include several, and often conflicting goals and priorities.

The leap in the use of AI allows for innovative development on the basis of modeling and computational capacity to solve problems and involves choosing from a large number of conflicting

criteria – the most optimal. The use of AI ranges from budget allocation to planning, as well as in many areas, from marketing and quality control to production and personnel management.

Financing innovative development includes both active state intervention in creating demand for innovations and decentralized regulation, in which the state supports those innovative directions that appear at the request of society [16].

As the authors of the article "Development of Artificial Intelligence: Advantages and Disadvantages" note, in the process of planning financing for innovative development, artificial intelligence can be used to analyze loan applications and identify the creditworthiness of borrowers, quickly assess data on the borrower's income and expenses, as well as analyze credit histories, which allows you to reduce the time required to make a decision on issuing a loan and reduce risks for the bank. In the field of finance, artificial intelligence can be used to create investment portfolios, analyze market data and predict its movement in order to make effective investments.

A mixed mechanism for regulating innovative development is often used in countries with a significant share of the public sector in the economy. In such a strategy, the state actively intervenes in the activities of enterprises and sectors of the economy, trying to achieve a high level of competitiveness. This approach is characteristic of Sweden, and to some extent also of Ukraine.

The main component of the system for stimulating innovative development is the financing and creation of a system for disseminating innovations within the framework of the general scientific and technical policy of industrial countries, which is aimed at ensuring the implementation of the results of scientific research and development into production and the further application of innovations in the real economy [17, p. 51]. Analysis of the experience of innovative development of the economies of industrial countries [18; 19] allows us to conclude that the structure of innovative development management in developed countries

is similar. In particular, the most typical is the structure of innovative development management of the national economy of the USA, a country that belongs to the top 10 most developed innovative economies in the world.

The process of innovative development of the economy in the USA is typical of the Euro-Atlantic model and includes all stages of the innovation cycle – from the emergence of a global innovative idea to its implementation in the production process. This allowed the USA to take a leading position in the market of high-tech products (space, weapons), where the share of US products is 39% [1, p. 152]. Among the government agencies regulating innovation development, the Department of Commerce plays an important role, which is engaged in determining global innovation trends, patenting, standardization and collecting statistical information on innovation processes, as well as funding promising innovation research. In addition, federal agencies such as the Department of Health and Human Services and the Department of Defense also have an impact on commercialization and innovation in their respective areas.

Small and medium-sized enterprises play an important role in the development of the US innovation economy. The main federal initiatives to support innovation development are the Small Business Innovation Research (SBIR) Program, the Small Business Support Program, and the Technology Transfer Program (STTR), which support innovative small and medium-sized enterprises. Thus, in 2015, these programs allocated almost $2 billion to small businesses with fewer than 500 employees [20].

The US Congress has the authority to implement innovations through legislative initiatives, granting permits and financing, organizing hearings, and overseeing the commercialization of innovations. The most important are the Committee on Innovation and the Committee on Small Business, as well as the Senate Committee on Commerce, Science, and Transportation.

Another element of innovation development management is the US judicial system, which resolves legal issues related to innovations, patents, and intellectual property.

Due to the favorable highly competitive business environment, the role of the state in the USA is mainly reduced to guaranteeing loans and tax breaks for innovative enterprises. State funding of innovative research is about 10% for industrial research and 17% for basic research, according to analytical data from the National Science Foundation (NSF) [21, p. 49].

At the regional level, innovative economic development is actively supported by state governments, which are closer to the specific needs of industries that form regional economies.

Non-governmental organizations also play an important role in shaping the innovative economy at the meso- and macro-levels. In addition, universities in the USA actively influence innovative development through research commissioned by industrial corporations. Therefore, most innovative ideas in the USA are implemented by the private sector, in particular through financing scientific research and development.

