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USAGE OF ARTIFICIAL INTELLIGENCE IN MANAGEMENT ACTIVITIES

The modern development of society is characterized by the digitalization of most areas of activity, one of the important elements of which is digital technologies, including artificial intelligence, which can provide new opportunities and increase the level of human efficiency for both the average person and managers. The practical aspects of using artificial intelligence technologies in modern life are quite multifaceted, in particular, they are used to automate routine tasks, analyze data, predict risks, conduct various studies, management practice, at the household level and in all major sectors of the economy. Today, the development of artificial intelligence covers a wide range of research and development related to the automation of processes, including management processes, which previously required human intellectual activity. This phenomenon can radically change many aspects of human life. The purpose of the article is to study the essence and conceptual provisions of artificial intelligence. The following methods were used in writing the article: the logical method, the method of generalization, the method of system analysis, the method of analysis and synthesis. It has been established that artificial intelligence should be understood as the development of agents that are flexible and able to adapt to various situations that were not previously known and not studied through life experience, achieving goals that are inaccessible to traditional computer systems. It has been determined that the main task of artificial intelligence is to create machines or develop special software that can perform cognitive functions similar to human ones, such as learning, understanding, planning, and problem solving. The conceptual framework of artificial intelligence focuses on automation, self-learning, security and ethics, as well as its integration into everyday life. The development of these technologies has great potential to improve many areas of human activity, but at the same time poses new challenges to society that require a careful approach, so the massive implementation of artificial intelligence technologies in everyday life is associated with numerous problems, primarily legal and ethical, which will become more serious and complex in the coming years. An important problematic issue concerns the legal regulation of the use of artificial intelligence technologies. In addition, in the process of using the capabilities of artificial intelligence, due to the complexity of its technologies, ethical issues arise that relate to bias, security, fairness, transparency, and accountability.

Keywords: *management, management decisions, management activities, digitalization, technology, artificial intelligence, machine learning, reactive machines, neural networks, computer systems.*

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ВИКОРИСТАННЯ ШТУЧНОГО ІНТЕЛЕКТУ В ЗДІЙСНЕНІ УПРАВЛІНСЬКОЇ ДІЯЛЬНОСТІ

Для сучасного розвитку суспільства характерна цифровізація більшості галузей діяльності, одним з важливих елементів якої є цифрові технології, в тому числі і штучний інтелект, що може забезпечити нові можливості та підвищити рівень ефективності діяльності як для пересічної людини, так і для менеджерів. Практичні аспекти застосування технології штучного інтелекту в сучасному житті людини досить багатогранні, зокрема їх використовують для автоматизації рутинних завдань, аналізу даних, прогнозування ризиків, різноманітних досліджень, управлінської практики, на побутовому рівні, практиці управління та в усіх основних галузях економіки. Розвиток штучного інтелекту сьогодні охоплює широкий спектр досліджень і розробок, пов'язаних з автоматизацією процесів, зокрема й управлінських, які раніше вимагали інтелектуальної діяльності людини. Це явище здатне кардинально змінити багато аспектів людської життєдіяльності. Метою статті є дослідження сутності та концептуальних положень штучного інтелекту. Під час написання статті використовувались наступні методи: логічний метод, метод узагальнення, метод системного аналізу, метод аналізу та синтезу. Було встановлено, що під штучним інтелектом слід розуміти розроблення агентів, які гнучкі та здатні адаптуватися до різних ситуацій, що не були відомі раніше та не вивчалися через життєвий досвід, досягаючи мети, що є недоступною для традиційних комп'ютерних систем. Визначено, що основним завданням штучного інтелекту є створення машин або розроблення спеціального програмного забезпечення, які можуть виконувати когнітивні функції, схожі на людські, такі як навчання, розуміння, планування і вирішення проблем. Концептуальні положення штучного інтелекту зосереджуються на питаннях автоматизації, самонавчання, безпеки та етики, а також його інтеграції у повсякденне життя. Розвиток цих технологій має великий потенціал для вдосконалення багатьох сфер діяльності людини, але одночасно ставить перед суспільством нові виклики, які потребують уважного підходу, тому масове запровадження технологій штучного інтелекту у повсякденне життя пов'язане з безліччю проблем, насамперед правових й етичних, які вже найближчими роками будуть ставати все серйознішими та складнішими. Важливе проблемне питання стосується і правового регулювання застосування технологій штучного інтелекту. Також в процесі використання можливостей штучного інтелекту через складність його технологій виникають етичні проблеми, що стосуються питання упередженості, безпеки, справедливості, прозорості, підзвітності.

