"THE ROLE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE DIGITAL TRANSFORMATION OF UZBEKISTAN'S BANKING SECTOR"

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Abstract. *This article comprehensively examines the theoretical and practical aspects of the digital transformation of Uzbekistan's banking sector in the context of the rapid development of financial technologies, as well as its role in promoting financial inclusion. The study analyzes the impact of modern trends such as digital banking services, fintech technologies, mobile banking, digital payment systems, remote banking services, digital lending, and Open Banking on the development of the banking system. Particular attention is paid to the importance of digital technologies in expanding access to financial services, improving the speed and convenience of banking services, reducing transaction costs, and expanding the geographical coverage of banking services.*

At the same time, the study identifies the uneven development of digital infrastructure across regions, disparities in the levels of digital and financial literacy among the population, cybersecurity and digital fraud risks, personal data protection, and integration issues between banking and fintech platforms as the main challenges in the digital transformation process. To address these challenges and accelerate the digital transformation of Uzbekistan's banking sector, the article develops scientific and practical recommendations aimed at improving digital infrastructure, strengthening bank–fintech cooperation, expanding the use of Open Banking and API technologies, enhancing cybersecurity mechanisms, and increasing the population's digital financial literacy. The findings of the study make it possible to assess digital transformation as one of the key factors in ensuring financial inclusion and the long-term sustainable development of the banking sector.

Keywords: *digital transformation, banking sector, financial inclusion, financial technologies, fintech, digital banking services, mobile banking, digital payments, remote banking services, digital lending, Open Banking, API technologies, digital infrastructure, financial literacy, digital financial literacy, cybersecurity, digital fraud, bank–fintech cooperation, digital economy, Uzbekistan's banking system.*

INTRODUCTION

Today, the rapid development of financial technologies is fundamentally transforming the mechanisms through which the global banking system operates. The development of artificial intelligence, Big Data, cloud technologies, mobile applications, blockchain, digital identification, QR and NFC technologies, and instant payment systems is shifting banking services from the traditional branch-based model toward a service delivery model based on digital platforms. This process not only increases the operational efficiency of banks but also creates new opportunities to expand access to financial services and promote financial inclusion.

In Uzbekistan, the digital transformation of the banking sector is considered one of the key directions for modernizing the national economy. In recent years, large-scale reforms have been implemented to digitalize banking services, develop electronic payments, expand remote banking services, and establish a fintech ecosystem.

The legal foundations of these processes are supported by the legislation of the Republic of Uzbekistan concerning banking activities and the digital economy. In particular, the Law of the Republic of Uzbekistan "On Banks and Banking Activities" establishes the modern legal framework for banking activities and provides an institutional foundation for developing banking services and improving relationships with customers. In addition, the Law "On Payments and Payment Systems" establishes the legal framework for electronic payments, payment systems, and modern payment services, thereby contributing to the development of digital payment infrastructure in the country.The strategic foundations of the digital transformation process are reflected in the "Digital Uzbekistan – 2030" Strategy, approved by Decree No. PF-6079 of the President of the Republic of Uzbekistan dated October 5, 2020. The Strategy identifies the digitalization of economic sectors, the widespread implementation of modern information and communication technologies, the development of digital infrastructure, and the expansion of digital services in the public and private sectors as priority areas.A separate strategic direction of banking sector reforms was established in the "Strategy for Reforming the Banking System of the Republic of Uzbekistan for 2020–2025," approved by Presidential Decree No. PF-5992 dated May 12, 2020. This document envisaged improving the quality of banking services, developing modern business models for banks, strengthening the competitive environment, and broadly introducing modern technologies into banking activities.

The impact of digital transformation on financial inclusion is particularly important. Under the traditional banking system, access to financial services often requires physical infrastructure such as bank branches and ATMs. Digital banking services, however, enable customers to make payments, manage accounts, open deposits, obtain loans, and conduct other financial operations remotely via mobile phones and the internet. As a result, additional opportunities are created for the integration of people living in remote areas, young people, small businesses, and previously underserved groups into the financial system. However, the digital transformation process also creates a number of challenges. These include the uneven development of digital infrastructure across regions, insufficient levels of digital and financial literacy among the population, increasing risks associated with cyber fraud and data security, as well as technological integration issues between banks and fintech companies.Therefore, the digital transformation of Uzbekistan's banking sector should be comprehensively studied not only as a technological process but also as an economic, institutional, and social process. The purpose of this study is to analyze the development trends of digital transformation in Uzbekistan's banking sector, assess its impact on financial inclusion, identify existing challenges, and develop scientific and practical recommendations for addressing them.

