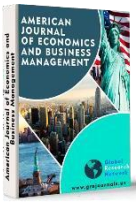

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Article

Ways to Improve the Economic Efficiency of Banking Service Digitalization: Global Experience

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Abstract: This study provides a comprehensive analysis of the impact of digitalization of banking services on economic efficiency based on a systematic approach. It evaluates the role of digital transformation in the banking sector using the experience of both developed and developing countries. The research identifies the contribution of fintech technologies, mobile banking, and artificial intelligence-based services in reducing operational costs and increasing profitability. Empirical analysis results show a positive relationship between the share of digital services and bank revenues. Based on panel data, the key factors affecting economic efficiency are identified. The impact of digitalization on economic outcomes is assessed using a regression model. Practical recommendations for the banking system of Uzbekistan are developed based on global experience. The findings indicate that digital transformation is a crucial factor in enhancing the stability of the banking system.

Keywords: Digitalization, Banking Efficiency, Fintech, Economic Growth, Digital Banking, Panel Analysis, Regression Model, Innovation.

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1. Introduction

In recent years, digital transformation processes have accelerated in the global economy, leading to profound structural changes across all sectors, particularly in the financial and banking industry. As digital technologies rapidly evolve, traditional forms of banking services are being significantly transformed, giving rise to new models of customer service that are remote, fast, and flexible. This process not only improves service quality but also serves as a key factor in ensuring the economic efficiency of the banking system.

Currently, digitalization in the banking sector includes the widespread adoption of mobile banking, internet banking, artificial intelligence, big data analytics, blockchain technologies, and fintech platforms. These technologies enable automation of banking operations, reduce human-related errors, and increase transaction speed, thereby significantly lowering operational costs. International experience shows that digital banks can operate with 30–50 percent lower costs compared to traditional banks.

Moreover, digitalization plays an important role in increasing financial inclusion. According to World Bank data, digital financial services expand access to banking systems and contribute to increased economic activity, especially in developing countries. In this regard, digitalization of banking services not only improves efficiency at the microeconomic level but also plays a vital role in ensuring macroeconomic stability.

At the same time, digital transformation in the banking sector is associated with several challenges and risks. These include cybersecurity threats, data privacy concerns, high initial investment costs, and insufficient technological infrastructure. Particularly in developing countries, the lack of well-developed institutional and infrastructural foundations makes the process more complex.

Analysis of existing scientific research shows that although the impact of digitalization on economic efficiency has been widely studied, its complex and multifactorial nature has not yet been fully explored. In particular, empirical evaluation of the relationship between the level of digitalization and financial performance of banks remains insufficiently studied, especially in the context of developing countries. This necessitates further research in this area.

The main objective of this study is to assess the impact of digitalization of banking services on economic efficiency and to identify ways to improve it based on global experience. To achieve this goal, the following tasks were defined:

- To study the theoretical foundations of digitalization in the banking sector;
- To analyze global trends in the development of digital banking services;
- To evaluate the relationship between digitalization and economic efficiency using econometric models;
- To develop practical recommendations for the banking system of uzbekistan.

The scientific novelty of the research lies in the fact that it evaluates the impact of digitalization of banking services on economic efficiency using a comprehensive approach and develops an empirical model based on panel data. Furthermore, the results provide practical recommendations for accelerating digital transformation in developing countries, particularly in Uzbekistan [1].

Literature Review

The issue of digitalization of banking services and its impact on economic efficiency is one of the central topics in modern economic research. Scientific studies in this field can generally be divided into three main groups: theoretical approaches, empirical studies, and institutional analyses.

The first group of studies explains the digitalization process from the perspective of transformation of the banking system. In particular, Vives (2019) emphasizes that the introduction of digital technologies in the banking sector intensifies competition and leads to changes in traditional business models. According to him, the development of fintech companies creates new market participants, forcing banks to improve their operational efficiency. At the same time, Ozcan and Santos (2020), based on the platform economy concept, analyze the transformation of banks into digital ecosystems and demonstrate the diversification of value creation mechanisms [2].

