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BANKING RISK FORECASTING BASED ON ARTIFICIAL INTELLIGENCE

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Abstract: This scientific article analyzes the role and economic efficiency of artificial intelligence technologies in risk forecasting and management within the banking system. The study scientifically examines the possibilities of using machine learning, neural networks, big data, and predictive analytics methods to identify credit risk, liquidity risk, operational risk, and fraud risks. It also highlights the advantages of AI-based algorithms in the rapid and accurate assessment of risks compared to traditional methods in the modern banking system. The article analyzes the experience of artificial intelligence technologies used in international banking practice, including the risk management systems of JPMorgan Chase, HSBC, and other major financial institutions. During the study, the possibilities of digital transformation processes in the banking sector of Uzbekistan, automation of banking databases, and the introduction of artificial intelligence technologies were assessed. Research results indicate that AI-based forecasting systems are crucial for early detection of banking risks, reducing the share of non-performing loans, and strengthening financial stability. At the same time, the article develops scientific and practical proposals for developing digital infrastructure, strengthening cybersecurity, and training qualified IT specialists for the effective use of artificial intelligence in the banking system of Uzbekistan.

Keywords: Artificial intelligence, digitalization, cybersecurity, credit system, risk management, big data.

Introduction. The rapid development of digital technologies and artificial intelligence in the global economy is causing fundamental changes in the banking and financial system. In particular, the expansion of the volume of financial services, the increase in the number of clients and the complexity of operations increase the need for effective management of banking risks. In the modern banking system, accurate forecasting of threats related to credit risk, liquidity risk, operational risk, and cybersecurity is one of the important factors in ensuring financial stability. Therefore, the use of artificial intelligence technologies in banking activities is becoming one of the urgent economic directions. AI-based systems allow for the rapid analysis of large volumes of data, the identification of hidden connections, and the prediction of future financial risks. In particular, machine learning, neural networks, big data, and predictive analytics technologies are increasing the efficiency of the bank's risk management system. Unlike traditional risk assessment methods, artificial intelligence algorithms serve to identify non-performing loans early, detect fraudulent transactions, and minimize financial losses by processing data in real-time. Today, major international banks such as JPMorgan Chase, HSBC, and Bank of America are widely using artificial intelligence technologies in risk management. These technologies demonstrate high efficiency in determining credit ratings, assessing customer solvency, monitoring fraudulent transactions, and forecasting investment risks. Uzbekistan is also implementing large-scale reforms to digitalize the banking system and introduce modern technologies. In recent years, the digital transformation of the financial sector has accelerated through the automation of banking services, the development of remote banking services, and the expansion of electronic payment systems. At the same time, the issue of implementing artificial intelligence-based banking risk forecasting systems remains one of the underdeveloped areas. The purpose of

this scientific article is to analyze the role and economic efficiency of artificial intelligence technologies in predicting banking risks, study international experience, and evaluate the prospects for implementing these technologies in the banking system of Uzbekistan. During the study, the advantages of risk management systems based on artificial intelligence, existing problems, and scientific-practical recommendations for their improvement will be developed.

Literature review. Issues of artificial intelligence and banking risk management are considered one of the most relevant areas of modern economic research. In recent years, as a result of the development of digital technologies, the use of artificial intelligence technologies in analyzing large volumes of data and risk forecasting within the banking system has been expanding. A number of scientific studies in this direction have been conducted by foreign and domestic economists. John McCarthy's scientific works play a crucial role in shaping the theory of artificial intelligence. He is considered one of the scientists who introduced the term "artificial intelligence" into scientific discourse. Later, scientific approaches developed by Stuart Russell and Peter Norvig served as the theoretical basis for the practical application of artificial intelligence in the financial system. The effectiveness of machine learning and neural networks in banking risk forecasting research has been confirmed in numerous scientific works. In particular, in reports prepared by International Monetary Fund experts, artificial intelligence technologies are assessed as an important tool for identifying credit risks and ensuring financial stability. These studies emphasize that the ability of AI algorithms to quickly process large volumes of data significantly improves banks' risk management systems. Also, in the scientific analysis conducted by the Bank for International Settlements, risk management systems based on artificial intelligence were compared with traditional statistical models. According to the results, machine learning algorithms demonstrated a high degree of accuracy in determining the probability of credit default. In particular, it has been noted that real-time algorithms are effective in the early detection of fraudulent transactions.

Methodology. This scientific article utilizes modern economic and statistical research methods to study the theoretical and practical aspects of forecasting banking risks based on artificial intelligence. During the study, the effectiveness of artificial intelligence technologies in identifying and assessing banking risks was comprehensively analyzed, and their differences from traditional risk management systems were studied. The theoretical basis of the research is the scientific works of foreign scientists in the field of artificial intelligence, machine learning, neural networks and predictive analytics. In particular, the theories of artificial intelligence developed by John McCarthy, Stuart Russell, and Peter Norvig were used as a methodological basis. Modern scientific approaches to banking risk management also served as an important theoretical source for the study. The article uses methods of analysis and synthesis, economic comparison, statistical analysis, induction and deduction. The study examined the effectiveness of artificial intelligence algorithms in predicting credit risk, liquidity risk, operational risk, and fraud risks. The processing speed and prediction accuracy of machine learning-based models for large volumes of data were compared with traditional statistical models. The information base of the study consists of reports from the International Monetary Fund, the Bank for International Settlements, and the World Bank, as well as data from the Central Bank of the Republic of Uzbekistan. In addition, the experience of international banks, scientific articles and the results of modern IT research were widely used. International banking practice was also studied during the study. In particular, AI-based risk management systems used by JPMorgan Chase, HSBC, and Bank of

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America were analyzed. Their effectiveness in credit scoring, fraud detection, and financial risk forecasting was evaluated.