The main characteristic of the American model of management of innovative economic development at the meso- and micro-levels is that decisions on the implementation of innovative ideas are made by the top management of corporations. They determine the directions of innovation development, ways of their integration into the production process, the characteristics of products resulting from innovations, as well as methods and ways of their distribution. This approach makes it possible to quickly adjust research directions in case of incorrect decisions, in order to achieve the desired results. The advantage of this model is the accelerated entry of innovative products into the market, the conquest of new markets and the establishment of close feedback with consumers, which allows for rapid changes or improvements to the product. Examples of this are the successes of Microsoft, Tesla and Apple,

whose innovation management has made them among the most powerful in the world.

However, this approach also has disadvantages, including the risk of making wrong decisions due to insufficient qualifications of individual managers and the limited financial and scientific potential of corporations to solve problems. As a result, innovative products may have a short life cycle or quality deficiencies. This may lead to the withdrawal of innovative products from the market for further development, which, in turn, leads to additional financial losses and harms the image of corporations. In Germany, like the USA, state intervention in the innovative development of the economy is limited to financing global innovations, the implementation of which is deferred in time. Support for operational innovations consists in providing tax breaks to innovative enterprises and grant funding for research in the field of environmental and social innovations that do not bring a quick economic effect, but solve important issues, such as environmental protection and improving the quality of life.

Management of innovative development at the meso- and micro-levels in Germany has its own specific features, due to the cultural characteristics of society, which are expressed in resistance to risks and the desire for stability. German corporations have historically been leaders in innovation in the field of technology and quality, but due to fear of risks and loss of image, they cannot always respond quickly to new innovative ideas, as Americans do, which slows down their innovative development. The advantage of the German model is high-quality innovative products that have a longer service life, but they may be late to the market and face competition.

In Germany, decisions on the implementation of innovations are agreed upon by the owners of corporations, which takes more time, and even after the decision is made, the process of developing innovations can be slowed down by a lack of finance. However, small and medium-sized enterprises have the opportunity to respond faster to changes and successfully implement innovative ideas. Such

companies should constantly stimulate innovations, monitoring new ideas from the very beginning.

The innovation development system in Sweden is an example of successful state intervention. In Sweden, most innovation programs are developed in universities and private companies and are financed by manufacturing corporations and the state budget. However, the largest funding for innovations in the country is carried out by big business through industrial research institutes. Sweden actively finances innovations at the level of 1% of GDP and involves big business, which finances up to 3% of GDP.

Japan has a different model of innovation management, in which the government actively supports innovations through various ministries, as well as through a system of research centers and universities. Japan ranks 13th in the world ranking of innovative economies and has a developed system of public funding of innovations through competitions and specialized agencies. The main part of financing of innovation processes is carried out by large businesses, such as Toyota, Softbank, and Hitachi, which finance up to 98% of their scientific and technological research [22].

Conclusions. Thus, the management of innovative development of national economies has different approaches depending on the country. In Ukraine, due to the absence of large corporations, innovative development at this stage depends mainly on state support, which causes a number of problems, such as a weak legislative framework, high interest rates on loans and corruption.

We also believe that the problematic issues of forming a team whose members have technical knowledge, experience of teamwork, personal characteristics, communication skills, leadership and motivation for personal innovative development, taking into account the use of artificial intelligence in order to ensure a high level of competitiveness of the state economy, are important.

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1.3. ARTIFICIAL INTELLIGENCE AS A PRACTICAL TOOL FOR HUMAN DEVELOPMENT

Introduction. The impact of artificial intelligence (AI) as a practical tool for the development of humanity in various spheres of life is studied, including healthcare, education, finance, industry, and logistics. The advantages of using AI are described, which contribute to increasing efficiency, optimizing processes, and creating new opportunities for development. Examples of successful implementation of AI are considered, including automation of disease diagnostics, forecasting disease outbreaks, personalized learning, and detecting financial fraud. Ethical and social challenges associated with the use of AI are identified, including issues of data security, algorithm transparency, and the threat of unemployment due to automation. Recommendations for the responsible use of AI are proposed, including the creation of ethical standards, protecting data confidentiality, retraining employees, and ensuring the transparency of decisions made by AI. Prospects for further research are related to improving the regulatory framework and the impact of AI on social processes.

