

The Impact Of Digital Banking Technologies On The Performance Of Commercial Banks In Uzbekistan

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Abstract

The rapid development of digital technologies has significantly transformed the global banking sector and has become an important driver of efficiency improvements in financial institutions. In recent years, commercial banks have increasingly implemented digital banking technologies such as mobile banking, internet banking, electronic payment systems, big data analytics, and cloud-based financial services. In Uzbekistan, the digital transformation of the banking system has become one of the key priorities of financial sector reforms aimed at improving the accessibility, quality, and efficiency of banking services.

The purpose of this study is to assess the impact of digital banking technologies on the performance of commercial banks in Uzbekistan. The research is based on the analysis of banking sector development indicators and financial performance of commercial banks during the period 2018–2025. The study applies economic-statistical analysis, comparative analysis, system analysis, econometric methods, and SWOT analysis to evaluate the relationship between digital banking development and bank efficiency indicators.

The results of the study show that the rapid expansion of digital banking infrastructure has significantly improved the operational performance of commercial banks in Uzbekistan. In particular, during the analyzed period the number of bank cards issued in the country

increased more than twofold, while the digital payment infrastructure significantly expanded, particularly through the growth of ATMs and self-service banking devices. At the same time, the volume of remote banking services and digital transactions grew significantly, reflecting the increasing adoption of digital financial services by customers. The analysis also demonstrates that the implementation of digital banking technologies contributed to improvements in key financial performance indicators of banks, including higher profitability (ROA and ROE) and improved operational efficiency through reductions in transaction and service costs.

The study concludes that digital banking technologies play a crucial role in enhancing the efficiency and competitiveness of commercial banks in Uzbekistan. The findings suggest that further development of digital financial infrastructure, wider integration of financial technologies, and the expansion of digital banking services will contribute to strengthening the sustainability and performance of the national banking system.

Keywords: Digital transformation, digital banking technologies, digital banking, banking efficiency, commercial banks, banking performance, financial technologies (FinTech), banking sector digitalization, financial innovation, banking services digitalization, operational efficiency, profitability indicators, financial sector development, banking infrastructure.

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INTRODUCTION

In recent decades, the rapid development of digital technologies has significantly transformed the global economy and reshaped the functioning of financial institutions. The banking sector has been one of the most affected industries, as digital technologies have fundamentally changed the ways financial services are delivered, managed, and consumed. The widespread use of internet banking, mobile banking, electronic payment systems, big data analytics, artificial intelligence, and cloud computing has enabled banks to improve operational efficiency, expand customer access to financial services, and enhance their competitiveness in increasingly digitalized markets.

Digital transformation has become a key driver of innovation and efficiency in modern banking systems. Financial institutions across the world are actively implementing digital banking technologies to automate internal processes, reduce operational costs, and create new financial products and services. As a result, the role of digital technologies in improving bank performance has become one of the central topics in contemporary financial research.

A number of scholars have examined the relationship between technological innovation and organizational efficiency. Porter (1985) emphasized that technological innovations play a crucial role in creating competitive advantages for companies by optimizing value chains and improving productivity. Similarly, Rynjolfsson and McAfee (2014) highlighted the importance of information technologies in enhancing productivity and economic growth through the digitalization of business processes. Research conducted by Vial also demonstrates that digital transformation represents a fundamental change in organizational structures, strategies, and business models driven by the adoption of digital technologies.

In the banking sector, digital technologies have significantly transformed traditional financial services. Digital banking allows customers to perform financial transactions remotely, without visiting physical bank branches, which increases the accessibility and convenience of banking services. At the same time, the implementation of financial technologies (FinTech) has intensified competition within the financial market and encouraged banks to develop innovative digital products. These technological changes have led to the emergence of new financial ecosystems where banks, fintech companies, and digital platforms interact to provide integrated financial services.

In emerging economies, digital transformation of the banking sector plays an important role in improving financial inclusion and strengthening financial infrastructure. Many developing countries are actively modernizing their banking systems by introducing digital payment platforms, expanding electronic banking services, and developing fintech ecosystems. These reforms contribute to improving the efficiency and sustainability of financial institutions while increasing the accessibility of financial services for the population.

Uzbekistan has also been actively implementing reforms aimed at modernizing the banking sector and developing digital financial infrastructure. In recent years, significant progress has been made in expanding digital banking services, increasing the use of bank cards and electronic payment systems, and developing remote banking services. The government has adopted several strategic programs focused on the development of the digital economy and the digital transformation of financial institutions. As a result, the level of digitalization in the banking sector has increased significantly, creating new opportunities for improving banking efficiency and service quality.

