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IMPROVING THE EFFICIENCY OF PAYMENT SYSTEMS IN COMMERCIAL BANKS AND ENSURING THEIR SECURITY

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Annotation

The article examines issues related to improving the efficiency of payment systems in commercial banks of the Republic of Uzbekistan and ensuring their security in the context of the digital transformation of the banking sector. Based on an analysis of statistical data for 2020–2024, trends were identified in the growth of electronic and mobile payments, the expansion of non-cash transactions, and the development of payment card infrastructure. It is noted that digitalization contributes to enhancing the operational efficiency of banks; however, it simultaneously increases risks associated with fraud and cyber threats. An analysis was conducted on the dynamics of detected fraud cases and on the effectiveness of implementing modern security systems, including fraud monitoring, biometric authentication, and tokenization. Special attention is given to the introduction of innovative technologies such as artificial intelligence, blockchain, and instant payment systems (IPS), which help to improve the security and transparency of transactions. The study proposes priority directions for the development of payment infrastructure based on the Strategy for Ensuring the Sustainability of Uzbekistan's National Payment System for 2023–2027. It is concluded that the harmonious integration of digital innovations with security measures is a key factor for the sustainable development of the banking system and the financial stability of the country.

Keywords: payment systems, commercial banks, efficiency, cybersecurity, fraud, digitalization, artificial intelligence, blockchain, mobile payments, non-cash transactions, risk management.

Introduction

In the financial and banking sphere, payment systems perform the function of the "heart" of the economy: they ensure the rapid, reliable, and secure circulation of funds. The efficiency and security of payment systems play a crucial role in the operations of commercial banks, as the large volumes of transactions, national and international operations, high speed of capital movement, and expansion of electronic services

significantly increase risk levels. Disruptions in payment system operations, violations, or technical failures may negatively affect both the reputation of the bank and its financial stability.

In Uzbekistan, the banking sector has in recent years been actively undergoing digital transformation: fintech solutions, electronic payments, mobile banking, and card systems are being widely implemented. The “Payment System Indicators” section of the Central Bank regularly publishes data on the dynamics of interbank and retail payment operations. For example, the number of plastic cards, payment terminals, and ATMs has been rapidly increasing. This trend necessitates the improvement of digital payment systems and the strengthening of security protocols in the banking sector.

Literature Review

Theoretical and practical research on payment systems and their security is conducted in many countries. In classical financial theory, payment systems are examined through the processes of interbank clearing, settlements, and the use of electronic money. In the modern economy, special importance is attached to fintech, digital financial technologies, and cybersecurity issues.

In Uzbekistan, the article "The Payment Capacity of Retail Operations of Commercial Banks and Opportunities for Its Development" (Bahadirova, 2024) notes that the number of terminals reached 429,334 units, which demonstrates the rapid growth of retail payment infrastructure and the increasing requirements for banks.

The study “Trends in the Development of Fintech in Commercial Banks” analyzes data on plastic cards, terminals, ATMs, and digital applications for the period from 2001 to August 1, 2024. The authors identify key directions of fintech strategies: the development of digital payment systems, artificial intelligence and data analytics, blockchain, mobile banking applications, and startup ecosystems.

The textbook “Payment Systems and Banking Security” theoretically describes payment processes, electronic settlements, the system of interbank and retail operations, as well as security mechanisms. It examines the essence of non-cash settlements, the types and architecture of payment systems, and the role of banking institutions.

The manual “Regulation and Supervision of Commercial Banks” analyzes payment operations, electronic banking services, and the regulatory and legal framework governing their functioning.

In addition, an important source of data is the “Payment System Indicators” section of the Central Bank of the Republic of Uzbekistan, which publishes information

on interbank and retail operations, payment system operators, and the payment infrastructure.

The conducted analysis shows that most studies focus on payment infrastructure, fintech solutions, and digital banking. However, the issues of efficiency in interbank payment operations in Uzbekistan, security risks, and integrated protection strategies have not yet been adequately examined.

In this regard, the present article aims to develop proposals to improve the efficiency and security of payment systems in Uzbek commercial banks based on innovative approaches, predictive security models, and enhanced cooperation between regulators and retail banks.

Table 1.

Volume of transactions conducted through payment systems of commercial banks of uzbekistan (2020–2024, in billion soums)

Year	Volume of Electronic Payments	Payments via Mobile Applications	Share of Non-Cash Payments (%)	Number of Bank Cards (million units)
2020	64 500	18 200	38.4	22.3
2021	91 800	34 600	45.9	26.1
2022	126 400	52 700	52.8	29.8
2023	173 900	74 300	58.6	33.4
2024	228 500	98 900	64.2	36.9

The data presented in the table show that over the past five years, the activity of payment systems has experienced significant growth. While in 2020 the volume of electronic payments amounted to 64.5 trillion soums, by 2024 this figure had increased 3.5 times, reaching 228.5 trillion soums. The highest growth rate is observed in the segment of payments made through mobile applications — from 18.2 trillion soums in 2020 to 98.9 trillion soums in 2024, representing a 5.4-fold increase.