Artificial intelligence (AI) is one of the most powerful and controversial technologies of our time, with the potential to radically change human activity and social processes. In the context of the digital transformation of the economy,

AI plays an important role in increasing business efficiency, automating routine operations, reducing costs and improving decision-making processes. However, the implementation of AI is accompanied by a number of problems, including ethical dilemmas, employment challenges, security and control issues, as well as the uneven distribution of technological benefits.

Presentation of the main research material. Artificial Intelligence (AI) has become a key tool that contributes to the development of humanity, introducing innovations and increasing efficiency in various areas of life (Fig. 1):

– healthcare. AI helps diagnose diseases by analyzing medical images and patient data, which contributes to early detection of diseases and increased accuracy of treatment;

– finance. In banking, AI is used to detect fraudulent transactions, analyze market trends, and automate customer service;

– education. Intelligent adaptive learning systems adapt to the individual needs of students, providing a personalized approach to education;

– industry. AI-based robotic systems optimize production processes, increasing productivity and reducing costs;

– Transport. The development of autonomous vehicles and the optimization of logistics routes contribute to increasing the safety and efficiency of transportation;

– business. AI allows you to automate routine tasks such as order processing, inventory management and accounting, which reduces the cost of time and resources. The ability to quickly analyze large databases and volumes of information helps to detect hidden errors, which eases the workload on staff.

At the same time, the issue of regulating and responsible use of AI remains relevant to avoid abuse and negative consequences for society. The challenge lies in the need to develop a comprehensive approach that will allow for the integration of AI without harming fundamental human values.

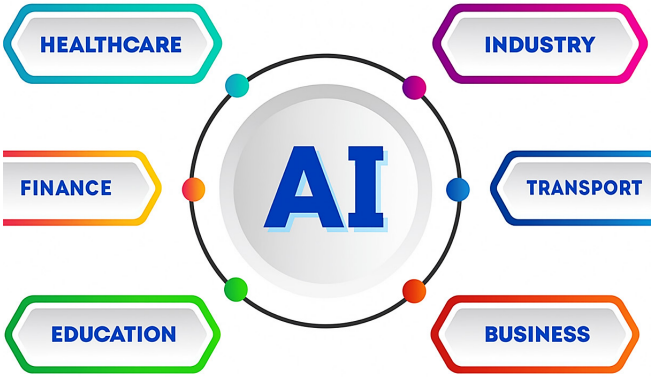

Fig. 1. Areas of application of AI (compiled by the authors)

Today, the key challenges are:

– Job losses. Automation could lead to mass unemployment, especially among workers engaged in manual labor and simple administrative tasks.

– Data privacy and security. The development of AI requires the use of large amounts of data, which creates privacy risks and ethical issues.

– Ethical issues: How can we ensure that AI algorithms act in accordance with moral norms and do not discriminate?

– Control and accountability. Autonomous systems can operate independently of human control, which increases the risk of unintended consequences.

Thus, the need for comprehensive theoretical and practical research into the impact of AI, its potential threats, and benefits is urgent and critical for the development of modern society.

The issue of artificial intelligence as a practical tool for human development is widely discussed in academic circles. A review of research reveals a number of key aspects: the economic impact of AI, its role in creating new jobs, reducing costs and increasing the efficiency of business processes. At the same time, there are

concerns about ethical implications and the risks of losing control over the technology.

Artificial intelligence is one of the most relevant topics of modern scientific research, covering various aspects of its impact on society, economy and culture. According to a study by the McKinsey Global Institute [1], the implementation of AI could add from 2.6 to 4.4 trillion dollars annually to the global economy, increasing productivity in various sectors.

In the field of education, research highlights the importance of ethical use of AI, particularly with regard to academic integrity and student data privacy [2].

The use of AI in the educational process requires the development of clear ethical norms and standards to ensure the responsible use of technology.

