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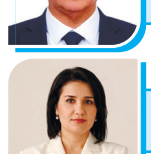
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AUTOMATION AND OPTIMISATION OF SERVICE PROCESSES IN COMMERCIAL BANKS

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Abstract. This study examines the automation and optimisation of customer service processes in commercial banks, using Uzbekistan as a case study. Economic, comparative and statistical analyses of data from the Central Bank of Uzbekistan and international sources indicate that digital transaction volumes are growing significantly faster than staffing levels and physical infrastructure. The study proposes a staged discover–redesign–automate–control framework and a process priority score, along with three practical recommendations.

Keywords: commercial banks, banking services, service processes, automation, optimisation, business process reengineering, robotic process automation, process mining, artificial intelligence, digital transformation, remote banking, straight-through processing, cost-to-income ratio, operational efficiency, Uzbekistan.

Аннотация. В данном исследовании рассматриваются вопросы автоматизации и оптимизации процессов обслуживания клиентов в коммерческих банках на примере Узбекистана. Экономический, сравнительный и статистический анализ данных Центрального банка Республики Узбекистан и международных источников показывает, что объёмы цифровых транзакций растут значительно быстрее, чем численность персонала и масштабы физической инфраструктуры. В исследовании предлагаются поэтапная модель «выявление – реорганизация – автоматизация – контроль» (discover–redesign–automate–control), а также показатель приоритетности процессов и три практические рекомендации.

Ключевые слова: коммерческие банки, банковские услуги, процессы обслуживания, автоматизация, оптимизация, реинжиниринг бизнес-процессов, роботизированная автоматизация процессов, интеллектуальный анализ процессов, искусственный интеллект, цифровая трансформация, дистанционное банковское обслуживание, сквозная автоматизированная обработка операций, коэффициент операционных расходов к доходам, операционная эффективность, Узбекистан.

INTRODUCTION

In banking, the cost and speed of service delivery have become as important to competitiveness as the cost of funds. McKinsey & Company (2025) estimates that artificial intelligence could reduce the industry's cost base by a net 15–20% and that banks adapting more slowly to technological changes could face a reduction of approximately USD 170 billion in their share of global profit pools. Demand has already shifted towards digital channels: 79% of adults worldwide have an account, while 62% of adults in low- and middle-income economies made or received a digital payment in 2024 (World Bank, 2025). Customers conducting transactions through mobile devices increasingly expect loan decisions or transfers to be completed within minutes, which requires the automation of the underlying service processes.

Uzbekistan demonstrates this transition within a relatively short period. The number of remote banking service users increased from 20.2 million on 1 January 2022 to 62.1 million on 1 April 2025 (Embassy of the Republic of Uzbekistan in the United Kingdom, n.d.; Trend News Agency, 2025). The number of bank cards in circulation reached 68.27 million on 1 January 2026, while mobile banking transaction volumes increased by 60% in 2025, reaching UZS 646 trillion (Khuchkarov, 2026; Kun.uz, 2026b). At the same time, banks with state participation accounted for 64.53% of total banking system assets as of 1 December 2025, and the government plans to reduce the number of state-owned banks from nine to four by 2030 (Kun.uz, 2026a). Privatisation and the entry of digitally oriented banks further increase the importance of efficient internal processes.

Process automation in banking has been extensively studied in developed markets. In Uzbekistan, published research has primarily focused on the expansion of remote banking channels (Mamadiyarov, 2021; Toshmurodov, 2025) and financial efficiency at the sectoral level (Saidov, 2026). Two research gaps can be identified. First, front-end digitalisation is measured in detail through indicators such as the number of users, bank cards and terminals, whereas the automation of the underlying service processes remains insufficiently

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measured. Second, there is no generally accepted method for determining which banking service processes should be prioritised for automation.

The scientific problem addressed in this study concerns the difference between the pace of digitalisation of service channels and the extent to which the underlying processes are redesigned and automated. When digital applications are integrated with predominantly manual back-office operations, customers gain access to digital interfaces, but processing times may remain unchanged, while banks continue to bear the costs of both digital and manual operations.