Despite the rapid development of digital technologies in the banking sector, the impact of digital banking technologies on the performance of commercial banks remains insufficiently studied, particularly in the context of emerging economies such as Uzbekistan. While many banks actively implement digital services, the economic effects of digital transformation and its influence on financial performance indicators require further empirical analysis.

Therefore, the purpose of this study is to analyze the impact of digital banking technologies on the performance of commercial banks in Uzbekistan. The research focuses on evaluating the relationship between the development of digital banking infrastructure and the financial efficiency of banks using key performance indicators such as Return on Assets (ROA), Return on Equity (ROE), Cost-to-Income Ratio (CIR), and Net Interest Margin (NIM).

The findings of this research are expected to contribute to a better understanding of how digital technologies influence banking efficiency and to provide practical recommendations for improving digital banking strategies in Uzbekistan. The results may also be useful for policymakers, financial institutions, and researchers interested in the development of digital banking and the modernization of financial systems in emerging economies.

LITERATURE REVIEW

Digital transformation has become one of the most important drivers of innovation and efficiency in the global financial system. The rapid development of digital banking technologies, including mobile banking, online platforms, artificial intelligence, and financial technologies

(FinTech), has significantly transformed the way financial institutions operate and deliver services. In recent years, many studies have focused on examining how digital technologies influence the performance and competitiveness of commercial banks.

Recent academic research highlights the growing importance of digital transformation in improving banking performance. For instance, Alqararah, Shehadeh, and Yaseen (2025) demonstrate that digital transformation capabilities significantly enhance banking performance by improving operational efficiency, organizational flexibility, and service innovation in commercial banks. Their findings show that digital technologies enable banks to optimize internal processes and improve financial outcomes.

Similarly, Hassan (2025) analyzed the relationship between financial technology adoption and bank performance in developing economies and found that FinTech development positively affects bank profitability and operational efficiency. The study indicates that digital technologies can improve lending activities and optimize banks' liability structures, which ultimately enhances financial performance.

A growing body of literature also examines the role of digital banking infrastructure in improving efficiency. Bueno (2024) argues that digitalization significantly improves operational efficiency in the banking sector by automating internal processes, reducing transaction costs, and increasing the speed of financial services. These improvements allow banks to operate more efficiently and compete more effectively in digital financial markets.

Several recent empirical studies analyze the relationship between digital transformation and bank profitability. For example, Febriansyah (2025) found that digital transformation has a positive and statistically significant impact on Net Interest Margin (NIM) and overall financial performance in Indonesian commercial banks. The results suggest that digital technologies improve banking efficiency by increasing transaction volumes and reducing operational costs.

Other studies emphasize the importance of fintech ecosystems in shaping bank performance. He (2025) shows that financial technologies improve bank performance by increasing operational efficiency and supporting business growth. According to this research, the integration of

fintech solutions allows banks to expand digital services, attract new customers, and strengthen their competitive positions in financial markets.

At the same time, some studies suggest that the relationship between digitalization and bank performance may be complex. Xiang (2023) found that the impact of digitalization on bank performance can follow a nonlinear pattern, where initial digital investments may temporarily reduce efficiency due to high implementation costs, but in the long-term digital technologies contribute to higher profitability and operational performance.

Despite the growing number of studies on digital banking and financial technologies, most empirical research has focused on developed economies or large emerging markets such as China, Indonesia, and European countries. Consequently, the impact of digital banking technologies on the performance of commercial banks in Central Asian economies, including Uzbekistan, remains relatively underexplored.

Therefore, further research is needed to evaluate how digital banking technologies influence the efficiency and financial performance of commercial banks in Uzbekistan. This study contributes to the existing literature by analyzing the development of digital banking infrastructure and its relationship with key banking performance indicators such as Return on Assets (ROA), Return on Equity (ROE), Cost-to-Income Ratio (CIR), and Net Interest Margin (NIM).

METHODOLOGY

This study uses a quantitative approach to examine the impact of digital banking technologies on the performance of commercial banks in Uzbekistan. The research focuses on analyzing the relationship between the development of digital banking infrastructure and key financial performance indicators of banks. The object of the study is the commercial banking sector of the Republic of Uzbekistan, while the research period covers 2018–2025, a time during which the banking sector experienced significant growth in digital financial services and electronic payment infrastructure.

