



PROSPECTS FOR THE USE OF BIG DATA ANALYTICS IN COMMERCIAL BANKS

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In the modern financial environment, the rapid development of digital technologies has significantly transformed the operations of commercial banks. Big Data analytics has emerged as an important tool for improving decision-making, assessing financial risks, and enhancing customer experience. According to the World Bank, approximately 76% of adults worldwide had a financial account in 2021, compared with 51% in 2011, reflecting the growing importance of digital financial services and data-driven banking solutions¹.

The application of Big Data analytics enables commercial banks to process large volumes of customer transactions, identify behavioral patterns, and detect suspicious activities in real time. These capabilities can improve credit scoring accuracy, strengthen fraud prevention, and support personalized banking services. For example, analyzing transaction histories and repayment behavior allows banks to assess borrowers more comprehensively, potentially reducing non-performing loans and improving the efficiency of lending operations.

In Uzbekistan, the ongoing digital transformation of the banking sector creates new opportunities for implementing Big Data technologies. The increasing use of mobile banking, electronic payments, and online lending generates substantial amounts of data that can support more effective financial management. However, challenges related to data security, technological infrastructure, and the shortage of qualified specialists remain significant. Therefore, this study examines the prospects for using Big Data analytics in commercial banks, focusing on its potential to improve operational efficiency, risk management, and competitiveness in the digital economy.

The analysis of Big Data analytics in commercial banks demonstrates that data-driven technologies are becoming an important factor in improving banking efficiency and competitiveness. By processing large volumes of transaction records, customer profiles, credit histories, and payment information, banks can identify market trends and make more accurate financial decisions. According to the World Bank's Global Findex Database 2021, 76% of adults worldwide had a financial account, indicating the expanding role of formal and digital financial services [1]. This development creates opportunities for commercial banks to use advanced analytical tools to improve

¹ Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. World Bank. Source

customer segmentation, develop personalized products, and optimize operational processes.

One of the most significant applications of Big Data analytics is credit risk management. Traditional credit assessment methods often rely on limited financial indicators and historical repayment records. In contrast, Big Data technologies can analyze broader datasets to identify patterns associated with borrowers' repayment behavior, subject to data protection and regulatory requirements. Machine learning models can support early identification of potential defaults, fraud detection, and more effective allocation of financial resources. Research by the Bank for International Settlements highlights the growing relevance of big data and machine learning in financial analysis and risk assessment [2]. Nevertheless, the effectiveness of these technologies depends on data quality, model transparency, cybersecurity, and the ability to prevent algorithmic bias.

For commercial banks in Uzbekistan, Big Data analytics offers opportunities to strengthen digital banking services, improve lending decisions, and increase customer satisfaction. The expansion of mobile applications, electronic payments, and remote banking generates increasingly large datasets that can support real-time monitoring and predictive analysis. However, successful implementation requires investment in digital infrastructure, skilled personnel, secure data management systems, and appropriate governance mechanisms. Banks should also establish clear procedures for protecting customers' personal information and evaluating the reliability of analytical models. Therefore, the long-term prospects of Big Data analytics in Uzbekistan's banking sector depend not only on technological adoption but also on effective risk management, regulatory compliance, and the integration of data-driven solutions into strategic decision-making.

The data presented in Table 1 reveal a substantial expansion in global access to financial services. Between 2011 and 2021, the share of adults with a financial account increased from 51% to 76%, representing a rise of 25 percentage points.

This trend indicates a growing opportunity for commercial banks to use Big Data analytics to understand customer behavior, improve service personalization, and develop digital financial products.

Furthermore, the adoption of AI-based technologies across financial services

Table 1.

International indicators demonstrating the potential for Big Data analytics in commercial banking²

Indicator	Year	Value	Implications for commercial banks
Adults worldwide with a financial account	2011	51%	Establishes the baseline for financial inclusion
Adults worldwide with a financial account	2017	68%	Expanding access increases the potential volume of banking data

² World Bank. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. Official report.; Bank for International Settlements. (2024). Annual Economic Report 2024. Official report

Adults worldwide with a financial account	2021	76%	Greater financial inclusion creates opportunities for data-driven services
Adults in developing economies with an account	2017	63%	Indicates the scope for expanding digital banking
Adults in developing economies with an account	2021	71%	Strengthens the potential for data-based customer segmentation
Financial services firms using AI for functions including cash-flow forecasting, credit scoring and fraud detection	2024 report	70%	Demonstrates the growing adoption of AI-enabled analytics in finance

demonstrates the increasing importance of advanced analytics in banking operations. These technologies can support credit risk assessment, fraud detection, liquidity forecasting, and operational efficiency. However, wider access to financial services does not automatically guarantee effective Big Data implementation. Banks must also invest in data infrastructure, cybersecurity, analytical expertise, and responsible data governance.

The study concludes that Big Data analytics has significant potential to transform the operations of commercial banks by improving decision-making, credit risk assessment, fraud detection, and customer relationship management. International evidence indicates that the expansion of financial inclusion and the growing adoption of artificial intelligence are creating favorable conditions for data-driven banking. The analysis also demonstrates that the effective use of Big Data depends on technological infrastructure, data quality, cybersecurity, and the availability of qualified specialists. For Uzbekistan, the integration of advanced analytical technologies represents an important opportunity to strengthen the competitiveness and resilience of the banking sector.

Based on the findings, the following recommendations are proposed:

- develop integrated Big Data platforms. Commercial banks should integrate transaction data, customer information, credit histories, and digital payment records into secure analytical systems to support timely and evidence-based decisions.

- improve credit risk assessment. Banks should introduce machine learning models to complement traditional credit scoring methods, enabling more accurate borrower assessment and early identification of potential loan defaults.

- strengthen fraud detection and cybersecurity. The implementation of real-time transaction monitoring and anomaly detection systems can help identify suspicious activities and reduce financial losses.

Commercial banks should expand professional training in data analytics, artificial intelligence, cybersecurity, and financial modeling to develop the expertise required for digital transformation. Establish responsible data governance. Banks should ensure compliance with personal data protection requirements, improve the transparency of analytical models, and regularly evaluate the accuracy and fairness of automated decisions.

In conclusion, the systematic implementation of these recommendations can help commercial banks in Uzbekistan improve operational efficiency, strengthen risk management, enhance customer satisfaction, and establish sustainable competitive

advantages in the digital economy. Future research should assess the measurable impact of Big Data analytics on banking performance using indicators such as operating costs, non-performing loan ratios, fraud losses, and customer retention rates.

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