



Muhammadsolih Khabibullokhaji^a 

^aDeputy Director, “Kelajak” Center, Yakkasaray District

E-mail: muhammadsolihxabibulloxoji@gmail.com

Orcid: 0009-0009-8125-5673

ANALYSIS OF THE CURRENT STATE OF DIGITAL TRANSFORMATION OF COMMERCIAL BANKS AND ASSESSMENT OF ITS EFFICIENCY

Abstract. *The study examines the current state of digital transformation of commercial banks and the assessment of its efficiency. The problem is analyzed through the development of digital banking technologies, new efficiency assessment methods (SFA, DEA), and the impact of digitalization on operating costs, profitability, and risk management. The article presents digital transformation as a key condition for increasing bank efficiency, strengthening competitiveness, and ensuring the sustainable development of the banking system. The views of Uzbek, Russian, and international researchers are reviewed in connection with practical experience and modern approaches to measuring the effectiveness of digital initiatives in commercial banks.*

Keywords: *commercial banks, digital transformation, efficiency assessment, SFA model, operational efficiency, digital banking, fintech, bank performance, cost efficiency, national banking system.*

INTRODUCTION

At the beginning of the 21st century, the rapid development of digital technologies fundamentally transformed the banking system. For commercial banks, digital transformation has become not only a technological upgrade but also an essential condition for increasing operational efficiency, meeting customer needs, and ensuring competitiveness. Mobile banking, artificial intelligence, cloud technologies, fintech solutions, and automated processes have enabled banks to reduce operating costs, improve service quality, and create new sources of income.

In Uzbekistan's banking system as well, digital transformation processes are being carried out extensively within the framework of the "Digital Uzbekistan - 2030" strategy. However, assessing the real efficiency of digital changes, measuring their impact on financial results, and identifying existing problems remain pressing issues. Alongside traditional financial indicators, there is a growing need to analyze bank efficiency using modern methods such as SFA and DEA.

The purpose of this article is to study the current state of digital transformation of commercial banks and to analyze the theoretical and practical aspects of assessing its efficiency. The study examines the essence of digital transformation, the mechanisms of its impact on banking activities, assessment methods, and approaches formed on the basis of experience in Uzbekistan and abroad.

MAIN PART

The process of digital transformation of commercial banks has become one of the most important development directions of Uzbekistan's banking system in recent years. Since 2020, the reforms carried out within the framework of the "Digital Uzbekistan - 2030" strategy have fundamentally changed the operations of banks. The introduction of digital technologies has significantly altered not only the forms of service delivery but also banks' internal operational processes, cost structure and efficiency indicators. In 2020 the number of mobile banking users was only 4.3–6.8 million, while by 2024–2025 this figure reached 17.6–23.5 million - an almost three- to fourfold increase. The number of internet banking users also rose from 2.9–3.5 million to 10.5–17.2 million. By mid-2025 the total number of users of remote banking services exceeded 40 million and, according to some reports, approached 70 million. These figures demonstrate a fundamental change in the population's attitude toward banking services. The share of electronic payments rose from 42–45% in 2020 to 68–82% in 2024 and, according to some sources, exceeded 70% in 2025.

The rapid growth of digital banking indicators has attracted the attention of both local and international researchers, who have examined the impact of digital transformation on bank efficiency from different theoretical and methodological perspectives. A review of the existing literature reveals a wide range of approaches to measuring the effectiveness of digitalisation in the banking sector.

Maqsudov A.U. in his study used the Stochastic Frontier Analysis (SFA) model to assess the efficiency of commercial banks in Uzbekistan during 2021–2024. He conducted an in-depth analysis of changes in operating costs, number of employees, loan volumes and deposit volumes, and found that the average efficiency of banks was around 89.5–89.6%. The researcher noted that digital transformation processes had a positive impact on the efficiency of the banking system, although the increase in operating costs temporarily reduced efficiency in the short term (Maqsudov, 2024).

Nabiho‘jayeva M.U. and Xoshimova X.X. developed a comprehensive methodology for assessing the financial stability and efficiency of commercial banks in the digital economy. They formed a system of indicators that takes into account not only traditional financial indicators (capital adequacy, liquidity, profitability) but also the level of digital transformation of banks. The researchers proposed a rating approach to the stability and efficiency of banks based on an integral index model (Nabiho‘jayeva, Xoshimova, 2025).

Fayziyeva M. studied the promising directions for assessing the efficiency of using digital technologies in the activities of commercial banks. She analysed foreign methodologies for evaluating the effectiveness of introducing digital technologies in various sectors and developed her own methodology adapted to the conditions of commercial banks in Uzbekistan. The researcher also proposed a strategy for the effective development of digital technology offerings (Fayziyeva, 2023).