Ключові слова: *менеджмент, управлінські рішення, управлінська діяльність, цифровізація, технологія, штучний інтелект, машинне навчання, реактивні машини, нейронні мережі, комп'ютерні системи.*

Introduction. The global trend towards the priority and dominance of the technological dimension in the life of a modern person is expanding and deepening every year. The rapid development and large-scale penetration of artificial intelligence technologies are changing almost all spheres of public life, primarily the economy, governance, transportation, and education system and also management activities, thereby affecting the social, physical, cultural, intellectual, mental, and other values of society and human beings. At the same time, today artificial intelligence is used even in those areas that "make a person smart" and distinguish human society from other biological communities. In view of this, the use of artificial intelligence can be considered among the most pressing issues today, as we encounter artificial intelligence or products created with its help on a daily basis without even thinking about it. This situation is undoubtedly positive, as it contributes to the technological development of humanity, but at the same time, the rapid development of artificial intelligence technologies brings new threats and problems, some of which we have not yet fully realized.

Materials and methods. The issues of artificial intelligence development and the possibilities of its application have been studied by foreign and domestic scholars, in particular, by the following: O. Baranov, N. Bostrom, I. Geletska, O. Karapetyan, M. Karchevskyi, A. Kolesnikov, O. Kudryk, J. McCarthy, M. Ford, and others.

The interpretation of the concept of "artificial intelligence" is a matter of much debate among scientists. On the one hand, artificial intelligence is interpreted quite abstractly:

– the ability of an automated system to independently select the most optimal solution to a problem from a predetermined set of options;

– the ability of a computer program or automated system to perform human functions, making the best decision based on the analysis of external factors and taking into account available experience;

– the ability to learn, generalize and make analogies;

– ability to solve complex problems;

– the ability to establish relationships with the external world through communication, perception and awareness of what is perceived.

On the other hand, more specific definitions of artificial intelligence can often be found in the scientific literature, defining it as a specific field of science:

– a program (robot) that can replace a person in various activities;

– a branch of computer science that specializes in the formalization of tasks that resemble those performed by humans;

– science and technology that can reproduce the thought processes inherent in the human brain and direct them to the creation of computer programs, processing of various data, as well as automated intelligent machines that can completely replace and simplify human activity [4, p. 100].

However, despite the growing interest of scientists in this topic in recent years, given its novelty and rapid development, today not only has no unified conceptual approach to the definition of artificial intelligence been developed, but the main social, legal, and ethical issues of its functioning have not been sufficiently studied.

The purpose of the study is to investigate the issues of using artificial intelligence in the implementation of managerial activities.

In the process of fulfilling the tasks of scientific research, the following methods were used: historical and logical analysis – to determine the evolution of scientific knowledge about management activities; scientific abstraction – to formulate the goal and conclusions; dialectical and logical – to systematize the conceptual and categorical apparatus of using artificial intelligence in the implementation of management activities and in the process of formulating conclusions.

Results. In the era of massive digitalization of public life, artificial intelligence has become widespread in most areas of human activity: from the household level (for example, for searching for information on the Internet, creating presentations, in household appliances) to various areas of economic and managerial activities (e-commerce, diplomacy, justice, maintenance of law and order, military) and even in scientific research.