The empirical analysis is based on statistical and financial data obtained from official reports of the Central Bank of the Republic of Uzbekistan, analytical publications on the development of the banking sector, and financial statements of commercial banks. These sources

provide information on the expansion of digital banking services, including bank cards, electronic payment systems, POS terminals, ATMs, and remote banking services.

Several analytical methods were applied in the study. Economic-statistical analysis is used to evaluate trends in the development of digital banking technologies and the financial performance of banks. Comparative analysis allows for assessing changes in banking indicators during the analyzed period. System analysis is used to examine digital transformation as a complex process affecting banking operations, while econometric methods are applied to analyze the relationship between digital banking development and bank performance indicators. In addition, SWOT analysis is used to identify strengths, weaknesses, opportunities, and threats associated with digital transformation in the banking sector.

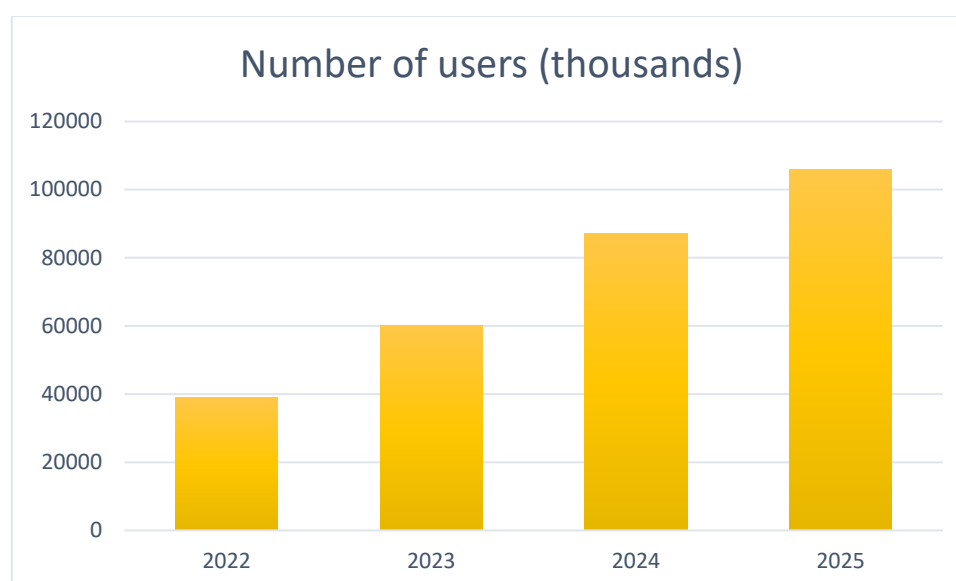
The efficiency and financial performance of commercial banks are evaluated using key banking indicators widely applied in financial research, including Return on Assets (ROA), Return on Equity (ROE), Cost-to-Income Ratio (CIR), and Net Interest Margin (NIM). These indicators make it possible to assess profitability, operational efficiency, and the effectiveness of banking operations in the context of digital transformation.

RESULTS

The empirical analysis demonstrates that the development of digital banking technologies has significantly accelerated the digital transformation of the banking sector in Uzbekistan. Statistical data show a rapid expansion of digital payment infrastructure and a substantial increase in the use of electronic financial services during recent years.

Picture 1

Growth dynamics of the number of users of remote banking services in Uzbekistan



Source: Compiled by the author based on data from the Central Bank.

According to the analysis, the number of bank cards issued in Uzbekistan increased sharply over the studied period. In 2022, the total number of bank cards amounted to 27,105,785, while in 2023 this figure increased to 34,195,648. By 2024, the number of bank cards reached 46,205,950, and by the beginning of 2025 it grew to 61,996,419. Thus, within three years the number of bank cards in circulation increased by more than 2.3 times, indicating the rapid expansion of digital payment services and the growing adoption of cashless transactions in the country.

Table 1

Dynamics of development of payment infrastructure in the banking system of Uzbekistan

Year	Number of bank cards	POS terminals	ATMs	Transactions via POS (million UZS)
2022	27 105 785	433 384	12 940	111 136 942
2023	34 195 648	434 018	20 379	177 671 013
2024	46 205 950	429 334	26 655	254 719 135
2025	61 996 419	426 225	29 909	326 735 209

Source: Compiled by the author based on Central Bank statistics.