LITERATURE REVIEW

The digital transformation of the banking sector and financial inclusion have been extensively studied in recent years in both international and domestic academic research. The World Bank's Global Findex Database assesses the level of financial inclusion through indicators such as account ownership, the use of digital payments, saving, and access to credit services. Demirgüç-Kunt et al. emphasize that the development of digital payments and mobile technologies is expanding access to financial services for the population. Ozili (2018) examined the impact of digital finance on financial inclusion and financial stability, noting that digital services can reduce the costs of financial services and facilitate access to the financial system.

Sahay et al. (2020) demonstrated that the development of fintech technologies strengthens financial inclusion by increasing the accessibility and availability of financial services.

Arner, Barberis, and Buckley (2016) showed that the development of fintech is transforming traditional banking business models and contributing to the emergence of new digital financial services. Gomber, Koch, and Siering (2017) assessed the development of digital finance as an important factor in the future transformation of the financial sector. Research on Uzbekistan has also increasingly focused on the development of digital banking services, fintech, mobile banking, and digital payments. However, existing studies have often examined the impact of digital transformation on financial inclusion from the perspective of individual services.

Therefore, this article focuses on evaluating digital payments, mobile banking, digital lending, fintech, digital infrastructure, financial literacy, and cybersecurity as an integrated system. This represents the main research gap addressed by the study.

RESEARCH METHODOLOGY

This study employs a comprehensive methodological approach to assess the digital transformation of Uzbekistan's banking sector and its impact on financial inclusion. The empirical basis of the research consists of statistical data and annual reports of the Central Bank of the Republic of Uzbekistan, data from the World Bank's Global Findex Database, and academic sources related to digital banking services. The study applies systematic, comparative, statistical, content analysis, and normative-legal analysis methods.

Through systematic analysis, the study examines the impact of digital transformation on banking services, payment infrastructure, and customer service processes. Statistical and comparative analyses are used to evaluate the development dynamics of bank cards, mobile banking, digital payments, online lending, and remote banking services. During the study, the impact of digital transformation on financial inclusion was assessed according to such criteria as service convenience, accessibility, transaction costs, geographical coverage, and digital literacy.

Based on the findings, the study identifies existing challenges in Uzbekistan's banking sector and develops recommendations aimed at improving digital infrastructure, strengthening bank–fintech cooperation, introducing Open Banking mechanisms, and increasing the population's digital and financial literacy.

RESEARCH RESULTS AND DISCUSSION

The digital transformation of Uzbekistan's banking sector has become one of the important directions of financial system development in recent years. The introduction of digital technologies into banking activities has accelerated the transition from the traditional branch-based service model to a model based on mobile and online platforms. In particular, the expansion of mobile banking, internet banking, digital payments, remote identification, and online lending services is increasing the population's access to financial services.

Statistical data from the Central Bank of the Republic of Uzbekistan also confirm this trend. By the end of 2025, the volume of online transactions conducted by individuals through mobile banking applications amounted to UZS 645.6 trillion. In addition, the number of bank cards reached 68.2 million, while the significant expansion of online micro-lending demonstrates the growing economic importance of digital banking services. The Central Bank regularly publishes statistical data on the number of bank cards and users of remote banking services.