Meanwhile, a study conducted in Ukraine analyzes the impact of AI on the national and international economy, predicting a 14% increase in global GDP by 2030 due to the implementation of AI [3]. This highlights the significant potential of AI in stimulating economic development.

However, alongside the positive predictions, there are concerns about the ethical aspects of AI use. A study published on the Zenodo platform examines the impact of AI on the ethical aspects of scientific research in Ukrainian educational institutions, highlighting the need to develop ethical guidelines to ensure the responsible use of AI.

The aim of the article is to study the impact of artificial intelligence as a practical tool for the development of humanity in various spheres of life. The article aims to analyze both positive and potentially negative aspects of the implementation of AI, with an emphasis on its role in increasing efficiency, automating processes, and influencing social and economic structures.

The main objectives of the study are:

– assess the current state and trends in the development of artificial intelligence;

– identify key areas of AI use, including economics, education, medicine, and other industries;

– analyze the ethical and social challenges associated with the use of AI;

– develop recommendations for the responsible and effective implementation of AI in social processes;

– to identify prospects for further research and development of a regulatory framework to regulate the use of AI.

Despite the great contribution of AI to the development of humanity, ethical and social challenges associated with the use of AI have gained considerable relevance in modern society. The large-scale implementation of this technology creates new opportunities, but also raises a number of issues that require discussion and resolution. The main problems are privacy and data security. Since AI systems analyze huge amounts of information, including confidential data, there is a need to ensure reliable protection and compliance with confidentiality standards.

Another challenge is the ethical dilemmas associated with algorithmic decision-making. The opacity of algorithms and the difficulty of understanding them create risks of discrimination, as AI can make decisions that unknowingly reproduce social biases or injustices. Therefore, mechanisms need to be developed to ensure transparency and accountability of AI systems.

The automation of work through AI also creates social consequences, including the threat of unemployment for workers whose jobs may be automated. This requires the introduction of retraining programs and support for workers who may be affected by such changes.

There are also concerns about the autonomy of AI systems, which can operate independently of human control. This increases the risk of creating unpredictable situations that could have serious consequences for society. In particular, the question of who will be responsible for the decisions made by artificial intelligence is important.

Thus, the development of AI requires not only technical improvements, but also the development of ethical norms and social mechanisms that would ensure the responsible use of the technology. Addressing these challenges is critical for AI to work for the benefit of society, respecting fundamental human rights and freedoms.

Artificial intelligence is one of the most important technological advances of our time, with the potential to transform almost every aspect of human activity. Its applications have been found in various areas of life: from healthcare and education to industry and transportation.

AI is significantly transforming the healthcare sector, offering innovative solutions for diagnostics, treatment, and management of medical processes [4]. Let's consider specific examples of AI applications and the problems it helps solve:

– Disease diagnosis. AI algorithms analyze medical images, such as X-rays, MRIs, and CT scans, to detect abnormalities. For example, AI-based systems can detect signs of breast cancer in mammograms with accuracy that exceeds the capabilities of the human eye. This contributes to early detection of diseases and increased treatment effectiveness.

– Disease outbreak prediction. AI analyzes large amounts of data from various sources, including social media and medical records, to predict infectious disease outbreaks. This allows health authorities to take proactive measures to prevent epidemics.

– Automation of administrative processes. Implementing AI in administrative tasks, such as processing medical records and managing appointment schedules, reduces the burden on medical staff and minimizes the likelihood of errors.

– Drug development. AI accelerates the process of developing new drugs by analyzing large amounts of scientific data and predicting the effectiveness of potential drugs. This reduces the time and cost of bringing new drugs to market.

– Telemedicine and remote monitoring. AI supports the development of telemedicine, enabling remote monitoring

of patients and real-time medical consultations. This is especially important for patients in remote regions.

It is also important to consider the impact of AI on economic processes. Its application allows businesses to significantly increase efficiency, reduce costs, and create new opportunities for development, while solving complex economic problems.

