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## **IMPROVING THE QUALITY OF ORGANIZATION MANAGEMENT IN THE ERA OF DIGITALIZATION: LEADERSHIP AND NEURO-NETWORKS**

### **Introduction**

Modern trends in the development of digital technologies and trends in the field of management bring the issue of leadership and neural networks to the fore. Leadership in this process acts as a necessary competence of each participant, which characterizes the ability to take responsibility and make independent decisions, and neural networks - strengthen digital competence and significantly affect business productivity, which will ultimately ensure an improvement in financial status.

Artificial intelligence and machine learning are two technologies that have become not just buzzwords, but also necessary tools for the development of modern business. Proper application of these technologies can help business structures gain millions of benefits, ranging from increased efficiency and reduced workflow time to user convenience and accessibility. With the help of artificial intelligence and machine learning, companies can automate many tasks, allowing employees to spend more time on creative and strategic thinking. The application of these technologies in business also allows forecasting and data analysis, which makes it possible to make more accurate and informed decisions. Despite the clear advantages at first glance, there are also disadvantages associated with the low qualification of workers in this field. It is also worth noting that the emergence of new AIs occurs at a very dynamic pace and not always an average manager, the manager can select from the general array the tool that will be the most effective for solving his business goals, and the decision is made on the basis of

recommendations of acquaintances, advertising, etc. Therefore, the study of the possibilities of using neural networks in practical activities, their advantages and possible disadvantages, as well as the issues of forming a mechanism for their introduction are relevant and in demand not only in the academic, but also in the practical space of the national economy.

### **Purpose, subject and research methods**

In this field of world development, significant attention is paid to outstanding personalities such as Elon Musk, Stephen Hawking, Mark Zuckerberg, Joseph Bezos, as well as numerous specialists who work in leading laboratories and institutes to develop artificial intelligence. The scientific works of foreign scientists such as Bostrom N., Lanier D., Markoff D., Ford M., as well as Ukrainian scientists such as Ivanyuk D., Efremov M., Tverdokhlib I.A., are used for the theoretical basis of this work . Ulyanivskyi T., Panchenko V., Reznikova N. and others [ 2, 6, 8, 9] . The research information base also includes data from leading foreign and domestic specialists and materials from scientific and analytical publications on this issue.

Research in the field of leadership and artificial intelligence must constantly take place and today is very relevant and necessary for modern organizations, given the changing demands of the business environment based on the constant appearance of new neural networks. Specialists of organizations should understand all their opportunities and threats for work and development in modern conditions and confidently apply them to achieve business goals.

The purpose of this scientific publication is to study the issue of improving the quality of management of organizations in the era of digitalization through the prism of the synergy of leadership and artificial intelligence and to formulate recommendations for their successful implementation.

The research used such methods as: analysis; synthesis; comparison; economic and statistical; prognostication; tabular; graphic, etc.

### **Results of the research**

Leadership, a key aspect of management, organization and relationships, is gaining particular importance in today's dynamic world. Its role is not limited to success at the individual, group or organizational level. It is a tool that helps you achieve results and ensure development by overcoming challenges and taking advantage of opportunities.

In the era of digital transformation, the relevance of leadership is manifested in the ability to effectively respond to technological progress and changes in the business environment. The ability to manage changes becomes a key to the successful functioning of organizations and an incentive for innovations.

Management 3.0 emphasizes the need to change the approach to managing organizations. Traditional hierarchical models no longer always function effectively in conditions of rapid technological changes. According to the Management 3.0 paradigm, managers should turn into leaders who inspire and help teams to solve tasks and make decisions independently. Leadership in this context is aimed at the development and support of employees, contributes to the creation of an open environment where ideas and innovations can unfold to their full potential [ 11] .

The synergy between leadership and neural networks in the context of digital reality facilitates the adaptation of organizations to a rapidly changing environment. This enables innovation, improved management and achievement of strategic goals. Therefore, leadership plays an important role in shaping the vision, directing efforts and achieving high results in today's world of technology.

Artificial intelligence, also known as AI, is a branch of computer science that aims to simulate processes related to human intelligence. The term "artificial intelligence" was proposed by John McCarthy, a professor at Dartmouth College, in 1956. McCarthy and his colleagues investigated the computer's ability to learn.

The increase in the amount of data is one of the key factors contributing to the development of artificial intelligence. According to Forbes, the amount of data created and used increased by 5,000% between 2010 and 2020.

Artificial intelligence can analyze and learn much faster than humans and has significant potential in many areas where it can be more effective than human intelligence.

AI combines all technologies that work with databases and are capable of self-learning, for example:

- Machine learning (ML) – studies methods of constructing algorithms;
- Deep learning (DL) – focuses on data classification;
- Artificial neural networks (ANN) - reproduces the work of the human brain;
- Natural language processing (NLP) - specializes in speech recognition technologies.