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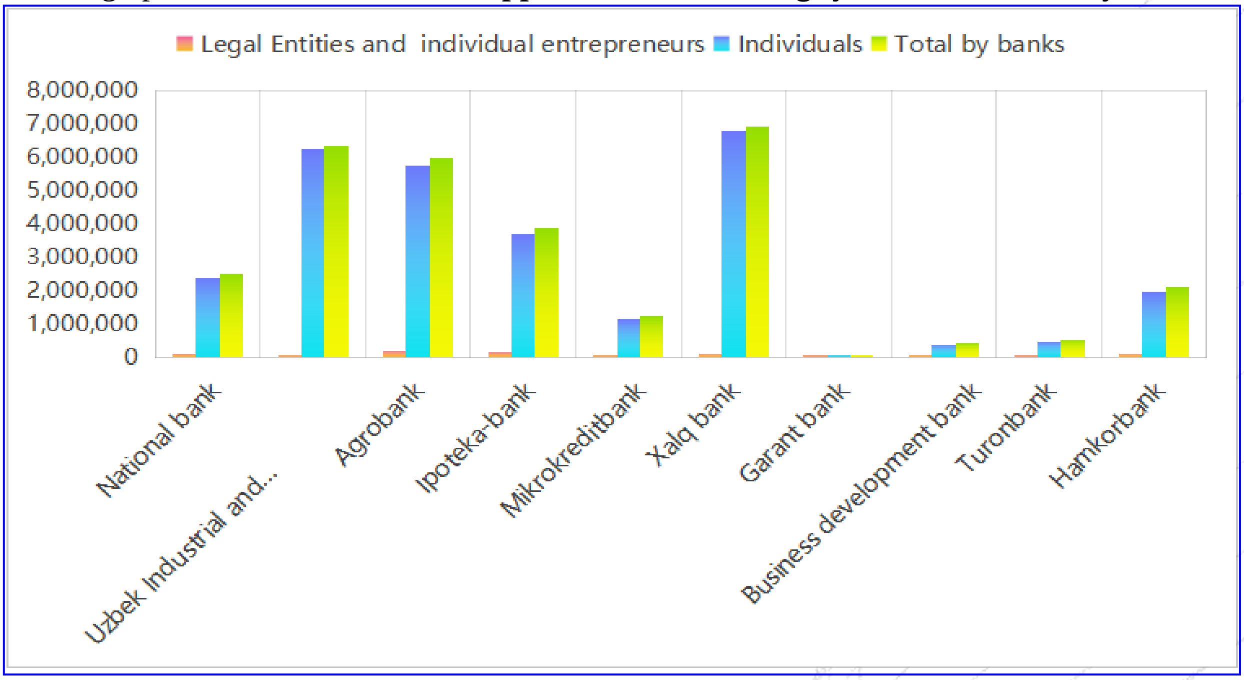
1-graph:**Number of customers applied remote banking systems as of January 1, 2025**



Mobile banking is one of the areas of digital transformation that has the most direct impact on the population. The ability of customers to make payments, manage their accounts, open deposits, apply for loans, and perform other banking operations without visiting a bank branch significantly increases the accessibility and convenience of financial services.

1-table

Online Operations through Mobile Banking in Uzbekistan, 2025

Indicator	**Volume**
Total online transactions through mobile banking	**UZS 645.6 trillion**
Online deposit transactions	**UZS 99.3 trillion**
Online foreign currency exchange transactions	**UZS 55.8 trillion**
Online microloans	**UZS 38.6 trillion**
Online loan repayments	**UZS 46.7 trillion**

The data presented in the table show that transactions conducted through mobile banking are not limited to everyday payments but also include more complex financial services, such as deposits, lending, foreign currency exchange, and loan repayments. This indicates that mobile applications are becoming not merely an additional channel for banking services, but one of the core service delivery platforms of banks.

Another important indicator of digital transformation is the development of payment infrastructure. The growth in the volume of electronic payments is associated with a decline in the use of cash and an increase in the population's adoption of digital financial services.

2-table Dynamics of Major Digital Payment Systems in Uzbekistan

Indicator	2024	2025	Growth
Interbank payment system transactions, trillion UZS	7,279	11,375	**56.3%**
Clearing system transactions, trillion UZS	100	126	**26.0%**
Clearing system transactions, million transactions	123	144	**17.1%**
Instant payment system transactions, trillion UZS	918	1,390	**51.4%**
Instant payment system transactions, million transactions	47.6	61.3	**28.8%**

As shown in the table, significant growth was observed in the main indicators of Uzbekistan's electronic payment infrastructure during 2024–2025. In particular, the increase in the volume of transactions through the interbank payment system from UZS 7,279 trillion to UZS 11,375 trillion indicates that digital settlements have strengthened their role in the economy. The instant payment system also demonstrated significant growth, with the volume of transactions increasing from UZS 918 trillion to UZS 1,390 trillion, indicating growing demand for digital payment services.

This process is also important for financial inclusion. In the World Bank's Global Findex methodology, digital payments are considered an important indicator of account usage.[3]

According to the Global Findex 2021 data for Uzbekistan, 36.8% of respondents participating in the survey had made a digital merchant payment.[4] This indicator demonstrates significant potential for further expanding the use of digital payments among the population.

The effectiveness of digital transformation should be assessed not only in terms of the technological development of banks, but also by the extent to which the population actually uses these services. Therefore, the study selected account ownership, use of bank cards, account management through mobile or internet banking, and the use of digital payments as the main indicators of financial inclusion.