The very concept of "artificial intelligence" does not currently have a clearly established definition. For professionals from various industries in which artificial intelligence technologies have been implemented or are planned to be implemented, this is one of the key problems, as the issue of defining the concept of "artificial intelligence" by the scientific community is quite complex and broad. Artificial intelligence technologies are used to create bots that analyze stock market transactions, in the development of self-parking cars, and in the design of smart refrigerators that detect food leftovers and can purchase independently through a supermarket chain. Even the selection of advertising messages in the browser or photos in the Instagram app is based on artificial intelligence analysis of the user's previous preferences.

The idea of artificial intelligence is that machines can approach the level of human intelligence if they are able to model human mental activity [5, p. 60]. This includes not only the ability to perform complex computations or analyze large amounts of data, but also the ability to self-learn, adapt, and make decisions based on context. Artificial intelligence means the ability of automated systems to take on human functions, make choices and decisions based on previous life experience and analysis of external influences.

John McCarthy, an American programmer and inventor of the LISP programming language, at the Dartmouth Conference, first used the term "artificial intelligence" in 1956. McCarthy noted that artificial intelligence "...is the science and technology of creating intelligent machines, especially intelligent computer programs..." [12 c. 225]. Later, artificial intelligence began to be interpreted as a technology for developing intelligent computer programs, machines that can perform certain creative functions that were traditionally considered inherent only to humans. Another well-known definition of artificial intelligence is "the development of agents that are flexible and able to adapt to different situations that were not previously known or learned through life experience, achieving goals that are not available to traditional computer systems" [3, p. 15].

The Oxford Dictionary defines artificial intelligence as the theory of developing computer systems that can perform tasks that require human intelligence, such as visual perception, speech recognition, decision-making, and translation. Thus, artificial intelligence is "the imitation of human mental activity with the help of special software." It is "an autonomous system that can perform tasks without human intervention in this process, and that makes decisions analogous to the human brain and can pass the Turing test" [7, p. 140].

The European Commission's Expert Group on Artificial Intelligence proposed the following interpretation: "human-designed systems that, having a complex goal, operate in the physical or digital world, perceiving the environment, interpreting and analyzing the collected structured or unstructured data and, based on the knowledge gained from this data, making

the most optimal decisions (according to predefined parameters) to achieve the goal" [10]. In addition, the European Parliament defines artificial intelligence as any "tool used by a computer program to reproduce human-like behavior, including planning, reasoning, and creativity" [11].

Among Ukrainian scholars, the proposed definition of artificial intelligence by O. A. Baranov is quite interesting – "...it is a certain set of methods, tools, techniques, technologies, primarily computer ones, which imitate (model) cognitive functions that have criteria, characteristics and indicators equivalent to the criteria, characteristics and indicators of the corresponding human cognitive functions..." [1, c. 46].

Ukraine has adopted "The Concept of Artificial Intelligence Development in Ukraine" at the legislative level. Thus, this document interprets artificial intelligence as "...an organized set of information technologies, which can be used to perform complex tasks by applying a system of scientific research methods and data processing algorithms obtained or independently created in the process of work, as well as to create and use decision-making models, own knowledge bases, algorithms for working with information and determine ways to achieve the assigned tasks..." [8].

Based on the analysis of the scientific literature, it can be noted that the term "artificial intelligence" refers to the theory and practice of developing computer systems that are capable of performing tasks that usually require human intelligence, such as speech recognition, visual perception, translation, and decision-making, i.e. artificial intelligence should be understood as "a method of making a computer or special software 'think' like a human mind".

Artificial intelligence can be organized in several ways, depending on the stages of its development or the actions it performs. For example, four stages of artificial intelligence development are generally recognized.