The study of the impact of the use of neural networks on the performance indicators of organizations is a topical topic of research in the field of artificial intelligence. Neural networks can be used to solve various tasks, including predicting the performance indicators of organizations.

For example, neural networks can be used to develop models that predict a company's profits based on historical data about sales, costs, and other factors. Neural networks can also be used to measure employee productivity, to predict a company's market share and other performance indicators.

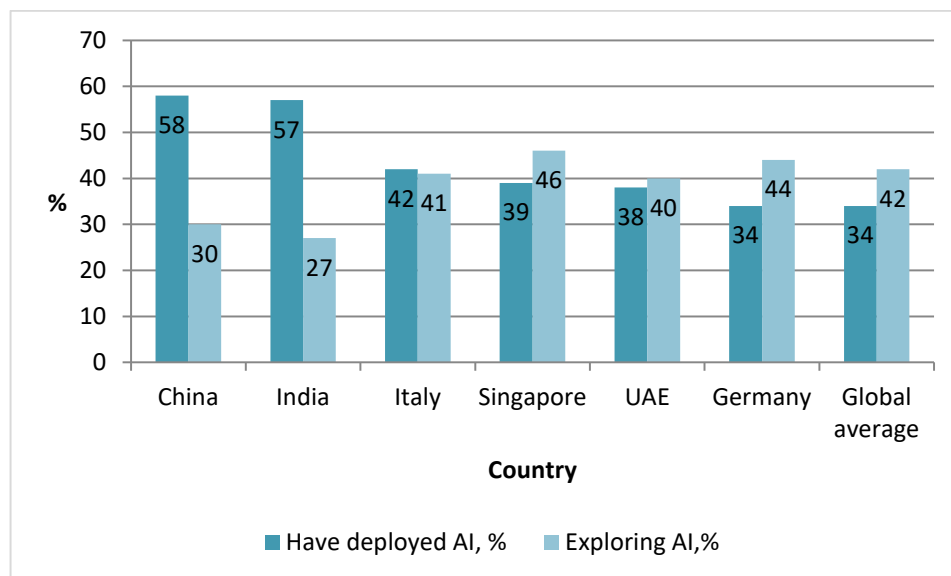
As a result, some businesses say they need more support and resources from governments and regulators to successfully implement AI. It is also

important to consider ensuring the reliability of AI and reducing the potential for unwanted consequences that may arise from improper use of AI.

Overall, AI is a promising development direction for enterprises in all industries, but requires detailed analysis and development of a strategy for use, as well as data collection and processing. It is important to consider the ethical, social and legal aspects of AI to ensure successful and sustainable implementation of this technology.

Studies of the impact of the use of neural networks on the performance indicators of organizations have shown that it can lead to an improvement in the quality of decisions made and an increase in the efficiency of companies. However, it is worth considering that the success of using neural networks depends on the correct selection of algorithms and model parameters, as well as on the quality and quantity of input data.

According to the results of a survey conducted by Morning Consult on behalf of IBM from March 30 to April 12, 2022 among 7,502 enterprises worldwide, it was found that 35% of them are currently implementing artificial intelligence. This is 4 percentage points more than in 2021 (Fig. 1).



**Fig. 1. Proportion of survey enterprises adopting AI by country**

Source: IBM Global AI Adoption Index [4]

China and India recorded the highest levels of AI use with 58% and 57% respectively among the businesses surveyed, while Canada, the UK, the US and South Korea had the corresponding figures of 28%, 26%, 25% and 22%.

Among the enterprises surveyed, 28% have a balanced AI strategy, 25% are focused on only limited or specific use cases, and 37% are developing an AI strategy.

Regarding cloud computing, 43% of enterprises surveyed use private clouds, 32% use hybrid or multiple clouds, 13% use public clouds, and 8% use on-premise servers.

While more and more businesses are considering the trustworthiness of AI, most have not taken steps to ensure the trustworthiness and accountability of their AI: 74% have not mitigated unintentional bias; 68% did not track performance changes and model changes; 61% were not convinced that they could explain the decision with the help of artificial intelligence; 60% have not developed an ethical policy for the use of artificial intelligence.

According to the IBM Global AI Adoption Index 2022, 35% of enterprises already use artificial intelligence (AI) in their business processes, while another 42% are actively considering the possibilities of applying this technology. A significant range of AI applications in business is highlighted, including areas such as video games, self-driving cars, chatbots, facial recognition technologies, voice assistants Alexa, Google Assistant, Siri, and social media advertising.

