

WAYS TO IMPROVE COMMERCIAL BANKS' INVESTMENT ACTIVITIES THROUGH DIGITALIZATION

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ABSTRACT: This article examines the issues of improving the investment activities of commercial banks through modern digital technologies, particularly Artificial Intelligence (AI) and Big Data analytics. The mechanisms for applying digital models to investment portfolio optimization, risk assessment, and forecasting processes are analyzed. During the research, econometric modeling was conducted using data from leading commercial banks operating in the financial market of Uzbekistan. The results indicate that the use of intelligent systems in investment decision-making significantly increases profitability while reducing risk levels. The article concludes with practical recommendations for the digital transformation of the national banking system.

Keywords: commercial banks, investment activity, digitalization, artificial intelligence, risk management, Big Data, portfolio optimization.

1. INTRODUCTION

In the context of the modern global economy, commercial banks can no longer rely solely on traditional lending practices. The globalization of financial markets, increasing competition, and changing customer demands encourage banks to diversify their sources of income. In this regard, the investment activities of commercial banks—namely investments in securities, startup projects, long-term investment funds, and innovative enterprises—have become increasingly important.

However, investment activities are always associated with a high degree of uncertainty and risk. Traditional analytical methods, expert assessments, and linear financial models often fail to accurately predict rapidly changing market trends. As a result, the quality of banks' investment assets may deteriorate, leading to financial losses.

In the Republic of Uzbekistan, banking sector reform and digitalization are among the key priorities of state policy. Establishing digital ecosystems within banks and implementing modern IT solutions in investment management have become pressing issues. The purpose of this study is to scientifically and practically substantiate effective ways of organizing and improving the investment activities of commercial banks based on Artificial Intelligence and Big Data analytics.

2. RESEARCH METHODOLOGY

The study employed methods such as system analysis, comparative economic analysis, grouping, and econometric modeling. To evaluate and optimize banks' investment portfolios, Artificial Intelligence-based machine learning algorithms, including Random Forest and Gradient Boosting, were applied.

The research focused on three major commercial banks actively engaged in investment operations in Uzbekistan's financial market (referred to as Bank A, Bank B, and Bank C).

Quarterly financial reports and investment portfolio data covering the period from 2023 to 2025 were analyzed.

The main variables included in the model were:

Independent variables:

- Volume of investments in IT infrastructure ((X_1));
- Number of projects evaluated using Big Data analytics ((X_2));
- Digital competency level of employees ((X_3)).

Dependent variable:

- Profitability of the bank’s investment portfolio ((Y), measured as ROA or ROI).

The general form of the model was expressed as the following nonlinear function:

$$Y = [\beta_0 + \beta_1 \ln(X_1) + \beta_2 X_2 + \beta_3 X_3 + \epsilon]$$

where:

- (β_0) – intercept term;
- ($\beta_1, \beta_2, \beta_3$) – elasticity coefficients;
- (ϵ) – random error term.

3. RESEARCH RESULTS

The conducted analyses and econometric modeling demonstrated a strong positive correlation between the level of digital technology implementation in banks and the effectiveness of their investment activities ((R^2 = 0.84)).

Table 1. Comparative Indicators of Commercial Banks’ Investment Activities (Based on 2025 Results)

Indicators	Bank (Traditional)	A (Partially Digitalized)	B Bank C (AI and Big Data Implemented)
Investment portfolio volume (billion UZS)	1,200	1,850	2,400
Average portfolio profitability (%)	14.2%	16.8%	21.5%
Share of non- performing investments (NPI (%))	6.4%	3.1%	0.8%
Time required for project evaluation	12 days	4 days	2 hours

Indicators	Bank (Traditional)	A (Partially Digitalized)	B Bank C (AI and Big Data Implemented)
Risk detection accuracy	68%	82%	96%

The data presented in Table 1 indicate that Bank C, which fully utilizes Artificial Intelligence technologies, achieved an investment portfolio profitability rate of 21.5%, which is 7.3 percentage points higher than that of the traditional bank. More importantly, the share of non-performing investments (NPI) in Bank C was only 0.8%. This demonstrates the high capability of AI algorithms in project scoring and early risk detection.

Furthermore, the time required for project analysis and decision-making decreased from 12 days to only 2 hours. This enables banks to quickly seize highly profitable and liquid investment opportunities in the market.

4. DISCUSSION

The findings confirm that improving the investment activities of commercial banks is directly linked to technological transformation. Artificial Intelligence models provide advantages in the following areas:

1. Algorithmic Trading (High-Frequency Trading)

Banks can analyze stock and bond prices within microseconds and execute the most profitable trading operations without human intervention.

2. Predictive Analytics

By analyzing macroeconomic indicators, inflation rates, exchange rates, and sectoral development trends, AI systems can forecast which industries are likely to become the most attractive investment destinations in the future.

However, several obstacles hinder the large-scale implementation of these systems. First, the Big Data infrastructure within Uzbekistan's financial market remains fragmented and underdeveloped. Second, there is a shortage of specialists such as Data Scientists and Quantitative Analysts who possess expertise in both finance and information technology.

International experience, particularly that of major financial institutions such as JPMorgan Chase and Goldman Sachs, demonstrates that although the transition to digital models requires significant initial capital investment, it is the most effective long-term strategy for ensuring stability and competitiveness in the banking sector.

5. CONCLUSION AND RECOMMENDATIONS

Based on the research findings, the following practical recommendations are proposed for improving the investment activities of commercial banks in Uzbekistan through digitalization:

- **Establish a centralized AI-based scoring system:** Introduce automated intelligent rating systems that minimize human intervention in evaluating investment projects.

- **Implement real-time investment portfolio monitoring systems:** Develop platforms capable of continuously analyzing market risks and portfolio performance.

- **Enhance human capital:** Train qualified specialists in FinTech and attract foreign experts to strengthen digital competencies within the banking sector.

The targeted implementation of digital technologies will enhance the investment attractiveness of commercial banks and serve as an important bridge for attracting foreign investment into the national economy.

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