Reactive machines are limited artificial intelligence that responds only to different types of stimuli based on pre-programmed rules. This is where the development of artificial intelligence technology began. Reactive machines do not use memory and therefore cannot learn from new data. An example of a reactive machine is IBM's Deep Blue program, which defeated chess champion Garry Kasparov in 1997;

– limited memory – most modern artificial intelligence systems belong to this system. They can use memory for their own improvement by learning from new data, mostly with the help of a neural network;

– theory of mind – currently, there is no theory of mind for artificial intelligence, but research into the possibilities of creating one is ongoing. A theory of mind describes an artificial intelligence that can mimic the human mind and has the same decision-making capabilities as humans, including recognizing and remembering emotions and reacting in social situations as humans do;

– self-awareness is the next stage in the development of the theory of mind of artificial intelligence (its future generation). Self-aware artificial intelligence describes a mythical machine that is aware of its existence and has the intellectual and emotional abilities of a human [13].

All of what we now call artificial intelligence is considered "narrow" artificial intelligence because it can only perform narrow sets of actions based on its programming and training. For example, an AI algorithm used to classify objects will not be able to perform natural language processing. Predictive analytics, virtual assistants, and Google search are all forms of narrow artificial intelligence. High profile AI applications include advanced web search engines, recommender systems (used by YouTube, Amazon, and Netflix), virtual assistants (e.g., Gemini, Siri, and Alexa), autonomous vehicles (Waymo), generative and creative tools (ChatGPT, AIart). However, many artificial intelligence programs are not perceived as artificial intelligence, as they are often filtered into general applications without being called artificial intelligence.

Different subfields of AI research are centered on specific goals and the use of specific tools. Traditional goals of artificial intelligence research include reasoning, knowledge representation, planning, learning, natural language processing, perception, and robotics capability support. To achieve these goals, AI researchers have adapted and integrated a wide range of techniques, including search and mathematical optimization, formal logic, artificial neural networks, tools and methods based on statistics, operations research, economic trends, and models. Artificial intelligence also draws on psychology, linguistics, philosophy, neuroscience, and other fields of science.

The use of the latest technological realizations of artificial intelligence extends to the sphere of creative activity of people. The emergence of neural networks capable of rapidly analyzing large amounts of information and providing more or less meaningful and reasonable answers in the process of interacting with a person, the opening of wide access to ChatGPT capabilities, requires people to think about their place in the world of artificial intelligence in the near future, which is capable of generating new knowledge and thus surpassing its creators. Therefore, the massive introduction of artificial intelligence technologies into everyday life is associated with many problems,

primarily legal and ethical, which will become more serious and complex in the coming years [6, p. 7].

The first problematic issue concerns the legal regulation of the use of artificial intelligence technologies. Scientists, realizing the potential danger of uncontrolled development of artificial intelligence, emphasize the prohibition or restriction of relevant research and strict control over the spread of these technologies. I. Musk, S. Hawking, S. Wozniak and other leading world scientists in the field of artificial intelligence development believe that humanity may go too far in the arms race and call for doing everything possible to prevent a catastrophe.

The use of artificial intelligence also raises many ethical issues. Due to the complexity and ubiquity of artificial intelligence technologies, the following ethical issues arise: bias, security, fairness, transparency, and accountability. Concerns about possible problems with the use of artificial intelligence technologies have led many non-governmental, governmental, academic, and even corporate organizations to make statements about the need to protect fundamental human rights in the field of artificial intelligence and machine learning.

The ethics of artificial intelligence technologies is distinguished from the ethics of other industries by the problem of the ethical behavior of an intelligent system in a situation where its decisions affect people. It is fundamentally important that an artificial intelligence system is capable of [6, p. 9]: making decisions about humans independently, analyzing data in such volumes and at such a speed that humans are not able to do (therefore, humans cannot check the correctness of decisions).

Accordingly, the main problem is to determine whether the decisions made by an intelligent autonomous system comply with ethical standards, i.e., whether it is ethical.

The first aspect implies that initially, the program for artificial intelligence is written by humans, but later on, the artificial intelligence system organizes itself almost independently, can self-improve, restructure, and improve its parameters. Therefore, it is important to bring ethics to the artificial intelligence technology itself. The difficulty lies in the fact that a moral choice is a choice that is determined not by clearly defined legal norms, but by roughly formulated rules, principles, personal opinions, and everything that can be assessed as "good" or "bad" Accordingly, it is difficult to formalize and incorporate into artificial intelligence.