3-table Selected Financial Inclusion Indicators in Uzbekistan

Indicator	2021, %
Respondents with an account at a financial institution	**48.6**
Account holders who managed their account via mobile phone/internet	**44.9**
Account holders who checked their balance via mobile phone/internet	**59.1**
Respondents with a debit card	**41.0**
Respondents who made a digital merchant payment	**36.8**

The research findings indicate that although digital transformation is developing rapidly in Uzbekistan's banking sector, a number of challenges remain that limit its full impact on financial inclusion. The first challenge is the uneven development of digital infrastructure across regions. Differences in internet quality and access to digital services may restrict the ability of the population in certain regions to use modern banking services. The second challenge is the insufficient level of digital and financial literacy. Having a bank account or a bank card does not automatically imply digital financial inclusion. The World Bank also emphasizes that an important aspect of financial inclusion is the active use of accounts for purposes such as digital payments, savings, and credit. The third challenge is cybersecurity and digital fraud. As digital channels expand, protecting customers' personal data and financial assets becomes increasingly important. Therefore, banks need to strengthen multi-factor authentication, biometric identification, real-time fraud detection, and customer notification systems. The fourth challenge is the insufficient integration between banks and fintech companies. International experience shows that platform integration and data sharing can reduce the cost of financial services and expand financial inclusion. However, such integration may also create risks related to data privacy and competition.

Proposed Digital Financial Inclusion Model for Uzbekistan

Based on the research findings, a "Digital Financial Inclusion Model" can be proposed for Uzbekistan's banking sector. The model consists of five interconnected elements: 1. Digital Infrastructure → 2. Unified Digital Identification → 3. Open Banking and Fintech Integration → 4. Digital Financial Services → 5. Financial Inclusion.

Direction	Key Measure	Expected Outcome
Digital Infrastructure	Development of internet and payment infrastructure in remote areas	Increased regional coverage of financial services
Open Banking	Introduction of unified API standards	Stronger bank–fintech integration
Digital Identification	Development of remote and biometric identification	Easier access to banking services
Fintech	Expansion of cooperation between banks and fintech companies	Emergence of new and affordable financial services
Financial Literacy	Digital financial education programs for the population	More effective use of digital financial services
Cybersecurity	AI-based fraud detection systems	Enhanced protection of customers' funds and personal data

Thus, the main objective of the proposed model is not merely to digitalize banking services, but to expand the population's access to financial services through digital technologies.

In this regard, digital infrastructure, fintech, Open Banking, financial literacy, and cybersecurity should be developed as an integrated system.

Such an approach will not only increase the economic efficiency of digital transformation in Uzbekistan's banking sector but also contribute to expanding the geographical and social coverage of financial inclusion.

CONCLUSION

The research findings demonstrate that the digital transformation of Uzbekistan's banking sector has developed rapidly in recent years, contributing to the increased accessibility, speed, and convenience of financial services. The expansion of mobile banking, internet banking, digital payments, QR and NFC technologies, remote identification, and online lending services has significantly improved the population's access to banking services. In particular, the development of digital channels creates important opportunities to improve access to financial services in areas where the availability of traditional bank branches is limited.

The analysis shows that the positive impact of digital transformation on financial inclusion is primarily reflected in the reduction of transaction costs, shorter service delivery times, the ability to conduct banking operations remotely, and the wider availability of financial services to different population groups. At the same time, the development of digital financial services is expanding opportunities for small businesses and entrepreneurs to access payment, credit, and other financial services.However, the study also identified several challenges limiting the effectiveness of digital transformation. These include uneven development of digital infrastructure across regions, differences in the population's level of digital and financial literacy, risks associated with cyber fraud and personal data protection, as well as insufficient technological integration between banks and fintech companies. Therefore, digitalization should not be viewed solely as a technological modernization process, but rather as a comprehensive process encompassing infrastructural, institutional, and social factors. To further accelerate digital transformation in Uzbekistan's banking sector, it is proposed to establish an integrated "Digital Bank – Fintech – Financial Inclusion" model. Within this model, it is advisable to strengthen data exchange and technological cooperation between commercial banks, fintech companies, and government institutions, develop unified API standards, gradually introduce Open Banking mechanisms, and adapt digital financial services to the needs of different population groups.Furthermore, it is necessary to develop internet and digital payment infrastructure in remote areas, establish continuous programs to improve the population's digital and financial literacy, strengthen AI-based fraud detection systems in banks, and improve mechanisms for protecting customers' personal data. Alongside expanding access to digital services, it is equally important to develop people's ability to use these services safely and responsibly. Overall, the digital transformation of Uzbekistan's banking sector is an important factor in the development of financial inclusion. Its future effectiveness will depend on the coordinated development of digital infrastructure, the fintech ecosystem, regulatory mechanisms, cybersecurity, and financial literacy. Therefore, ensuring that digital banking services are accessible, secure, affordable, and available to all segments of the population should remain one of the strategic priorities of Uzbekistan's banking sector.\

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