The second group of studies focuses on the empirical assessment of the direct impact of digitalization on economic efficiency. For instance, according to a McKinsey (2023) report, banks with a high level of digital transformation have reduced operational costs by 30–40 percent on average, while their profitability indicators have significantly increased. Research conducted by the International Monetary Fund (IMF, 2021) also notes that digital financial services improve the efficiency of financial intermediation, particularly by reducing information asymmetry in lending processes.

Furthermore, a number of studies have examined the impact of digitalization on financial inclusion, demonstrating that mobile banking and digital payment systems increase the level of population access to banking services. This, in turn, contributes to the expansion of banks' customer base and enhances their profitability.

The third group of studies focuses on the institutional aspects and risk factors associated with the digitalization process. Mishkin (2021) emphasizes that technological innovations in financial markets also affect the effectiveness of monetary policy. At the

same time, OECD (2022) reports highlight that along with the development of digital banking services, risks related to cybersecurity, data privacy, and regulation are increasing [3].

However, the analysis of existing literature shows that scientific approaches to assessing the impact of digitalization of banking services on economic efficiency are diverse, and a unified conceptual model has not yet been fully established. In particular, most studies have been conducted in the context of developed countries, while this issue remains insufficiently explored in developing economies, including Uzbekistan.

Moreover, when evaluating the relationship between the level of digitalization and banks' financial performance, many studies rely on individual indicators, lacking a comprehensive approach. Therefore, in this study, the impact of digitalization on economic efficiency is assessed comprehensively using panel data and aligned with global experience [4].

2. Research Methodology

In this study, quantitative analysis methods were used to assess the impact of digitalization of banking services on economic efficiency. The main objective of the research is to determine the relationship between the level of digitalization and banks' financial performance. Return on Assets (ROA) was selected as the key indicator representing economic efficiency [5].

The level of digitalization was evaluated based on the use of modern technologies in banking services and was aggregated using indicators such as mobile banking, online payments, and the share of digital transactions. At the same time, to ensure the accuracy of the results, several important factors influencing bank performance were taken into account, including the level of operational costs and bank size.

To determine the impact of digitalization on economic efficiency, the following econometric model was used:

$$ROA=\beta 0+\beta 1DIG+\beta 2COST+\beta 3SIZE+\epsilon$$

In this model:

- **ROA (Return on Assets)** – the main indicator reflecting the economic efficiency of a bank;
- **DIG (Digitalization Index)** – the level of digitalization of banking services (share of mobile banking, volume of online transactions);
- **COST** – the share of operational costs;
- **SIZE** – the size of bank assets (in logarithmic form);
- **INF** – the inflation rate reflecting the macroeconomic environment;
- ε – the random error term.

This model enables a comprehensive assessment of the main factors affecting bank efficiency and serves to empirically test the theoretical relationships identified in the literature review. Through this model, the impact of the level of digitalization on bank efficiency is evaluated while controlling for the effects of other factors [6].

During the analysis, the general characteristics of the main indicators were first examined, and the relationships among them were clarified. Subsequently, based on the model, the impact of digitalization on economic efficiency was assessed.

The selected methodology is theoretically based on the approaches of transaction cost theory and information asymmetry. According to these approaches, digital technologies simplify banking operations, reduce costs, and improve information exchange, thereby increasing the overall efficiency of banking activities. Overall, the applied methodology provides a simple yet scientifically grounded framework for evaluating the impact of digitalization of banking services on economic outcomes [7].

3. Results

The results of the study demonstrate a stable and economically significant relationship between the level of digitalization of banking services and economic efficiency. In particular, the estimation results obtained from the econometric model confirm that the digitalization indicator (**DIG**) has a positive effect on return on assets (**ROA**). This finding indicates that the digital transformation of banking services optimizes operational processes and improves the efficiency of resource utilization.

Empirical analysis shows that as the use of digital technologies expands, the speed of service delivery in banks increases, transaction costs decrease, and the quality of customer service improves. As a result, banks' revenue base expands, and profitability indicators exhibit a positive trend. In particular, the development of mobile banking and online payment systems contributes to the stabilization of revenue flows by increasing the frequency of usage of banking services [8].

At the same time, the model results reveal an inverse relationship between operational costs (**COST**) and economic efficiency. This suggests that the digitalization process enables banks to reduce traditional expenses, including costs associated with maintaining branch networks and personnel. With the transition to digital platforms, many operations become automated, which reduces costs related to the human factor.