The second aspect of artificial intelligence ethics involves analyzing and preventing ethical conflicts that arise in the process of applying artificial intelligence, including privacy violations, possible discrimination, social stratification, employment problems, etc. The topic of professional ethics of AI developers is a separate issue that also requires consideration, and in the future, it is possible to create ethical codes and guidelines for AI developers.

Conclusions. Artificial intelligence in the broadest sense is a branch of computer science research that develops and studies methods and software that allow machines to perceive their environment and use learning and intelligence to perform actions that maximize their chances of achieving certain goals. Artificial intelligence is the ability of automated systems to take on certain functions of human intelligence, for example, to choose and make optimal decisions based on previous experience and rational analysis of external influences. It is important to note that artificial intelligence, along with the enormous prospects that its development opens up for humanity, also carries new dangers associated with the loss of human control and the ability to reproduce itself.

REFERENCES:

1. Baranov O. A. (2023). Vyznachennia terminu "shtuchnyi intelekt". Informatsiia i pravo [Definition of the term "artificial intelligence"]. *Informatsiia i pravo* [Information and Law]. 1 (44). 32–49. [in Ukrainian]

2. Bostrom Nick (2020). *Superintelekt. Stratehii i nebezpeky rozvytku rozumnykh mashyn* [Superintelligence: Strategies and Dangers of Developing Intelligent Machines] *(*A. Yashchuk, A. Yashchuk, Trans. in Eng.). Kyiv: Nash format. [in Ukrainian]

3. Heletska I. O., Shovdra M. M. (2024). Vyznachennia poniattia "shtuchnoho intelektu" ta yoho mistse u systemi tsyvilnoho zakonodavstva Ukrainy [Definition of the concept of "artificial intelligence" and its place in the system of civil legislation of Ukraine]. *Halytski studii: yurydychni nauky* [Halytski Studies: Legal Sciences]. 6. 13–19. [in Ukrainian]

4. Karchevskyi M. V. (2017). Pravove rehuliuvannia sotsializatsii shtuchnoho intelektu [Legal regulation of the socialization of artificial intelligence]. *Visnyk Luhanskoho derzhavnoho universytetu vnutrishnikh sprav imeni E.O. Didorenka* [Bulletin of the Luhansk State University of Internal Affairs named after E. O. Didorenko]. 2 (78). 99–105. [in Ukrainian]

5. Kozlovets M. (2024). Tekhnolohii shtuchnoho intelektu ta yikh vplyv na buttievist liudyny [Artificial intelligence technologies and their impact on human existence]. *Humanities Studies.* 19. 55–66. [in Ukrainian]

6. Kolesnikov A. P., Karapetyan O. M. (2023) Shtuchnyi intelekt: perevahy ta zahrozy vykorystannia [Artificial intelligence: advantages and threats of its use]. *Efektyvna ekonomika* [Effective Economy]. 8. 1–13. [in Ukrainian]

7. Kudryk O. V., Bisikalo O. V., Zditovetskyi Yu. S. (2024) Metody tonkoho nalashtuvannia shtuchnoho intelektu [Methods of fine-tuning artificial intelligence]. *Visnyk Vinnytskoho politekhnichnoho instytutu. Bulletin of the Vinnytsia Polytechnic Institute.* 4. 139–146. [in Ukrainian]

8. Kabinetu Ministriv Ukrainy (2020, Decembe 2). *Rozporiadzhennia «Pro skhvalennia Kontseptsii rozvytku shtuchnoho intelektu v Ukraini* [On the approval of the Concept of Artificial Intelligence Development in Ukraine]. Available at: https://zakon.rada.gov.ua/laws/show/1556-2020-%D1%80#Text (accessed 10.09.2024). [in Ukrainian].