Among the factors that make it difficult to successfully implement artificial intelligence systems, it is noted that 34% of enterprises see limited skills, experience or knowledge in this area as an obstacle, 29% note excessive price, 25% face the lack of a platform for developing models, and 24% call projects too complex or unsuitable for scaling and integration due to their high data complexity. According to the survey, the majority, namely two-thirds, of enterprises are planning or already implementing AI in order to achieve their sustainability goals.

The use of AI in business, according to the consulting company Accenture, can contribute to the growth of companies and the optimization of work processes. Modern AI models are able to generate new content, such as generating images on text requests, with the help of companies such as Stability AI and Midjourney. The well-known Ukrainian 'Stary Lev Publishing House' announced the publication of Maryna Ponomarenko's book 'The Book of Love and Fury, illustrated with the help of Midjourney.

Google, thanks to machine learning technologies, has improved the volume of online advertising and search results and is also developing a system for creating chatbots like ChatCPT, called LaMDA (Language Model for Dialogue Applications).

Amazon uses AI to manage supply chains, Microsoft integrates AI into the Bing search service and the Edge browser. In the Kyiv cafe "Cantin", AI performs the functions of a cashier, where customers pay with a tray of food, placing them in square portals with cameras. AI-based "Vilnokasa" is available in

supermarkets, which allows customers to pay with a smartphone by scanning the product's barcode without standing in line at the checkout. Meta uses AI to target ads, while Megogo uses AI to dub movies.

As such, AI is a key tool to support sustainable development and has the potential to be a critical success factor for businesses in all industries. However, it is important to remember that the successful implementation of AI requires not only the availability of the necessary technical resources, but also the development of a strategy for use, ethical policy, data collection and processing, etc.

AI can be used in business for various tasks (Table 2).

Therefore, the application of AI in business can help increase the efficiency and accuracy of decision-making, reduce risk and costs, and improve interactions with consumers and customers.

Today, artificial intelligence can automate the processes of creating texts, music and pictures, and is also used to solve a variety of tasks, such as analyzing legal cases, performing complex medical operations and controlling complex devices. According to Gartner, the global business value associated with artificial intelligence reached \$1.2 trillion in 2018 and will grow to \$3.9 trillion in 2022. Early projections indicate that AI will have a major impact on the global economy, contributing \$15.7 trillion by 2030. The AI market is expected to reach \$500 billion by 2024 [5].

Despite the undeniable advantages, the use of artificial intelligence has its drawbacks. Business leaders need to understand that AI is not just a technology that can be integrated with just a few organizational changes. Instead, there is a need to prepare employees and the team for this. Like other technologies, AI cannot work on its own.

**Table 2. Use of AI in business for various tasks**

Prognostication	market trends, demand for goods and services, company profitability, production costs, commodity prices, customer outflow , etc.
Quality control	neural networks can help enterprises monitor and control the quality of products and services, identify flaws and problems in the production process
Marketing researches	to help businesses analyze the behavior of their customers, which will help in determining the effectiveness of marketing campaigns, improving sales strategies and developing personalized advertising materials
Tone recognition and natural language processing (NLP)	enables search engines to be smarter, chatbots to be more helpful, and improves accessibility for people with disabilities [1]
Recommendations	providing recommendations to customers, regarding the selection of goods and services, as well as for personalizing marketing communications
Optimization	production processes, finding optimal solutions, cost minimization, and neural networks can help enterprises improve the processes of generating potential customers and sales management, which will allow enterprises to use their resources more efficiently and attract new customers, etc.
Classification	data such as customers, products, services, grouping of market segments, etc
Financial planning	for the development of financial strategies and budget planning, which will help enterprises ensure stability and efficiency in the financial sphere
Data Analytics	enables companies to obtain information that was previously unavailable, discovering new patterns and correlations in data, helping enterprises work with large volumes of data, allowing them to more effectively analyze and use this data for decision-making
Automation	thanks to automation, people are saved from boredom, employee satisfaction increases and processes are improved! Teams no longer spend countless hours on repetitive tasks, and employees' time is freed up to focus on more valuable work. Another added bonus is that AI automation is more accurate and less likely to let any relevant information fall through the cracks.

Source: formed by the authors

The entire organization, including the workforce and business structure, must be part of a single plan aligned with the company's goals. To address all the



challenges, business leaders and executives must create an AI roadmap to understand how the technology will help the business achieve its goals. All this should be done in cooperation [5].