In the manufacturing sector, one of the most prominent examples of AI in manufacturing is General Motors (GM). GM's production lines used to suffer from high levels of defects, which resulted in significant financial losses. The introduction of machine learning systems made it possible to analyze data in real time, detect anomalies, and prevent defects from occurring. GM uses AI to monitor the condition of its factory equipment. The system collects 165 million images every day, the analysis of which allows it to predict possible malfunctions before they occur. This ensures smooth operation of production lines and reduces repair costs and downtime.

AI is also being used extensively in retail. Walmart has used demand forecasting algorithms that analyze large amounts of data about sales, weather, holiday periods, and other factors to optimize inventory. It is estimated to reduce inventory costs by up to 10%, saving the company more than $1 billion annually.

Artificial intelligence is making a significant contribution to improving efficiency in the financial industry. For example, JPMorgan Chase has created a Contract Intelligence (COiN) platform that automatically analyzes and processes legal documents. This solution allows processing 12,000 contracts in a matter of seconds, instead of the 360,000 hours that employees previously spent. The implementation of COiN has helped the bank significantly reduce operating costs, increase efficiency, and optimize the use of human resources.

Artificial intelligence plays a key role in increasing efficiency and optimizing processes in the logistics industry. DHL is actively implementing AI to optimize delivery routes and manage supply

chains. According to a DHL report, AI allows analyzing large amounts of data, including traffic information, weather conditions and other factors that affect the delivery of goods. This helps reduce fuel costs and shorten delivery times, increasing the company's competitiveness in the market.

Artificial intelligence (AI) plays a key role in combating fraud in financial transactions, ensuring effective detection and prevention of illegal activities [5]. By analyzing large volumes of data and detecting anomalies, AI is able to respond quickly to potential threats.

US Treasury Department. The department has been implementing AI-based systems to detect fraudulent schemes and improper payments. In the past year, these technologies have helped prevent more than $1 billion in losses, demonstrating their high effectiveness in protecting government finances.

Barclays Bank: Uses AI to monitor payment transactions in real time, allowing it to detect and prevent potential fraud. This approach not only protects customers but also strengthens their trust in the bank's security measures.

JPMorgan Chase has implemented AI algorithms to detect fraudulent credit card transactions. These systems analyze transaction information in real time, allowing them to quickly identify suspicious transactions and prevent financial losses.

AI is being actively implemented in the educational sector, helping to solve a number of problems and increase the efficiency of the educational process:

– Personalized learning. AI-powered platforms like Century Tech analyze individual student needs and tailor learning materials to their strengths and weaknesses, leading to increased student engagement and improved learning outcomes.

– Automated grading. AI systems like Grammarly help teachers automatically check students' written work, identifying grammatical and stylistic errors. This significantly reduces grading time and ensures objectivity in grading.

– Virtual tutors. Platforms like Duolingo use AI to teach foreign languages, adapting tasks to the user's level of knowledge and providing instant feedback. This promotes effective learning and increases motivation to learn.

– Student performance analysis. Universities are implementing AI-based systems to track students' academic progress, allowing them to identify potential problems early and provide needed support. This helps reduce student dropout rates and increase overall performance.

The results of the study show that artificial intelligence is one of the most important technological achievements of our time, capable of significantly influencing various aspects of human activity, including healthcare, education, economics and logistics [6]. It was found that its application provides increased efficiency of processes, reduced costs and created new opportunities for development.

The responsible implementation of artificial intelligence (AI) in social processes requires a comprehensive approach that includes ethical, social and economic aspects. To ensure the harmonious development of technologies and protect the interests of society, the following recommendations should be followed (Table 1):

– Establishing ethical standards and regulations. Developing clear regulations governing the use of AI is critical to protecting human rights and upholding ethical principles.

– Data privacy protection. Ensuring reliable protection of personal information using encryption and other modern technologies.

– Retraining of workers. Development of retraining programs for people whose professions can be automated to avoid social tension.

