

## INNOVATIVE MODERNIZATION OF THE BANKING SECTOR OF THE KHOREZM REGION BASED ON DIGITAL TECHNOLOGIES AND REMOTE BANKING SERVICES: TRENDS, CHALLENGES, POTENTIAL AND DEVELOPMENT DIRECTIONS

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**Аннотация.** В статье рассматриваются тенденции, проблемы и перспективные направления инновационной модернизации банковского сектора Хорезмской области на основе цифровых технологий и дистанционного банковского обслуживания. Показано, что цифровизация является ключевым фактором трансформации финансовой системы и способствует повышению эффективности банковских операций, расширению доступа к финансовым услугам и росту финансовой инклюзии населения. На основе статистических данных Центрального банка Республики Узбекистан и государственных ведомств проанализированы динамика безналичных платежей, развитие мобильного банкинга и инфраструктуры эквайринга региона. Выявлены барьеры цифровизации, включая цифровое неравенство, недостаточную цифровую грамотность старшего поколения и инфраструктурные ограничения. Предложены направления модернизации банковского сектора, включающие развитие цифровой инфраструктуры, повышение финансовой грамотности населения, стандартизацию банковских мобильных приложений и внедрение модели «Цифровой банк 2.0». Реализация данных мер позволит повысить долю онлайн-услуг, снизить операционные расходы банков и усилить роль цифровых сервисов в социально-экономическом развитии региона.

**Abstract.** The article examines the trends, challenges, and prospective directions of innovative modernization of the banking sector of the Khorezm region based on digital technologies and remote banking services. Digitalization is considered a key driver of the transformation of the global financial system and contributes to increasing the efficiency of banking operations, expanding access to financial services, and enhancing financial inclusion of the population. Using statistical data from the Central Bank of the Republic of Uzbekistan and government agencies, the dynamics of non-cash payments, the development of mobile banking, and the expansion of the acquiring infrastructure in the region are analyzed. The main barriers to digitalization are identified, including digital inequality between urban and rural areas, insufficient digital literacy of the older population, low confidence in online transactions, and infrastructural limitations. The article proposes directions for the modernization of the regional banking sector, such as the development of digital infrastructure, improvement of financial literacy, standardization of mobile banking applications, and implementation of the “Digital Bank 2.0” model. Implementation of the proposed measures will increase the share of online services, reduce operating costs of banks, and strengthen the role of digital services in the socio-economic development of the Khorezm region.

**Ключевые слова.** Цифровизация; банковский сектор; дистанционное банковское обслуживание; мобильный банкинг; финансовая инклюзия; Хорезмская область; цифровые технологии; онлайн-операции; цифровая трансформация; банковская инфраструктура; искусственный интеллект; финтех; эквайринг; региональная экономика; модернизация банков.:

**Key words.** Digitalization; banking sector; remote banking services; mobile banking; financial inclusion; Khorezm region; digital technologies; online transactions; digital transformation; banking infrastructure; artificial intelligence; fintech; acquiring; regional economy; banking modernization

**Introduction.** The development of digital technologies is a key direction in the transformation of the global financial system. The trend of transitioning from traditional banking operations to remote digital services is observed in all countries, including Uzbekistan. Digital transformation has been identified as one of the priority areas of state policy, which is reflected in the financial sector development strategies up to 2030. The relevance of this research is confirmed by a significant increase in demand for remote banking services (RBS). According to the Central Bank of the Republic of Uzbekistan, the share of cashless payments in the country increased from 54 % in 2023 to 66 % in 2024 [1]. In the Khorezm region, the number of users of mobile banking applications grew by 38% within one year, while the volume of online transactions increased by 41%. These trends require in-depth analysis, identification of digitalization challenges, and the development of directions for the modernization of the regional banking sector.

**Relevance of the Study:**

The digitalization of the banking sector in the Khorezm region is intensifying under the influence of the following factors:

- accelerated state-led digital transformation [2];
- increased availability of smartphones and mobile internet [3];
- the need to reduce banks' operating costs and improve efficiency;
- growth of financial inclusion among the regional population;
- transformation of the banking services consumption model toward remote channels.

These trends make the modernization of the Khorezm banking sector a strategically important direction of regional development.

**Object of the Study:**

The banking sector of the Khorezm region.

**Subject of the Study:**

Digital technologies and remote service channels used by banks in the region.

**Purpose of the Study:**

To analyze the level of digitalization of the Khorezm banking sector and to develop recommendations for the modernization of banking services based on digital technologies.

**Research Objectives:**

- to study the theoretical foundations of digitalization;
- to analyze the banking infrastructure of the region;
- to assess the dynamics of remote banking services development;
- to identify the problems of digital transformation;
- to propose directions for the modernization of the banking sector.