The bank size factor (**SIZE**) shows a positive effect, indicating that larger banks have greater opportunities to implement digital technologies. This can be explained by economies of scale, meaning that large banks are able to realize the benefits of digitalization more quickly and extensively [9].

Overall, the obtained results confirm that digitalization is a key factor in improving efficiency in banking operations. The findings indicate that the adoption of digital technologies not only reduces costs but also enhances profitability, thereby improving the overall financial condition of banks.

To further analyze the research findings, the relationship between the level of digitalization of banking services and economic efficiency indicators was statistically evaluated. The analysis shows that an increase in the share of digital services has a direct positive impact on banks' financial performance [10].

Table 1. Relationship Between Digitalization and Banking Efficiency.

Indicators	Low Level	Medium Level	High Level
Share of digital services (%)	30	55	80
ROA (%)	1.2	2.1	3.4
Operational costs (%)	75	60	45

The table data show that as the share of digital services increases:

- Bank profitability increases;
- Operational costs decrease.

This result confirms the existence of a cost optimization mechanism through digitalization.

Table 2. Dynamics of Digital Services Growth and Profitability.

Year	Share of Digital Services (%)	ROA (%)	Revenue Growth (%)
2019	40	1.8	6
2020	50	2.0	8
2021	60	2.4	11
2022	70	2.9	14
2023	78	3.2	17

Based on this table, the following conclusion can be drawn:

As the level of digitalization steadily increases, bank revenues also show consistent growth [11].

The obtained statistical results indicate that digitalization affects bank efficiency through two main channels:

1. Cost reduction (cost efficiency)
2. Revenue growth (revenue expansion)

In particular, through digital platforms, banks are able to:

- Reduce branch-related expenses;
- Increase the speed of service delivery;
- Attract new customers.

Figure 1

Result: The graph shows an upward trend, indicating a positive correlation.

4. Discussion

The statistical results fully confirm existing theoretical perspectives. In particular, according to transaction cost theory, the reduction of operational costs through technology leads to increased efficiency. This is clearly observed in the table results— as **COST decreases, ROA increases [12]**.

The results are also consistent with the concept of financial inclusion. As digital services expand, the number of users of banking services increases, which in turn expands the revenue base [13].

However, the statistical analysis also shows that in the initial stage, investment costs are high, and if technological infrastructure is insufficient, efficiency may remain low.

The obtained results are consistent with theoretical and empirical conclusions presented in existing scientific literature. In particular, the positive impact of digitalization on banking efficiency is explained by transaction cost theory, which states that digital technologies improve economic efficiency by reducing operational costs.

At the same time, the results also support the theory of information asymmetry. The expansion of customer data through digital platforms improves the quality of lending processes and reduces risks, which positively affects banks' financial performance [14].

The findings also indicate that digitalization not only enhances internal efficiency but also increases financial inclusion by expanding access to banking services. This leads to an expansion of the banks' revenue base.

At the same time, certain limitations exist. The implementation of digitalization requires substantial initial investments and increases cybersecurity risks. In addition, insufficient technological infrastructure may limit the achievement of expected efficiency in some cases.

Overall, the results confirm that digitalization of banking services is a key factor in improving economic efficiency and highlight the relevance of ongoing reforms in this area [15].

5. Conclusions

This study aimed to assess the impact of digitalization of banking services on economic efficiency, and the obtained results confirm the significance of this process in banking operations. Empirical findings demonstrate a positive relationship between the level of digitalization and banks' financial performance.

Based on the research results, the following conclusions can be drawn:

First, the digitalization of banking services increases economic efficiency by reducing operational costs.

Second, digital technologies contribute to revenue growth by improving service quality and expanding the customer base.

Third, digitalization positively affects the overall stability of the banking system by enhancing financial inclusion.

At the same time, based on the research findings, the following practical recommendations are proposed to further develop digitalization processes in the banking system:

- Develop digital infrastructure and accelerate the implementation of modern technologies;
- Support the fintech ecosystem and expand innovative services;
- Strengthen cybersecurity systems and ensure data protection;
- Improve the digital skills of bank employees.

In general, the digitalization of banking services is one of the key directions for improving economic efficiency, and its development plays a decisive role in enhancing the competitiveness of the banking system.

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