The aim of this study is to develop scientifically grounded proposals for automating and optimising service processes in commercial banks, with particular application to Uzbekistan. The study makes three contributions. First, it systematises existing approaches to process automation. Second, using statistical data for 2020–2026, it demonstrates that digital transaction volumes are growing faster than staffing levels and physical infrastructure, while improvements in cost efficiency remain gradual. Third, it proposes a four-stage framework, a Process Automation Priority Score and process-level performance indicators.

LITERATURE REVIEW

The conceptual foundation of this study is business process reengineering. Hammer (1990) argued that business processes should be fundamentally redesigned before automation, as automating existing procedures may accelerate the execution of processes without addressing their underlying inefficiencies. Subsequently, process mining made it possible to reconstruct actual workflows using system event logs (van der Aalst, 2016), while robotic process automation introduced software robots capable of interacting with existing interfaces to perform repetitive, rule-based tasks (van der Aalst, Bichler, & Heinzl, 2018). Syed et al. (2020) identified the continued need for systematic methods to determine which processes should be selected for automation.

Empirical studies have examined the effects of process automation on banking operations. Wojciechowska-Filipek (2019) demonstrated that robotic automation of statutory information enquiries at a Polish bank reduced the number of process stages from seven to three and shortened the maximum processing time from sixteen days to three. Fuster, Plosser, Schnabl and Vickery (2019) found that technology-based lenders processed mortgage applications approximately 20% faster without an increase in default rates. Hernando and Nieto (2007), examining Spanish banks, found that internet banking gradually reduced overhead costs, while improvements in profitability became evident only after approximately one and a half years. Brynjolfsson and Hitt (2000) explained that the benefits of information technology depend on complementary organisational changes.

Among researchers in Uzbekistan, Mamadiyarov (2021) analysed the factors influencing remote banking services during banking transformation, Toshmurodov (2025) examined the mechanisms for organising remote banking services and their relationship with operating costs, and Saidov (2026) assessed the impact of digital transformation on banking efficiency during 2020–2024. These studies provide evidence on the development of digital service channels and sector-level performance. However, the internal service process has not been examined as a separate unit of analysis within these studies. Table 1 summarises the main approaches.

Table 1
Principal approaches to automating and optimising banking processes

Approach	Authors	Core idea	Limitation for banks
Business process reengineering	Hammer (1990)	Radical redesign before automation	High implementation risk
Process mining	van der Aalst (2016)	Actual flows discovered from event logs	Depends on log quality
Robotic process automation	van der Aalst et al. (2018); Syed et al. (2020)	Software robots operate existing interfaces	Preserves an inefficient process
AI-based automation	McKinsey & Company (2025)	Models handle documents and decisions	Model risk; data governance

Source: compiled by the author from the cited works.

RESEARCH METHODOLOGY

The study is based on a desk-based analysis of secondary data and follows the IMRAD structure. It employs comparative literature analysis; economic analysis of the cost-to-income ratio, operating income per employee, and turnover per payment terminal; statistical methods, including growth rates, compound annual growth rates, and structural shares; and a comparison between state-owned and digitally native banks.

The data are obtained from Central Bank statistics on remote banking users by bank (Central Bank of the Republic of Uzbekistan, 2025a, 2025b), press reports reproducing Central Bank data, the financial inclusion survey reported by Khuchkarov (2026), and sectoral indicators compiled by Saidov (2026).

Artificial intelligence tools were used for approximately 10% of the research preparation process.

ANALYSIS AND RESULTS

Growth of Digital Channels. The number of remote banking users reached 48.4 million in September 2024, representing a 4.7-fold increase compared with five years earlier (Daryo, 2024), and rose to 62.1 million by 1 April 2025 (Trend News Agency, 2025).

Between 1 January 2022 and 1 April 2025, the total increased by a factor of 3.07, corresponding to a compound annual growth rate of 41.3% (Figure 1). This figure exceeds the country's population of 36.2 million (Saidov, 2026), indicating that customers may maintain connections with multiple banks and compare their service processes directly (Figure 1).