Abduraxmonov A. and Norboyev J. analysed the criteria for measuring and evaluating performance indicators of commercial banks from both scientific-theoretical and practical perspectives. They examined the main financial indicators determining efficiency, modern assessment methods and international experience based on the activities of commercial banks in Uzbekistan. The researchers also conducted an in-depth study of the impact of digital transformation and innovative technologies on the quality of banking services (Abduraxmonov, Norboyev, 2025).

Raxmonov M. systematically studied the international practice of integral assessment of the digital transformation of commercial banks and the specific aspects of the Uzbek context. He systematised existing approaches and formed the conceptual foundations for studying the relationship between digital transformation and the efficiency of banking activities. The researcher also analysed the current state of digitalisation in the banking system of Uzbekistan (Raxmonov, 2026).

Belalov M.R. conducted an in-depth study of the economic efficiency of investments in information technologies by commercial banks based on factor analysis and modelling of the return on IT capital. He identified significant differences in the efficiency of IT investments between different categories of banks and showed that the return is higher in large systemically important banks. The researcher emphasised that digital channels and AI-based systems provide the highest returns (Belalov, 2025).

Kurovskiy S.V., Mishin D.A. and Gugkayeva S.S. empirically studied the impact of digitalisation on the activities of Russian banks. Using three regression models based on panel data for 2020–2022, they found a stable positive relationship between the level of digitalisation and the main performance indicators of banks. The researchers emphasised that the importance of digitalisation increases especially during crisis periods (Kurovskiy, Mishin, Gugkayeva, 2025).

Plotnikova E.V. studied the factors influencing the efficiency of digital banks based on global trends. Through statistical analysis of various factors, she found that only the number of clients has a reliable positive impact on efficiency. The researcher noted that digital transformation is changing traditional business models and reducing the significance of the country factor (Plotnikova).

Kojievnikova G.V. and Solskaya I. Yu. synthesised a model of strategic management of the digital transformation of banking activities. They proposed a model that combines four key strategic approaches: customer-centricity, operational efficiency, an innovation-oriented paradigm and ecosystem thinking. The researchers conducted a preliminary validation of the model based on data from the top 20 banks in Russia (Kojievnikova, Solskaya).

Shen C., Wu J., Li Y. and Chen Q. empirically studied the impact of digital transformation on the cost efficiency of commercial banks using the example of Chinese banks. Based on panel data from 131 banks for 2013–2022, they created a digital transformation index and found that it significantly improves cost efficiency. The researchers also identified mediating channels such as business diversification, reduction of information asymmetry, improvement of fund utilisation efficiency and risk reduction (Shen, Wu, Li, Chen, 2025).

Citterio A., King T. and Locatelli R. determined the impact of digital transformation on bank profitability in a study of European banks. Based on data from 279 European banks for 2017–2022, they developed a new digitalisation index and showed that

digital transformation increases bank profitability, particularly through IT and network efficiency. The researchers also found that Covid-19 and the level of national IT infrastructure strengthen this relationship (Citterio, King, Locatelli, 2024).

The volume of digital transactions rose from 98.2 trillion soums in 2020 to 452.8 trillion soums in 2024 - a 4.6-fold increase. This growth, alongside reducing banks' operational burden, created convenience for customers and accelerated the transition to a cashless economy. The total assets of commercial banks grew from approximately 110 trillion soums in 2020 to nearly 640 trillion soums in 2024, and by the end of 2025 ranged between 890–960 trillion soums. The loan portfolio also expanded from 290 trillion soums to 500–600 trillion soums. Deposit volume grew from 210 trillion soums in 2020 to 370–444 trillion soums in 2025. A significant portion of this growth is attributable to funds attracted through digital channels. In 2020, the share of deposits attracted through digital channels was 11.4%, while by 2024 this indicator reached 52.6%. The volume of remote lending rose from 0.8 trillion soums in 2020 to 9.4 trillion soums in 2024 - an almost twelvefold increase. These figures confirm that digital transformation has significantly improved not only service quality but also banks' financial indicators.

