APPLICATION OF ARTIFICIAL INTELLIGENCE IN MANAGEMENT ACCOUNTING: KEY ASPECTS, PROSPECTS AND RISKS

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The article explores current issues regarding the application of artificial intelligence technologies in management accounting. Modern domestic business is characterized by changes associated with the processes of digital transformation. Management accounting, as a key tool for supporting management decision-making, acquires new opportunities through the introduction of digital innovative technologies. One of such technologies is artificial intelligence, which offers new opportunities for automation, analysis and forecasting. The use of artificial intelligence is one of the key tools that ensures the transformation of accounting processes, thereby increasing their efficiency, reliability and adaptability to changes in the market. The prerequisites and current directions for the application of artificial intelligence in management accounting were clarified, the possibilities of artificial intelligence technologies that can be used to increase the productivity of management accounting at the enterprise were identified, in particular: expert systems (planning, assessment, control, resource reporting and preparation of external reports); data analytics (identification of new models of relationships in large volumes of data); machine learning (analysis and identification of patterns in data and use of information obtained from this data to improve decision-making processes); neural networks (detection of fraud and unfair practices based on the analysis of a significant number of transactions). The impact of artificial intelligence technologies on the management accounting system was analyzed and its main advantages and prospects were systematized, which includes automation of accounting, increasing the efficiency of activities, conducting analysis, processing large amounts of information and making management decisions, at the same time, key risks that an enterprise may encounter are highlighted, in particular: significant financial costs; regulatory barriers and technical limitations; risks of loss of information confidentiality; the need for advanced training; personnel adaptation and ethical aspects of implementing innovative technologies; compliance risks. The prospects for the development of artificial intelligence technologies for the transformation of management accounting and the formation of competitive advantages and strategic business development are substantiated.

ЗАСТОСУВАННЯ ШТУЧНОГО ІНТЕЛЕКТУ В УПРАВЛІНСЬКОМУ ОБЛІКУ: КЛЮЧОВІ АСПЕКТИ, ПЕРСПЕКТИВИ ТА РИЗИКИ

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Ключові слова:
управлінський облік, штучний інтелект, технології штучного інтелекту, машинне навчання, нейронна мережа.

У статті досліджено актуальні питання щодо застосування технологій штучного інтелекту в управлінському обліку. Сучасному вітчизняному бізнесу притаманні зміни, що пов'язані з процесами цифрової трансформації. Управлінський облік, як ключовий інструмент підтримки прийняття управлінських рішень, набуває нових можливостей завдяки впровадженню цифрових інноваційних технологій. Однією з таких технологій є штучний інтелект, який пропонує нові можливості для автоматизації, аналізу та прогнозування. Застосування штучного інтелекту є одним із ключових інструментів, що забезпечує трансформацію облікових процесів, тим самим підвищуючи їх ефективність, достовірність та адаптивність до змін на ринку. З'ясовано передумови та актуальні напрями застосування штучного інтелекту в управлінському обліку, визначено можливості технологій штучного інтелекту, які можуть застосовуватися для підвищення продуктивності управлінського обліку на підприємстві, зокрема: експертні системи (планування, оцінка, контроль, звітність за ресурсами та підготовка зовнішніх звітів); аналітика даних (виявлення нових моделей взаємозв'язків у великих обсягах даних); машинне навчання (аналіз і виявлення закономірностей у даних та використання інформації, отриманої з цих даних, для покращення процесів прийняття рішень); нейронні мережі (виявлення фактів шахрайства та недобросовісної діяльності на основі аналізу значної кількості операцій). Проаналізовано вплив технологій штучного інтелекту на систему управлінського обліку та систематизовано його основні переваги і перспективи, що включає автоматизацію бухгалтерського обліку, підвищення ефективності діяльності, проведення аналізу, обробки великих масивів інформації та прийнятті управлінських рішень, разом з тим виділено ключові ризики з яким може стикнутися підприємство, зокрема: значні фінансові витрати; нормативно-правові бар'єри та технічні обмеження; ризики втрати конфіденційності інформації; потреба у підвищенні кваліфікації; адаптація персоналу та етичні аспекти впровадження інноваційних технологій; комплаєнс-ризики Обґрунтовано перспективи розвитку технологій штучного інтелекту для трансформації управлінського обліку та формування конкурентних переваг і стратегічного розвитку бізнесу.