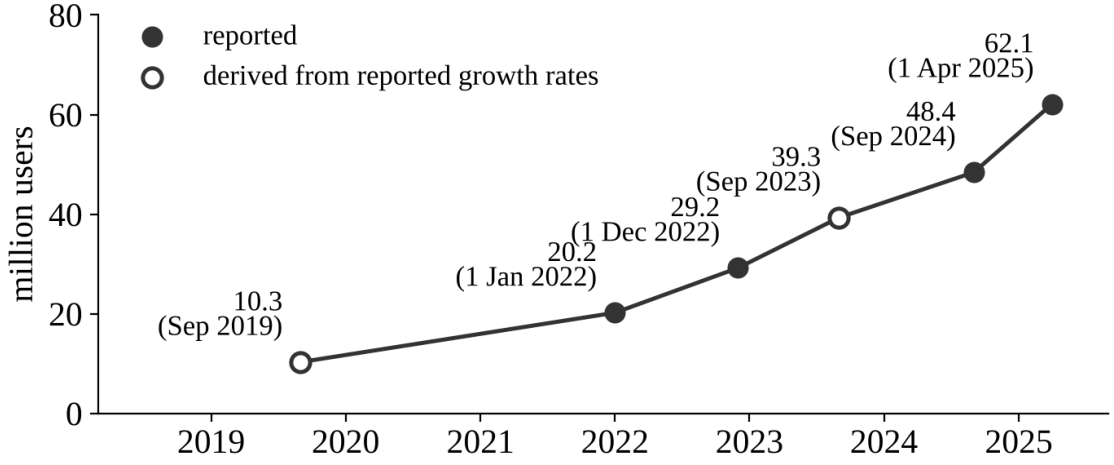


Figure 1. Users of remote banking services in Uzbekistan, 2019–2025[1]

Infrastructure and Throughput. Transaction volumes are growing significantly faster than the physical infrastructure. Table 2 shows that the number of payment terminals increased by 1.1% in 2025, while the volume of payments processed through these terminals rose by 40.9%, resulting in a 39.4% increase in turnover per terminal. Transaction volumes can increase without a proportional expansion of physical infrastructure, provided that the underlying transaction settlement and control processes operate without manual intervention (Table 2).

Table 2
Payment infrastructure and transaction volumes in Uzbekistan

Indicator	1 January 2025	1 January 2026	Change, %
Bank cards in circulation, million	62.0	68.27	+10.1
Payment terminals, units	426,225	430,762	+1.1
ATMs and infokiosks, units	29,909	40,090	+34.0
Payments through terminals, UZS trillion a year	326.7	460.25	+40.9
Turnover per terminal, UZS million	766.5	1,068.5	+39.4

Source: Kun.uz (2026b), reproducing Central Bank data; changes calculated by the author.

1 Source: Daryo (2024); Embassy of the Republic of Uzbekistan in the United Kingdom (n.d.); Trend News Agency (2025). Values for September 2019 and 2023 are derived by the author from growth rates in Daryo (2024).

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Concentration of Digital Customers. Between 1 January and 1 December 2025, two digitally native banks, Uzum Bank and AVO Bank, increased their combined number of remote banking users from 2.37 million to 9.77 million, representing an increase of 7.40 million. In comparison, four major state-owned banks (Xalq Bank, Uzbek Industrial and Construction Bank, Agrobank and National Bank) recorded an increase in their combined number of remote banking users from 21.66 million to 22.92 million, equivalent to an increase of 1.26 million, or 5.8% (Central Bank of the Republic of Uzbekistan, 2025a, 2025b). These trends indicate a growing customer preference for banks whose service processes are designed to support automation.

Operational Efficiency. Improvements in operational efficiency at the sectoral level have been evident, although their scale remains moderate. Operating income increased by a factor of 2.43 during 2020–2024, while staff numbers grew by 13.6%, resulting in a 2.14-fold increase in nominal operating income per employee. Over the same period, operating expenses increased by a factor of 2.24, while the cost-to-income ratio declined by only 3.3 percentage points. These findings suggest that digitalisation has contributed more significantly to the expansion of transaction volumes than to reductions in the cost of service delivery (Table 3).

Table 3
Operational efficiency of Uzbekistan's banking system, 2020–2024

Year	Operating expenses, UZS trillion	Operating income, UZS trillion	Cost-to-income ratio, %	Employees, thousand	Income per employee, UZS million
2020	11.5	26.9	42.8	74.2	362.6
2022	17.2	41.7	41.3	79.5	524.5
2024	25.8	65.3	39.5	84.3	774.7

Source: Saidov (2026), compiled from Central Bank data. Values are nominal.