The development of digital payment infrastructure is also reflected in the expansion of POS terminals. In 2022 the number of POS terminals installed in trade and service enterprises reached 433,384 units, while in 2023 it slightly increased to 434,018 units. In 2024 the number of POS

terminals amounted to 429,334, and in 2025 it reached 426,225 units. Although the number of terminals remained relatively stable, the functionality of payment infrastructure expanded through the introduction of QR-code payments and mobile payment systems, which contributed to the diversification of electronic payment channels.

Significant growth was also observed in the development of ATM infrastructure. In 2022 the number of ATMs operating in Uzbekistan was 12,940 units, while in 2023 their number increased to 20,379 units. In 2024 the figure rose to 26,655 units, and by 2025 it reached 29,909 units, demonstrating a more than 2.3-fold increase in self-service banking infrastructure. This expansion improved access to financial services and strengthened the availability of banking operations for the population.

Table 2

Dynamics of key financial indicators of commercial banks of Uzbekistan (billion soums)

Year	Assets	Loans	Deposits	Capital
2021	444 922	326 386	159 518	70 905
2022	557 719	396 110	191 017	87 397
2023	708 151	464 983	249 476	104 746
2024	860 344	563 291	319 948	126 389

Source: Compiled by the author based on data from the Central Bank of the Republic of Uzbekistan.

Another important indicator of digital banking development is the volume of transactions conducted through POS terminals. Statistical analysis shows that the volume of POS-based transactions increased from 111,136,942 million UZS in 2022 to 177,671,013 million UZS in 2023. In 2024 this figure reached 254,719,135 million UZS, and by 2025 it increased to 326,735,209 million UZS. This represents an increase of nearly three times within four years, confirming the rapid growth of cashless payments and digital financial services in Uzbekistan.

The analysis also shows that the expansion of digital banking infrastructure contributed to improvements in the operational efficiency of commercial banks. The growth of digital payment systems and remote banking services increased transaction volumes, reduced service costs, and improved customer accessibility to banking services. As a result, banks were able to optimize their operational processes and strengthen their financial performance.

Overall, the results demonstrate that the rapid development of digital banking technologies and payment infrastructure has become one of the key factors contributing to the improvement of banking efficiency and the modernization of the financial system in Uzbekistan.

DISCUSSION

The results of the study demonstrate that the rapid development of digital banking technologies has become a key factor influencing the performance of commercial banks in Uzbekistan. The significant increase in the number of bank cards, the expansion of ATM and payment infrastructure, and the rapid growth of cashless transactions indicate the active digitalization of the national banking system. In particular, the increase in the number of bank cards from 27.1 million in 2022 to almost 62 million in 2025 reflects a substantial expansion of digital financial services and the growing integration of digital payment instruments into everyday economic activity.

The growth of ATM and self-service infrastructure also confirms the ongoing transformation of the banking sector. The number of ATMs increased from 12,940 units in 2022 to nearly 29,909 units in 2025, which significantly improved the accessibility of banking services for the population and expanded the reach of financial institutions across the country. At the same time, the rapid growth of POS transactions—from 111.1 trillion UZS in 2022 to more than 326.7 trillion UZS in 2025—demonstrates the increasing role of electronic payments in the national economy and the gradual transition toward a cashless economy.

These findings are consistent with previous international studies that emphasize the positive impact of digital transformation on banking efficiency and performance. Digital technologies enable financial institutions to automate internal operations, reduce operational costs, and increase the speed and convenience of financial transactions. As a result, banks are able to serve a larger number of customers while maintaining higher levels of operational efficiency.

At the same time, the study shows that digital transformation in the banking sector is not limited to technological modernization alone. The successful implementation of digital banking technologies requires improvements in financial infrastructure, regulatory frameworks, and institutional management. The integration of fintech solutions, digital

payment platforms, and mobile banking services has created new opportunities for expanding financial inclusion and improving service quality.

However, the digital transformation of the banking sector also creates several challenges. Banks must invest significant financial resources in technological infrastructure, cybersecurity systems, and digital innovation. In addition, the rapid development of financial technologies increases competition from fintech companies and non-bank financial institutions, which may affect the traditional business models of commercial banks.

Despite these challenges, the results of the study suggest that digital banking technologies play a crucial role in strengthening the efficiency and competitiveness of commercial banks in Uzbekistan. The continued development of digital financial infrastructure, the expansion of electronic payment systems, and the adoption of innovative financial technologies are expected to further improve the performance of the banking sector and support the sustainable development of the national financial system.

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