Statement of the problem

In the conditions of the modern business environment, which is characterized by dynamic changes, global competition and increased complexity of production and logistics processes, there is a need to use innovative technologies in accounting. The application of artificial intelligence technologies in management accounting at domestic enterprises is not yet widespread. Given that management reporting is confidential information, the development of tools based on artificial intelligence and their practical implementation are carried out in a protected space so as not to lose competitive advantages. However, artificial intelligence in management accounting is a necessary tool for improving the efficiency of management decision-making. It analyzes large volumes of financial and operational data, identifies patterns and trends, can forecast financial indicators, assess risks and develop optimization strategies. The application of artificial intelligence technologies in management accounting allows you to make informed decisions regarding budgeting, investment, as well as determining growth and development strategies for the enterprise. In general, the use of AI in management accounting expands the capabilities of management personnel, contributes to the optimization of resource use and the achievement of greater competitiveness of the enterprise in the market. In the future, technological innovations, in particular artificial intelligence, will significantly affect management accounting. These changes require new knowledge and skills from specialists who want to maintain their competitive advantage and work confidently with artificial intelligence.

Analysis of recent studies and publications

The integration of innovative technologies into accounting processes is an objective necessity of today, therefore their implementation in accounting is increasingly being discussed in scientific circles. One of such innovations is artificial intelligence, which is at the stage of its active development. However, the issue of

using artificial intelligence in management accounting has not yet received significant attention in the works of domestic scientists.

Thus, Lyakhovich G.I., Vakun O.V. investigate the potential possibilities of using artificial intelligence to increase the efficiency of the management accounting system [4]. Modern aspects of the application of AI in management accounting are considered by Pravdyuk M.V. and Filipov R.V. [6]. Artificial intelligence technologies in management accounting and the possibilities of their use are revealed by Hocha N.V., Tenyukh Z.I., Pelekh U.V. [9]. The study by Shigun M.M., Furda V.O. is devoted to determining the key prospects for the application of artificial intelligence methods in the field of management accounting to optimize the further implementation of specific practical tasks [10]. At the same time, the issue of digitalization as a tool for optimizing management accounting at domestic enterprises is revealed by Pushkar I.V., Gladchuk G.G., Khrapach K.G. [7]. Sklyaruk I.P., Vovk N.O. investigate the transformation of management accounting in the context of digitalization and analyze how digital innovations can contribute to the efficiency and adaptability of management accounting [8].

The issue of the use of artificial intelligence in management accounting was indirectly, through the prism of the use of AI in accounting, studied in the works of such scientists as: Gnatyeva T. M., Yakovenko A. O., Zlatova M. G. [2]; Bilous O. S., Kundeus O. M. [1]; Kryvoshey O. V. [3]. The prospects for the use of artificial intelligence and its practical significance are revealed by the provisions of the National Strategy for the Development of Artificial Intelligence in Ukraine for the Period 2021-2030 [5]. It should be noted that the topic of the use of artificial intelligence in management accounting is not sufficiently covered in the works of domestic scientists and requires further research and development.

Objectives of the article

The purpose of the article is to study the main technologies of artificial intelligence and their capabilities for improving the management accounting system at the enterprise, taking into account the existing risks and prospects for accelerating the development of management accounting based on artificial intelligence.

The main material of the research

Artificial intelligence technology, in one form or another, is becoming widespread in all areas of the economy, including accounting. The development of artificial intelligence is changing the way accounting tasks are performed, with the potential to transform the entire profession.

Artificial Intelligence is a branch of computer science that studies methods and algorithms for creating automated systems capable of performing cognitive functions inherent in the human mind. To achieve its goals, the field of artificial intelligence uses a combination of approaches from mathematics, statistics, information theory, machine learning, neuroscience, and software engineering, creating a basis for automating complex processes in various fields [3]. Based on the analysis of scientific approaches

to defining the concept of artificial intelligence [1, 2, 6], this category will be understood as a branch of computer science that studies the creation of software systems and algorithms that are endowed with the ability to perform tasks that usually require the application of human intelligence, in particular: the ability to think; understand; generalize and learn from experience.