– Algorithmic transparency. Increasing the transparency of decisions made by AI, especially in critical areas such as healthcare or finance.

– Raising public awareness. Implementing educational programs to familiarize the public with the work of AI and the basics of data security.

Table 1

Recommendations for implementing AI in social processes (developed by the authors)

Recommendation	Description	Expected result
Creating ethical standards	Developing clear regulations and ethical principles for the use of AI	Protection of human rights and compliance with ethical standards
Data privacy protection	Use of encryption and information protection technologies	Maintaining privacy and data security
Retraining and social support	Implementation of employee retraining and support programs	Reducing socio-economic impacts
Transparency of algorithms	Developing algorithms that can be explained and tested	Building trust and preventing discrimination
Raising citizen awareness	Implementation of educational programs to familiarize with the principles of AI	Raising awareness and protecting citizens' rights

Implementing these recommendations will ensure that the benefits of AI are maximized while minimizing risks and ensuring that the technologies work for the benefit of society.

Creating a clear and effective regulatory framework is a key aspect of the responsible implementation of AI [7]. Modern regulations should take into account the specifics of new technologies and ensure a balance between the development of innovations and the protection of citizens' interests (Table 2).

Main directions for further research:

– the impact of AI on the labor market and social sphere. Research is needed on how automation of work processes will affect employment and what skills will be needed in the future. This will help develop strategies for retraining workers and supporting those who may lose their jobs due to the introduction of AI;

Table 2

Prospects for further research and regulatory regulation

Research / regulation area	Description	Expected result
Impact on the labor market	Researching the impact of automation on employment and identifying the skills needed	Creating retraining and support programs
Data security	Developing new methods for data protection and ensuring regulatory compliance	Increasing security and maintaining privacy
Ethical standards and algorithm transparency	Creating ethical standards for developers and ensuring transparency of AI solutions	Preventing discrimination and ensuring fairness
Global collaboration	Collaboration with international organizations to create global regulatory standards	International regulatory consistency
Control mechanisms	Implementing mechanisms for monitoring AI performance and accountability	Reducing risks and ensuring responsible use

– data security and privacy protection. Research into methods for protecting large amounts of data used by AI should continue to ensure privacy and information security. Particular attention should be paid to the development of encryption technologies and ensuring regulatory compliance;

– ethical aspects and algorithmic transparency. The need for research that would help create ethical standards for AI developers and users is extremely important. Approaches to ensuring algorithmic transparency need to be developed to prevent discrimination and bias in the decisions made by AI;

– Analyzing the impact of AI on society. It is important to study the social consequences of AI implementation, including the impact

on education, healthcare, and the economy. This will allow us to understand how technologies are changing social processes and how they can be used to improve the quality of life.

Conclusions. Summarizing the above, it can be argued that artificial intelligence is a powerful tool that significantly affects various areas of human activity. Its application allows you to optimize processes, increase work efficiency, reduce costs and create new opportunities for development. In the field of healthcare, AI contributes to improving diagnostics and treatment, and in the economy it helps to increase productivity and reduce company costs. In the field of education, artificial intelligence personalizes learning and automates assessment, which improves the quality of the educational process. The implementation of AI in logistics and finance demonstrates cost reduction and effective detection of fraudulent actions. The practical value of the research results lies in the development of recommendations for the responsible and effective implementation of artificial intelligence in various industries, which will ensure sustainable growth and increased competitiveness.

The practical value of the study lies in providing recommendations for the responsible and effective implementation of AI in social processes. The proposed measures, in particular the development of ethical standards and ensuring the transparency of algorithms, are aimed at ensuring a balance between using the benefits of AI and protecting public interests. Prospects for further research are related to improving the regulatory framework, developing new methods for regulating the technology, and studying its socio-economic impact on society.

This emphasizes the need for a comprehensive approach to the implementation of AI, which will take into account both technological and ethical aspects, contributing to the sustainable development of humanity and improving the quality of life.

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