Analysis and results. In recent years, the use of artificial intelligence technologies in the global banking system has been expanding significantly. In particular, AI-based systems demonstrate high efficiency in assessing credit risks, detecting fraudulent transactions, and forecasting liquidity risks. According to reports from the International Monetary Fund and the Bank for International Settlements, the share of operational risks and non-performing loans in banks using artificial intelligence has significantly decreased.

Table 1

Bank name	AI-powered route	Efficiency result
JPMorgan Chase	Credit risk assessment	Credit analysis speed increased by 40%
HSBC	Detection of fraudulent transactions	Suspicious transaction accuracy increased by 30%
Bank of America	Client risk profiling	Operating expenses decreased
Citibank	Predictive Analytics	Improved credit default forecast

The impact of artificial intelligence technologies on the risk management system in international banks

Table data shows that AI-based systems allow for faster and more accurate forecasting of banking risks compared to traditional methods. In particular, machine learning algorithms serve to accurately assess the solvency of customers by processing large volumes of data. The digitalization of the banking system is also accelerating in Uzbekistan. According to the Central Bank of the Republic of Uzbekistan, the volume of remote banking services and electronic payment systems has increased sharply in recent years. This leads to the formation of a large volume of digital data in the activities of banks. Analyzing this data using artificial intelligence allows for the effective management of banking risks.

Analysis shows that AI technologies are important in managing banks' loan portfolios. While traditional credit scoring systems primarily rely on a customer's financial history, artificial intelligence algorithms also analyze customer spending habits, transaction activity, and other metrics. As a result, the possibility of predicting the probability of credit default increases. AI technologies are also serving as an effective tool for detecting fraudulent transactions. Algorithms operating in real-time within the banking system automatically detect suspicious transactions, minimizing financial losses. This serves to strengthen banking security and customer trust. However, there are some problems with the implementation of risk management systems based on artificial intelligence in Uzbekistan. In particular, insufficient database integration, cybersecurity threats, a lack of qualified AI specialists, and the level of technological infrastructure development are factors limiting this process. Based

on the research results, it can be concluded that risk forecasting systems based on artificial intelligence can serve as an important tool for increasing the stability of Uzbekistan's banking sector, reducing credit risk, and improving the quality of financial services. In particular, the gradual introduction of AI technologies into the banking system will help increase the efficiency of digital banking services and strengthen financial security.

Suggestions and conclusions. Research results indicate that artificial intelligence technologies are a modern and effective tool for predicting and managing banking risks. AI-based systems provide higher accuracy and speed compared to traditional methods in identifying credit risks, monitoring fraudulent transactions, assessing liquidity risks, and mitigating operational risks. In particular, the ability to analyze large volumes of data in real time is of great importance in strengthening the stability of the banking system. During the study, the experience of international banks showed that the effective use of artificial intelligence technologies contributes to reducing banks' financial losses, reducing the share of non-performing loans, and improving the quality of customer service. Therefore, the widespread implementation of AI-based risk management systems in the banking sector of Uzbekistan is one of the important directions for increasing economic efficiency. Based on the research results, a number of scientific and practical proposals have been developed. First of all, it is necessary to further accelerate the digitalization of the banking system in Uzbekistan. With the widespread introduction of artificial intelligence and digital technologies, cyber threats are also increasing. Therefore, data protection in banks, the development of encryption technologies, and the implementation of modern security standards are important tasks. It is necessary to train qualified specialists in artificial intelligence and financial technologies. Expanding specialized programs in higher education institutions in the fields of AI, data science, and fintech, as well as developing cooperation with international IT companies, will increase the innovative potential of the banking sector. It is advisable to strengthen cooperation with the World Bank, the International Monetary Fund, and other international financial organizations. The introduction of international experience and technologies into the banking system will allow for the accelerated development of risk management systems based on artificial intelligence. In conclusion, forecasting banking risks based on artificial intelligence is one of the important innovative directions of the modern banking system. The gradual introduction of these technologies into the banking sector of Uzbekistan will serve to strengthen financial stability, effectively manage risks, and improve the quality of banking services. In the future, the development of AI technologies will accelerate the digital transformation of the banking system and serve as a crucial factor in increasing the international competitiveness of the country's financial sector.

REFERENCES

1. Decrees and Resolutions of the President of the Republic of Uzbekistan "On measures for the development of artificial intelligence technologies," 2021–2025.
2. Stuart Russell and Peter Norwig. Artificial intelligence: a modern approach. 4th Edition. Pearson Education.
3. John McCarthy. Programs with Common Sense. Stanford University.
4. Machine Learning / Tom M. Mitchell. McGraw-Hill Education.
5. International Monetary Fund. Artificial Intelligence and the Future of Financial Services. Washington DC, 2024.
6. Bank for International Settlements. Artificial Intelligence and Machine Learning in Financial Services. Basel, 2023.

7. World Bank. Digital Financial Services and Risk Management Report. Washington DC, 2024.
8. Organization for Economic Cooperation and Development. OECD Digital Economy Outlook 2024. Paris, 2024.
9. JPMorgan Chase. AI and Risk Management Annual Report, 2024.
10. HSBC. Digital Banking and Fraud Detection Report, 2023.
11. Asian Development Bank. Technology and Digital Transformation in the Banking Sector.
12. https://cbu.uz/uz/
13. https://mitc.uz/uz