The goal of AI technology development is to reduce the use of human resources to solve complex intellectual tasks that are difficult to manually algorithmize due to their multifactorial nature and complexity [11]. Management accounting in the modern economic environment increasingly relies on digital tools and technologies, such as ERP systems, Cloud technologies and computing, Big data, Block chain and Artificial intelligence, which contribute to new opportunities for collecting, processing and analyzing accounting and analytical data [8]. The formation and strengthening of the competitive environment forces management structures to respond in a timely manner to changes in the market situation. In this context, the requirements for management accounting as a basis for ensuring the adoption of sound management decisions are increasing. That is why artificial intelligence is developing every year and gradually occupying important links in business. The use of artificial intelligence technologies allows you to perform various tasks faster, more accurately, increase the efficiency of accounting processes, data analysis and decision-making, and also reduce the involvement of human resources. So, the current directions of application of artificial intelligence technology in management accounting are shown in Fig. 1.
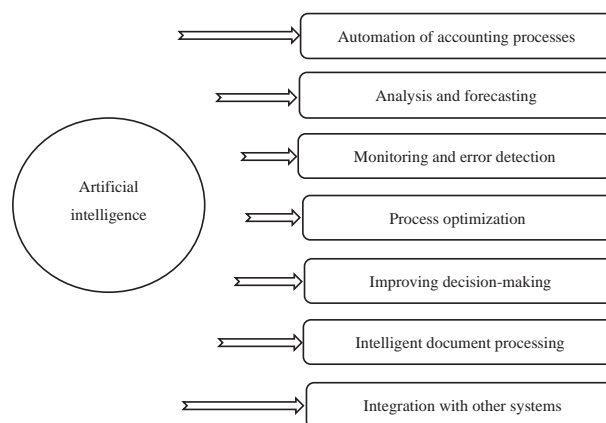

Fig. 1 – Directions of application of artificial intelligence in management accounting

Let's take a closer look at each of these areas.

First of all, automation of accounting processes is that artificial intelligence can significantly facilitate and accelerate many aspects of management accounting by automating routine and labor-intensive tasks. For example, data entry, processing and classification of transactions, which allows you to reduce errors and the cost of employee time, as well as reduce the cost of administrative tasks.

Artificial intelligence is able to analyze data and predict indicators. Automation of these processes helps to quickly identify trends and patterns. Thanks to this, machine

learning algorithms can predict future financial results, demand for products, costs and other key indicators, which helps to make informed decisions. Monitoring and error detection. With the help of artificial intelligence, you can detect atypical transactions or anomalies in accounting systems that may indicate financial violations, fraud or errors in data processing, which in turn allows you to quickly respond to potential problems and reduce risks when conducting management accounting.

Thanks to the use of artificial intelligence, it is possible to optimize a number of processes, for example, automatic generation of reports. This process can occur automatically based on real-time input data, which allows managers to receive up-to-date information without having to spend time on manual reporting. Also, thanks to artificial intelligence, it is possible to optimize the process of analyzing financial efficiency, because artificial intelligence allows you to analyze not only quantitative criteria, but also the relationships between various financial indicators. For example, between advertising costs and sales growth, which allows you to take into account the efficiency of various business processes and make decisions on them in the context of management accounting.

In general, due to the constant improvement of the functions performed by artificial intelligence, it is possible to conduct analysis of various processes through AI, and based on the conclusion to it, make informed decisions, providing detailed descriptions of the data obtained thanks to a computer program, analysis of financial data, forecasts and other factors. This allows you to thoroughly plan the company's development strategy, reduce business risks and increase the efficiency of management decisions. In the process of intelligent document processing, the use of artificial intelligence has become an integral part of management accounting. In particular, natural language processing (NLP) technologies can automatically process and classify documents (invoices, contracts, etc.), which allows you to reduce labor costs and reduce the likelihood of errors when entering data manually.

Also, artificial intelligence, through its large base of various software and forms of use, allows for the integration of other systems into management accounting.

For example, customer relationship management through Customer Relationship Management (CRM) or enterprise resource planning Enterprise Resource Planning (ERP), which improves the connection between financial and operational data, provides a more complete picture of the company's activities [9]. As noted earlier, artificial intelligence has a wide base of different technologies, each of which specializes in certain capabilities (Fig. 2).