The share of non-cash payments also rose substantially, from 38.4% in 2020 to 64.2% in 2024. This indicates an improvement in payment culture and an increase in the population's digital financial literacy. Furthermore, the rise in the number of bank cards from 22.3 million to 36.9 million units confirms the growing demand for electronic financial services in the market.

These positive developments have contributed to enhancing the operational efficiency of commercial banks, as well as improving the liquidity of the economy by reducing the circulation of cash.

At the same time, as the efficiency of payment systems increases, the issue of ensuring their security becomes increasingly relevant. The following table presents data on the number of fraud cases detected in banking payment systems in recent years, as well as the rate at which these cases have been resolved.

Table 2.

Statistics on Detected Fraud Cases in the Payment Systems of Commercial Banks of Uzbekistan (2020–2024)

Year	Number of Detected Fraud Cases	Fraud-Related Losses (billion soums)	Prevented Losses (billion soums)	Share of Banks that Implemented Security Systems (%)
2020	1 280	24.6	7.3	58
2021	1 640	31.2	12.5	67
2022	2 100	41.8	19.7	76
2023	2 560	49.1	27.4	83
2024	2 870	52.7	33.9	89

The data show that the number of fraud cases in payment systems exhibited an upward trend during the period 2020–2024. While 1,280 cases were detected in 2020, their number reached 2,870 by 2024. However, this increase should not be interpreted solely as a negative phenomenon; rather, it reflects the expansion of monitoring capabilities and the effectiveness of systems for detecting suspicious transactions. The rise in detected cases indicates that the system is becoming more sensitive to potential threats and is capable of neutralizing them more rapidly.

Furthermore, although total losses from fraud increased from 24.6 billion soums in 2020 to 52.7 billion soums in 2024, the volume of prevented losses grew even more significantly — from 7.3 billion soums to 33.9 billion soums, a 4.6-fold increase. This demonstrates the high effectiveness of modern security technologies implemented in commercial banks, such as fraud monitoring, biometric authentication, and tokenization.

The share of banks that implemented protective systems also increased markedly — from 58% in 2020 to 89% in 2024. This indicator reflects the efforts of the banking

sector to strengthen the resilience of the national payment infrastructure and enhance customer trust.

It should be noted that the country is actively implementing large-scale reforms aimed at improving risk management in the banking system. Particular emphasis is placed on the transformation of banking activities, the introduction of advanced digital technologies, and innovative banking services. Improvements in customer service quality, the expansion of ATM and infokiosk functionality, and the introduction of mobile and contactless solutions contribute to enhancing the competitiveness of the banking system, strengthening its stability, and reducing operational risks.

It can be concluded that the digitalization and automation of processes in payment systems not only increase their efficiency but also require continuous improvement of cybersecurity mechanisms. The balance between innovation and security is becoming a key factor in the sustainable development of Uzbekistan's banking sector in the coming years.