Among other things, it is worth noting the following possible threats and negative consequences of the use of AI:

- Job cuts. It is predicted that by 2025, about 85 million people will lose their jobs due to process automation. We are not talking about the complete disappearance of professions, but we are emphasizing the reduction of jobs. Because the use of artificial intelligence reduces the time to perform the operation by at least half.
- Social manipulation. Philippine politician Ferdinand Marcos Jr., who has a bot farm on TikTok, managed to win the 2022 elections thanks to this. Because TikTok is powered by artificial intelligence, each user receives content based on their preferences, and the algorithm is unable to filter out harmful or inaccurate content.
- Violation of privacy. The use of facial recognition technology in China has been used in offices, schools and other public places for several years, giving the Chinese government the ability to monitor the activities, relationships and political views of every citizen. And the data entered in the language models of artificial intelligence are not protected from dissemination and are added to the general information base of the system.
- Spreading false information. In particular, when using ChatGPT, the facts of users receiving fictitious information have been established. For example, in April 2023, a post for the 105th anniversary of the birth of the Ukrainian writer and public figure Oles Honchar appeared on the "New Channel" Instagram. The text talked about "little-known facts" of his life, but readers discovered that these facts are not little-known, but false [ 1 ] .
- The use of artificial intelligence to build autonomous weapon systems that independently detect and destroy targets is potentially dangerous because such weapons could end up in the hands of terrorists.

As already noted earlier, the implementation of tools based on artificial intelligence in business processes requires a reliable plan, a certain road map. In our opinion, there are nine such key stages:

- 1) establishment of business goals and strategic goals of the organization's development;
- 2) set realistic expectations for the implementation of artificial intelligence in activities and evaluate the possible results of this strategy;
- 3) choosing the right technologies and artificial intelligence tools that meet the defined business goals. It is important to consider various aspects such as the types of data, the amount of information, the tasks to be automated;
- 4) creation or adaptation of existing systems and processes of the organization for the integration of artificial intelligence. This can include developing

algorithms, building learning models for neural networks, customizing software solutions, and more.

- 5) pilot launch of an innovative solution using artificial intelligence on a limited scale, which will allow to evaluate the effectiveness, identify possible problems and make corrections to the strategy, if necessary;
- 6) dissemination of a successful pilot project to a larger volume of business. At this stage, it is important to take into account the scalability and stability of the infrastructure to ensure the stable operation of the innovative solution;
- 7) constant monitoring and analysis of the results of the use of artificial intelligence. This will make it possible to detect efficiency in time, change the strategy, if necessary, and respond to changes in the external environment;
- 8) training and professional development of personnel with regard to new skills that are necessary for the successful use of artificial intelligence tools and will be based on the development of leadership and digital competencies;
- 9) constant optimization and improvement of the use of artificial intelligence, taking into account accumulated experience and making corrections based on collected data and feedback.

It is important to remember that the implementation of artificial intelligence is a complex process that requires careful planning from the organization, a smart approach to the choice of technologies and constant training of personnel. Only in this way will the organization be able to succeed in the era of digitization and use the advantages offered by artificial intelligence.

## **Conclusions**

The use of neural networks to improve the quality of management of organizations in the era of digitalization has significant potential for improving efficiency and streamlining business processes. Artificial intelligence can be used to perform various tasks in organizations such as business process automation, forecasting and data analysis, production management, image and voice recognition, customer interaction and many others. The application of artificial intelligence can help improve work efficiency and productivity, reduce labor costs, and increase the quality of a product or service. It is known that artificial intelligence can perform complex analytical operations and make decisions faster than a human. At the same time, it is important to note that the involvement of AI can also have negative consequences, in particular related to data security risks, dependence on technology and a decrease in the level of employment in certain labor markets. Also, the use of artificial intelligence may have certain limitations and disadvantages, in particular, a limited ability to analyze non-specific and non-obvious data, which may lead to false results and underestimation of important aspects. Therefore, the use of neural networks and AI in the management of organizations should be carefully justified and carried out taking into account

positive and negative consequences, and the dynamic development of technologies justifies the need for further scientific research in this field.

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#### Abstract

The article is devoted to the issues of business development using a modern understanding of the concept of leadership and the possibilities of integrating artificial intelligence into business processes. The purpose of this scientific paper is to study improving the quality of management of organizations in the era of digitalization through the prism of the synergy of leadership and artificial intelligence and to formulate recommendations for their successful implementation. The issue of the relevance of AI implementation is considered in the paper. The statistical data of the introduction of AI in different countries of the world were studied and the expediency and risks of application were determined using the example of well-known companies of Ukraine and the world. It has been established that the use of neural networks to improve the quality of management of organizations in the era of digitalization has significant potential for improving efficiency and rationalizing business processes. The main factors limiting the introduction of such innovative solutions have been studied. Information on the areas of application of artificial intelligence is systematized, in particular, it can be used to perform various tasks in organizations, such as business process automation, forecasting and data analysis, production management, image and voice recognition, customer interaction, and many others. On the basis of the conducted research, the authors proposed

nine stages that can be included in the roadmap for the introduction of artificial intelligence in business organizations, provided that the leadership qualities of employees are developed.

**Keywords:** strategic decisions, innovation management, quality, digital marketing, leadership, artificial intelligence

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