Table 1. Digital transformation and key indicators of Uzbekistan's commercial banks (2020–2025)

Indicators	2020	2021	2022	2023	2024	2025
Mobile banking users (mln people)	4.3–6.8	6.8–9.5	9.5–12.9	13.1–16.4	16.8–19.8	23.5
Internet banking users (mln)	2.9–3.5	4.4–5.2	6.2–7.8	8.0–10.6	10.5–13.9	17.2
Total digital users (mln)	10.3	14.7	20.7	27.0	33.7	40.7+
Share of electronic payments (%)	42–45	49–58	55–69	61–74	68–82	70+
Volume of digital transactions (trillion soums)	98.2	154.7	236.3	327.5	452.8	–
Bank assets (trillion soums)	110	245	370	–	640	890–960
Loan portfolio (trillion soums)	290	340	400	–	500	595–629

Deposit volume (trillion soums)	210	260	310	–	–	371–444
ROA (%)	1.1–1.5	–	–	–	1.9–2.1	~2.0
ROE (%)	11.8	–	–	–	15.3–16.7	–
Share of deposits attracted via digital channels (%)	11.4	18.9	26.7	39.2	52.6	–
Volume of remote lending (trillion soums)	0.8	1.6	3.2	5.9	9.4	–
Investments in digitalization (billion soums)	780	1,120	1,650	2,300	3,150	–

The table presents key indicators reflecting the process of digital transformation of Uzbekistan's commercial banks during 2020–2025, showing the steady growth in the number of mobile and internet banking users, the rise in the share of electronic payments from 42–45% to over 70%, a 4.6-fold increase in the volume of digital transactions, significant expansion of bank assets and loan portfolios, improvement in ROA and ROE indicators, growth in the share of deposits attracted through digital channels from 11.4% to 52.6%, and an increase in investments directed toward digitalization from 780 billion soums to 3.15 trillion soums.

Banks' net profit for the first nine months of 2025 amounted to 10.9 trillion soums, 34.5% higher than the same period of the previous year. Return on assets (ROA) rose from 1.1–1.5% in 2020 to 1.9–2.1% in 2024–2025, while return on equity (ROE) increased from 11.8% to 15–16.7%. The cost-to-income ratio (CIR) fell to 30–35% in digital banks, while it remained around 50–60% in traditional banks. During the digital transformation process, banks significantly increased their IT investments. In 2020, investments directed toward digitalization amounted to 780 billion soums, and by 2024 this figure reached 3.15 trillion soums. According to KPMG analyses, banks that have successfully carried out digital transformation have managed to reduce operating costs by 28–35%.

However, the overall trend is positive. Between 2020 and 2025, digital transformation served to increase banks' cost efficiency, expand their customer base, and improve financial inclusion. The share of the population using banking services

rose from 44% to 72%. In banks where more than 70% of internal processes have been automated through digital services, profitability indicators are higher than in traditional banks. International experience also shows that banks that have successfully implemented digital transformation achieve a 15–20% improvement in ROA and ROE indicators. Studies conducted on banks in China, Europe, and Russia confirm the positive impact of digital investments on cost efficiency. Similar results are being observed in Uzbekistan's conditions as well. In assessing the efficiency of digital transformation, it is necessary not to limit the analysis to financial indicators alone, but also to take into account customer satisfaction, service speed, the quality of risk management, and the share of innovative products. As of 2025, commercial banks offer more than 300 types of online services. It is expected that the continuation of this process will further increase the competitiveness of the banking system and contribute to the digital transformation of the economy.

At the same time, to fully realize the benefits of digital transformation, it is necessary to further develop infrastructure, enhance human capital, and improve the regulatory environment. The figures for 2020–2025 show that digital transformation has become not only a mandatory process for Uzbekistan's commercial banks but also a key factor in increasing efficiency.

CONCLUSION

The issue of digital transformation of commercial banks and the assessment of its efficiency is of strategic importance today for ensuring the sustainable development and competitiveness of the banking system. The results of the study clearly show that the introduction of digital technologies in Uzbekistan's commercial banks during 2020–2025 led to significant positive changes. The number of mobile banking users rose from 6.8 million to 23.5 million, the share of electronic payments increased from 42–45% to over 70%, and the volume of digital transactions grew several times over. This process enabled banks to reduce operating costs, increase the speed and quality of service, expand their customer base, and improve financial inclusion. The growth in return on assets (ROA) and return on equity (ROE), the increase in the share of deposits attracted through digital channels, and the expansion of remote lending volumes confirm the economic efficiency of digital transformation.

At the same time, the study showed that digital investments may increase costs in the short term, but in the long run they significantly improve banks' overall efficiency. Analyzing banks' performance using modern assessment methods such as SFA and DEA allows for a more accurate measurement of the real impact of digital transformation. It is also worth noting that there are differences in the pace and efficiency of digital transformation between state-owned and private banks. In the future, the efficiency of the banking system can be raised to an even higher level by further deepening digital transformation, more broadly introducing artificial intelligence and fintech solutions, strengthening cybersecurity systems, increasing digital literacy, and improving the regulatory environment. Overall, digital transformation is emerging for Uzbekistan's commercial banks not only as a technological upgrade but also as an important factor in sustainable development and the modernization of the national economy.

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