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WAYS TO IMPROVE COMMERCIAL BANKS' INVESTMENT ACTIVITIES THROUGH DIGITALIZATION

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Abstract: This study examines the enhancement of commercial banks' investment activities through the adoption of modern digital technologies, particularly Artificial Intelligence (AI) and Big Data analytics. The research explores the application of digital models in investment portfolio optimization, risk assessment, and forecasting processes. Econometric modeling was conducted using data collected from leading commercial banks operating in Uzbekistan's financial market. The findings indicate that the integration of intelligent systems into investment decision-making significantly increases profitability while reducing investment risks. The study concludes with practical recommendations aimed at accelerating the digital transformation of the national banking sector.

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

1. Introduction

In the contemporary global economy, commercial banks can no longer rely exclusively on traditional lending operations. The globalization of financial markets, intensifying competition, and evolving customer expectations have encouraged banks to diversify their income sources. Consequently, investment activities—including investments in securities, startup ventures, long-term investment funds, and innovative enterprises—have become increasingly important components of banking operations.

However, investment activities are inherently associated with substantial uncertainty and risk. Traditional analytical approaches, expert evaluations, and linear financial models often fail to accurately predict rapidly changing market conditions. As a result, the quality of investment assets may deteriorate, potentially leading to financial losses.

In the Republic of Uzbekistan, banking sector reforms and digital transformation have been identified as strategic priorities of state policy. The development of digital ecosystems within banks and the implementation of advanced information technologies in investment management have therefore become particularly relevant. The objective of this study is to provide a scientific and practical justification for improving commercial banks' investment activities through the application of Artificial Intelligence and Big Data technologies.

2. Research Methodology

The study employed a combination of system analysis, comparative economic analysis, grouping methods, and econometric modeling. To evaluate and optimize banks' investment portfolios, machine learning algorithms based on Artificial Intelligence, including Random Forest and Gradient Boosting, were utilized.

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The research focused on three major commercial banks actively engaged in investment operations within Uzbekistan's financial market, referred to as Bank A, Bank B, and Bank C. Quarterly financial statements and investment portfolio data covering the period from 2023 to 2025 were analyzed.

The model included the following variables:

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 by Return on Assets (ROA) or Return on Investment (ROI).

The general form of the econometric model is expressed as:

$$Y = \beta_0 + \beta_1 \ln(X_1) + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

where:

- β_0 represents the intercept term;
- $\beta_1, \beta_2, \beta_3$ denote the elasticity coefficients;
- ε represents the random error term.

3. Research Results

The econometric analysis revealed a strong positive relationship between the level of digital technology adoption and the effectiveness of commercial banks' investment activities, with a coefficient of determination of ($R^2 = 0.84$).

Table 1. Comparative Indicators of Commercial Banks' Investment Activities (2025)

Indicators	**Bank A (Traditional)**	**Bank B (Partially Digitalized)**	**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

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Indicators	Bank A (Traditional)	Bank B (Partially Digitalized)	Bank C (AI and Big Data Implemented)
Share of non-performing investments (%)	6.4	3.1	0.8
Project evaluation period	12 days	4 days	2 hours
Risk detection accuracy (%)	68	82	96

The results presented in Table 1 demonstrate that Bank C, which extensively employs Artificial Intelligence technologies, achieved an investment portfolio profitability rate of 21.5%, exceeding that of the traditional bank by 7.3 percentage points. Furthermore, the proportion of non-performing investments in Bank C was only 0.8%, highlighting the effectiveness of AI-based project evaluation and early risk identification mechanisms.

Additionally, the time required for project assessment and decision-making decreased from 12 days to only 2 hours. This significant reduction enables banks to capitalize on profitable and liquid investment opportunities more rapidly.

4. Discussion

The findings confirm that improvements in commercial banks' investment performance are closely linked to technological transformation. Artificial Intelligence offers significant advantages in several key areas.

Algorithmic Trading

AI systems can analyze securities prices within milliseconds and execute highly profitable trading operations automatically, without direct human intervention.

Predictive Analytics

By processing macroeconomic indicators, inflation rates, exchange rate fluctuations, and sectoral development trends, AI technologies can forecast the industries most likely to generate attractive investment opportunities in the future.

Despite these advantages, several challenges hinder the large-scale implementation of such systems. First, the Big Data infrastructure within Uzbekistan's financial sector remains fragmented and insufficiently developed. Second, there is a shortage of qualified professionals, including Data Scientists and Quantitative Analysts, who possess expertise in both finance and information technology.

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International experience, particularly from major financial institutions such as JPMorgan Chase and Goldman Sachs, demonstrates that although digital transformation requires substantial initial investment, it remains the most effective long-term strategy for ensuring sustainability, competitiveness, and profitability in the banking sector.

5. Conclusion and Recommendations

Based on the research findings, the following practical recommendations are proposed to improve commercial banks' investment activities through digitalization:

- **Develop a centralized AI-based scoring system:** Implement intelligent automated rating systems that minimize human intervention in investment project evaluation.
- **Introduce real-time portfolio monitoring systems:** Create digital platforms capable of continuously assessing market risks and investment portfolio performance.
- **Strengthen human capital:** Expand FinTech education programs and attract international experts to enhance digital competencies within the banking sector.

The systematic implementation of digital technologies will increase the investment attractiveness of commercial banks and serve as an important mechanism for attracting foreign investment to the national economy.

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