9. Ford M. (2016). *Pryshestia robotiv. Tekhnika i zahroza maibutnoho bezrobittia* [The Rise of Robots: Technology and the Threat of a Jobless Future]. Kyiv: Nash format. [in Ukrainian]

10. European Commission (2018). *Definition of Artificial Intelligence: Main Capabilities and Scientific Disciplines. Report of the High-Level Expert Group on Artificial Intelligence*. Available at: https://digital-strategy.ec.europa.eu/en/library/definition-artificial-intelligence-main-capabilities-and-scientific-disciplines (accessed 10.09.2024).

11. *Intelligence artificielle: définition et utilization* (n. d). Available at: https://www.europarl.europa.eu/news/fr/headlines/society/2020082785804/intelligence-artificielle-definition-et-utilisation (accessed 10.09.2024).

12. McCarthy J. (1988). Review of The Question of Artificial Intelligence. *Annals of the History of Computing.* 10. 224–229.

13. *What is Artificial Intelligence (AI)?* (n.d.). Available at: https://cloud.google.com/learn/what-is-artificial-intelligence (accessed 10.09.2024).

14. *Official Oxford Dictionary website* (n. d.). Available at: https://www.oed.com/?tl=true (accessed 10.09.2024).

ЛІТЕРАТУРА:

1. Баранов О. А. Визначення терміну «штучний інтелект». *Інформація і право*. 2023. № 1(44). С. 32–49.

2. Бостром Нік. Суперінтелект. Стратегії і небезпеки розвитку розумних машин / пер. з англ. А. Ящук, А. Ящук. Київ : Наш формат, 2020. 408 с.

3. Гелецька І. О. Шовдра М. М. Визначення поняття «штучного інтелекту» та його місце у системі цивільного законодавства України. *Галицькі студії: юридичні науки*. 2024. Вип. 6. С. 13–19.

4. Карчевський М. В. Правове регулювання соціалізації штучного інтелекту. *Вісник Луганського державного університету внутрішніх справ імені Е.О. Дідоренка*. 2017. № 2 (78). С. 99–105.

5. Козловець М. Технології штучного інтелекту та їх вплив на буттєвість людини. *Humanities studies.* 2024. Вип. 19. С. 55–66.

6. Колесніков А. П., Карапетян О. М. Штучний інтелект: переваги та загрози використання. *Ефективна економіка.* 2023. № 8. С. 1–13.

7. Кудрик О. В., Бісікало О. В., Здітовецький Ю. С. Методи тонкого налаштування штучного інтелекту. *Вісник Вінницького політехнічного інституту*. 2024. № 4. С. 139–146.

8. Про схвалення Концепції розвитку штучного інтелекту в Україні: Розпорядження Кабінету Міністрів України від 2 грудня 2020 р. № 1556-р. URL: https://zakon.rada.gov.ua/laws/show/1556-2020-%D1%80#Text (дата звернення: 10.09.2024).

9. Форд М. Пришестя роботів. Техніка і загроза майбутнього безробіття. Київ : Наш Формат, 2016. 400 с.

10. European ommission. 2018. definition of rtificial ntelligence: main capabilities and scientific disciplines. eport igh-evel xpert roup on rtificial ntelligence. URL: https://digital-strategy.ec.europa.eu/en/library/definition-artificial-intelligence-main-capabilities-and-scientific-disciplines (дата звернення: 10.09.2024).

11. Intelligence artificielle: définition et utilisation. URL: https://www.europarl.europa.eu/news/fr/headlines/society/2020082785804/intelligence-artificielle-definition-et-utilisation (дата звернення: 10.09.2024).

12. McCarthy, J. Review of The Question of Artificial Intelligence. *Annals of the History of Computing*. 1988. № 10 (3). Pp. 224–229.

13. What is Artificial Intelligence (AI)? URL: https://cloud.google.com/learn/what-is-artificial-intelligence (дата звернення: 10.09.2024).

14. OED/Oxfod English Dictionary. URL: https://www.oed.com/?tl=true (дата звернення: 10.09.2024).

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