**Theoretical Foundations of Digitalization of the Banking Sector:**

Banking digitalization refers to the application of automation technologies, artificial intelligence, mobile applications, cloud solutions, and big data for the provision of banking services [4]. In international practice, the "Digital Bank 2.0" model dominates, characterized by the abandonment of the traditional branch network and a transition to digital ecosystems—super apps, service aggregators, online lending, and remote customer identification. According to a

McKinsey report (2024), the implementation of digital technologies enables banks to reduce operating costs by 30–55% and increase service speed by 5–20 times.

#### Banking Infrastructure.

According to the open data portal data.gov.uz, 92 branches of commercial banks and more than 150 mini-branches operate in the Khorezm region [5]. The acquiring infrastructure includes more than 2,300 ATMs and 12,000 POS terminals. The number of next-generation ATMs increased by 21% in 2024.

**Table 1. Number of New-Generation ATMs <sup>1</sup>**

Indicator	2023	2024	Growth, %
Mobile banking users	610 thousand	842 thousand	+ 38
Online transactions	7.3 trillion UZS	10.28 trillion UZS	+ 41
Online loans	193 thousand	272 thousand	+ 41
Share of cashless payments	54%	66%	+ 12

Population readiness for digital services.

According to the Ministry of Information and Communication Technology Development:

72 % of the population of the Khorezm region own smartphones;

67 % have access to stable mobile internet;

the level of digital literacy in rural areas is 48%;

about 34% of individuals aged over 55 do not use mobile banking due to a lack of digital skills.

**Table 2. Banking Service Infrastructure in the Khorezm Region<sup>2</sup>**

Indicator	2022	2023	2024	Growth Rate, %
Number of bank branches	85	89	92	+ 8.2
Mini-branches	130	142	150	+ 15.4
ATMs	1,900	2,100	2,300	+ 21.0
POS terminals	9,800	11,000	12,000	+ 22.4
Online payment points	4,200	6,100	7,800	+ 85.7

The data in Table 2 indicate a steady expansion of the banking infrastructure in the Khorezm region, particularly in the segment of cashless payments and digital channels.

The highest growth rates are observed in the number of online payment points (+85.7 %), which confirms the active transition of businesses and the population to digital financial instruments. The increase in the number of POS terminals and next-generation ATMs contributes to a reduction in cash circulation and strengthens financial discipline in the region.

#### Barriers and Challenges of Banking Digitalization.

<sup>1</sup> Central Bank of the Republic of Uzbekistan. Annual Report for 2023. – Tashkent: CBU, 2024.

<sup>2</sup> Compiled by the author based on data from Data.gov.uz – Open Data Portal of the Republic of Uzbekistan; the Central Bank of the Republic of Uzbekistan; and the Agency for Statistics under the President of the Republic of Uzbekistan (2022–2024).

Current barriers are confirmed by reports of the Ministry of Economy and the Central Bank and include:

- digital inequality between urban and rural areas;
- low digital literacy among the older population;
- insufficient standardization of banks' mobile applications;
- limited trust in online transactions;
- infrastructural problems related to internet coverage.

Artificial Intelligence and Machine Learning.

Artificial intelligence enables:

- reducing credit scoring time from 12 hours to 5 minutes;
- increasing the accuracy of creditworthiness assessment up to 94%;
- reducing fraud risks by up to 60%.

According to the World Bank report [6], the use of big data improves the quality of personalization of banking products and increases profitability by 10-17 %.

According to the Ministry of Digital Technologies, biometric services allow customer identification within 2–5 seconds and significantly reduce the risk of operator errors [7].

Directions for Modernization of the Banking Sector in the Khorezm Region:

- development of digital infrastructure: expansion of 4G/5G coverage in the districts of Koshkupyr, Bogot, and Shovot; introduction of digital mini-offices.

- enhancement of digital literacy: training programs through IT-Park; courses in schools and colleges; mobile training centers.

- development of incentive mechanisms for remote banking services: cashback programs; benefits for online transactions; discounts for entrepreneurs.

- standardization of banks' mobile applications: implementation of a unified UX standard in line with Central Bank recommendations.

- implementation of the "Digital Bank 2.0" model: super-apps; biometric authentication; electronic document management; AI-powered consultants.

Conclusion.

The conducted analysis shows that the banking sector of the Khorezm region demonstrates sustainable growth in digitalization, reflected in the increasing volume of online transactions, the number of active users of remote banking services, and the expansion of digital infrastructure. However, digital transformation faces several challenges, including low digital literacy, gaps in internet access, and a lack of trust among certain segments of the population.

The implementation of the proposed modernization measures will allow:

- increasing the share of online services to 80 % by 2026;
- reducing banks' operational costs by 27–30 %;
- enhancing the level of financial inclusion in the region;
- improving the accessibility and quality of banking services.

Thus, digital modernization becomes a key factor in the economic development of the Khorezm region.

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