It should be noted that artificial intelligence includes specific areas of technology that can be used to improve the productivity of management accounting in an enterprise, in particular:

− Expert systems (planning, evaluation, control, reporting on resources and preparation of external reports);

− Data analytics (identifying new patterns of relationships in large volumes of data);

− Machine learning (analyzing and identifying patterns in data and using information obtained from this data to improve decision-making processes);

− Neural networks (detecting fraud and unfair practices based on the analysis of a significant number of transactions).

Expert systems are computer programs or subsystems that integrate expert experience into a knowledge base system.

For management accounting, expert systems are used in inventory control, variance analysis, cost analysis, and diagnostics of management control systems. They can also be used in management accounting to automate the analysis of financial data, identify unusual situations, and provide recommendations on financial and economic activities [9]. In the context of management accounting, expert systems can increase the efficiency of planning, evaluation, control, and preparation of external reports, as well as checking the accuracy and reliability of financial and accounting information. That is, expert systems can help reduce risks by providing more reliable management accounting information.

Data Analytics has a significant impact on the work of a management accountant, as it allows you to discover new patterns of relationships in large volumes of data, and also provides improved data analysis and support
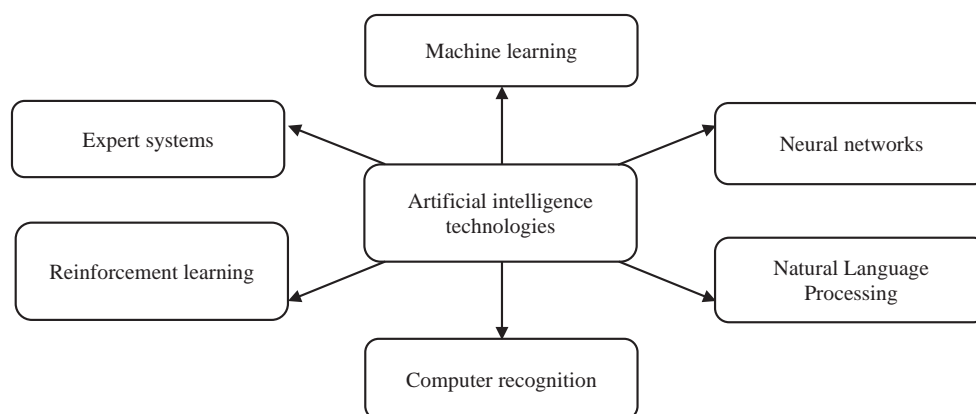
Fig. 2 – Basic artificial intelligence technologies

for decision-making based on management accounting information [4]. It is important to ensure the connection between data analytics, business intelligence and the productivity of management accountants. Without data analysis tools, an accountant will not be able to effectively perform his tasks in today's digital environment.

Machine Learning is a subfield of artificial intelligence in computer science that uses statistical techniques to give computers the ability to learn from data without explicit programming [10]. Machine learning in management accounting can be used to automate and optimize many financial and production processes. Machine learning algorithms can help analyze large amounts of financial data, predict performance, identify threats, and recommend optimal strategies. This will contribute to the accuracy of forecasts, reduce risks, and optimize financial management, and as a result, increase business efficiency.

In the matter of detecting risky or potentially fraudulent activities in the enterprise, management accountants (as well as internal auditors) will find a neural network useful. Neural Networks are another area of artificial intelligence that aims to simulate the analytical mechanisms implemented by the human brain [10]. They are more advanced machine learning algorithms, computing systems that are capable of finding more complex patterns. In management accounting, a neural network is an effective tool for detecting fraud by analyzing the data that is available for building a network and the need to detect unusual transactions. Neural networks can also be used to analyze customers and suppliers. When analyzing cooperation with buyers and suppliers in an enterprise, difficulties may arise, especially if there are a large number of counterparties. A management accountant using neural networks can analyze and identify the most profitable counterparties, identify debtors, and, if necessary, divide them into groups, classify them according to certain indicators, if this is necessary for analytical work [4].