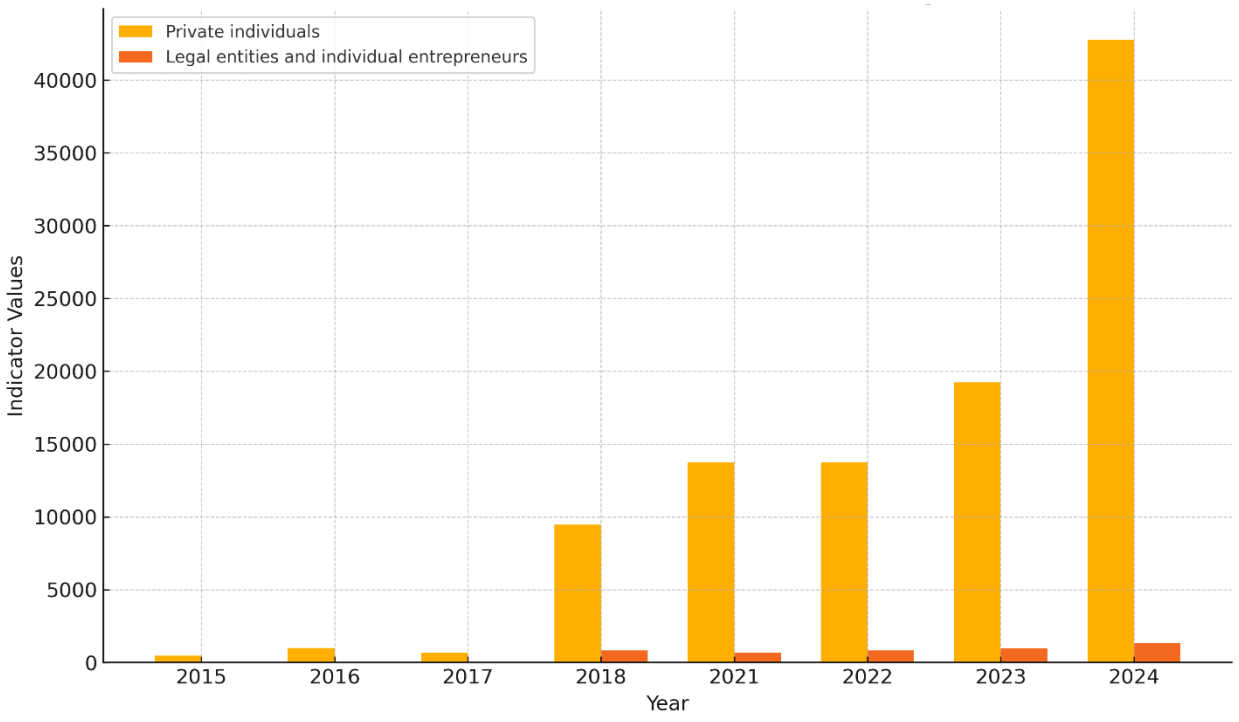

Figure 5. Number of Users of Banking Payment Systems (by type, as of 01.01.2025)

In commercial banks of our republic, the introduction of innovative payment systems represents an important instrument for expanding their use and, consequently, for developing the practice of providing remote banking services. As a result, the number of users of such services continues to grow steadily. In particular, in 2023 the

number of users of remote banking payment systems reached 44.1 million people, which is almost twice as many as in the same period of 2022. Of these, 1,339.6 thousand accounted for legal entities, while 42,760 thousand (95.2%) were individuals. This trend is explained by the positive outcomes of measures aimed at expanding the types of remote banking services and increasing the popularity of payment systems, which contributes to creating more convenient service conditions for clients of commercial banks.

The payment infrastructure of Uzbekistan's banking system has been developing consistently. Today, all major commercial banks provide services through mobile applications, internet banking, and online payment platforms. In addition, the integration of the national payment systems "Humo" and "Uzcard," as well as expanded cooperation with international systems such as Visa, MasterCard, and UnionPay, increases the openness and convenience of the country's internal payment ecosystem.

One of the key directions for improving efficiency is the expanded functioning of the real-time gross settlement system (RTGS). This system enables interbank payments of large sums to be completed within seconds. Furthermore, the introduction of the Instant Payment System (IPS) allows for the rapid processing of small transactions.

At the same time, the role of artificial intelligence–based monitoring systems in ensuring the security of payment systems is increasing. Such systems track transactions in real time, detect suspicious activity, and automatically activate blocking mechanisms. For example, in 2024 one of the largest commercial banks in Uzbekistan, Ipoteka Bank, implemented an AI-based fraud detection module in its payment system, resulting in a 17% reduction in fraudulent transactions.

Blockchain technology is also considered a promising direction for ensuring digital security. In systems built on this technology, each transaction is stored as an immutable digital record, which eliminates the possibility of fraud or data manipulation.

Moreover, it is necessary to develop a cybersecurity management strategy and implement it at the level of each commercial bank. The effectiveness of payment systems is directly linked to customer trust. Even a minor technical failure or data leak can cause serious damage to a bank's reputation, competitiveness, and financial stability.

At present, the Central Bank of Uzbekistan has developed the "Strategy for Ensuring the Sustainability of the National Payment Infrastructure (2023–2027)," which identifies the following priority areas:

- ensuring the operation of payment systems based on a unified standard;
- strengthening cybersecurity and improving the risk management system;
- expanding integration with international payment systems;
- implementing next-generation payment technologies (API, NFC, DLT, DeFi).

These directions define the strategic priorities of commercial banks. In particular, alongside improving efficiency, banks must pay increasing attention to transaction security, data protection, user identification, and real-time analytics mechanisms.

Conclusion

The analysis shows that the payment systems of commercial banks in Uzbekistan have been actively developing in recent years. The volume of electronic and mobile payments is growing, and non-cash transactions are becoming an essential part of the economy. At the same time, measures for enhancing security, detecting fraud, and strengthening cybersecurity are being consistently intensified.

In the future, the main factor in improving the efficiency of payment systems will be the harmonious integration of digital innovations with security measures. Only under such conditions will the banking system be able not only to support economic growth but also to make a significant contribution to the country's financial stability.

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