So, we can systematize the positive impact of the use of artificial intelligence technologies on the management accounting system (Fig. 3).
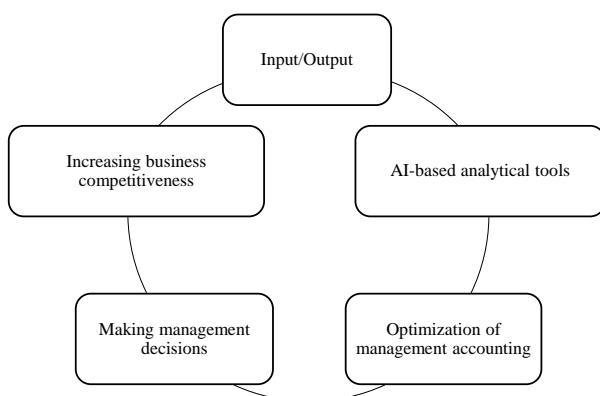

Fig. 3 – The impact of artificial intelligence on management accounting

The use of artificial intelligence technologies in management accounting has significant advantages and opens up certain prospects. However, AI also has a number of disadvantages and problematic aspects, namely: training artificial intelligence models and experiments with them requires large data sets, training time and powerful equipment with a graphics processor and a large amount of RAM. Also, the use of AI in management accounting may encounter certain problems, in particular: insufficient quality data for training models, the need for a large amount of technical expertise, and others (Table 1).

Table 1 – Advantages and prospects, disadvantages and risks of using AI in management accounting

Advantages and prospects	Disadvantages and risks
–	–
–	–
–	–

Source: grouped based on [9, 7, 10]

Therefore, for the effective implementation of artificial intelligence technologies in the management accounting system, companies must first assess the presence of prerequisites, namely: the growth in the volume and complexity of data that need to be processed and analyzed; the increase in the complexity of business operations due to the expansion of markets and the development of new technologies; the relevance of the introduction of innovations; the spread of technological solutions in business. It is also important to assess their own needs and capabilities, thereby reducing possible financial and operational risks. It can be considered that artificial intelligence is a catalyst for the transformation of approaches to doing business and organizing management accounting.

The relevance and importance of the practical application of artificial intelligence elements in all spheres of the national economy is evidenced by the approval by the Cabinet of Ministers of Ukraine of the National Strategy for the Development of Artificial Intelligence for the period 2021-2030 [5]. The main purpose of which is to create a balanced legal framework for the development and integration of artificial intelligence, which will promote investments and innovations, minimizing potential risks and solving a set of problems that require solutions at the state level. All this indicates the importance, targeted orientation and potential of the development of artificial intelligence in Ukraine.

Conclusions

The concept of artificial intelligence is based on the ability of information systems to detect patterns in structured and unstructured data, predict outcomes based on the results of analyzing large amounts of information, and optimize decision-making processes in complex multifactorial decision-making environments. The application of artificial intelligence in management accounting aims to increase the productivity of accountants who perform management accounting and form an information base for making management decisions.

Relevant areas of application of artificial intelligence technology in management accounting have been

identified: automation of accounting processes; analysis and forecasting; monitoring and detection of errors; process optimization; increasing the validity and efficiency of decision-making; intelligent document processing and integration with other systems.

Having analyzed the role and impact of artificial intelligence technologies on the management accounting system, it was found that the use of AI has significant advantages and prospects: automation and acceleration of management accounting and analysis processes, control and rapid sorting of information into certain categories, detection of errors and fraud, etc. However, it is worth noting that artificial intelligence has disadvantages and risks: significant financial costs; regulatory barriers and technical limitations; risks of loss of information confidentiality; the complexity of integrating artificial intelligence technologies with software products already existing at the enterprise; the lack of qualified specialists and a low level of digital literacy imply significant costs for personnel training; the need for constant monitoring and updating, as technologies are constantly changing, this can lead to additional costs and be a resource-intensive process for the company. However, despite the negative aspects, the opportunities provided by artificial intelligence in management accounting and its advantages are much more significant and promising. Of course, innovation cannot be ignored, because the application of artificial intelligence technologies will help bring the management accounting system to a new, higher quality level. This, in turn, will provide the enterprise with competitive advantages, operational efficiency and strategic business development.

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