The results suggest that automation in Uzbekistan's banking sector has been implemented primarily in digital service channels, while the underlying service processes have received comparatively less attention. This finding is consistent with the approaches proposed by Hammer (1990) and Brynjolfsson and Hitt (2000).

Two approaches emerge from these findings. The first involves organising automation as a continuous four-stage cycle.

In the discovery stage, banks apply process mining to establish baseline performance indicators, including transaction volumes, processing times, manual interventions and error rates.

In the redesign stage, unnecessary process steps are eliminated, and a standard straight-through processing path is distinguished from exceptional cases.

In the automation stage, appropriate technologies are selected according to process characteristics: system integration for stable, high-volume workflows; robotic process automation for legacy system interfaces; and artificial intelligence for document processing and decision-making.

In the control stage, operational results, model-related risks and information security are reviewed (Figure 2).

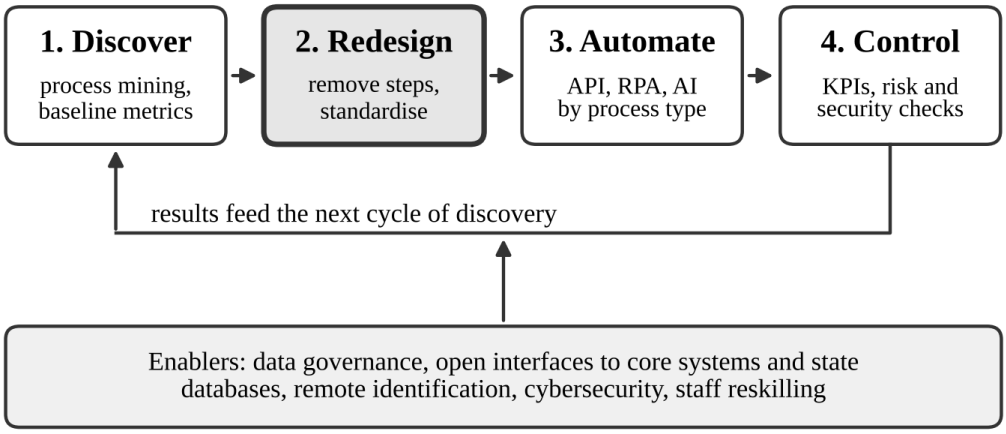


Figure 2. Staged framework for automating and optimising bank service processes[2]

2 Source: developed by the author.

The second approach involves prioritising processes for automation. The proposed Process Automation Priority Score is calculated as the product of annual process volume, degree of standardisation and proportion of manual effort, divided by implementation complexity. Each factor is rated by experts on a scale from 1 to 5. Accordingly, high-volume, rule-based processes requiring substantial manual effort are given priority for automation. Table 4 presents the indicators used to evaluate progress in process automation.

Table 4
Service processes, automation technologies and performance indicators

Service process	Dominant technology	Key performance indicators
Customer onboarding	Remote biometric identification	Share of accounts opened remotely; time to open
Retail lending	Automated scoring; electronic signature	Time to decision; straight-through processing rate
Enquiries and complaints	Chatbots; AI classification	First-contact resolution rate; resolution time
Regulatory reporting	Robotic process automation	Manual hours per report; error rate

Source: developed by the author.

For Uzbekistan, the practical significance of these findings is evident. With five state-owned banks scheduled for privatisation by 2030 (Kun.uz, 2026a), process efficiency is becoming an important component of bank valuation. In 2025, 59% of adults held a bank account, while 7.4% saved through a formal financial institution (Khuchkarov, 2026). The economic viability of small deposits and loans depends on keeping the associated service costs close to zero. At the same time, automation requires particular attention to fraud, cybersecurity and model-related risks, making the control stage an essential component of the proposed approach.

CONCLUSION AND RECOMMENDATIONS

Process redesign should precede automation, and the technologies employed should be appropriate to the characteristics of each process. In Uzbekistan, digital transaction volumes have grown faster than physical infrastructure capacity, while customers have increasingly adopted services offered by digitally native banks. Nevertheless, the banking sector's cost-to-income ratio declined by only 3.3 percentage points during 2020–2024. Based on these findings, three practical recommendations are proposed.

1. Implement redesign-first automation programmes in each bank. A designated board member should be responsible for overseeing service processes and applying the proposed four-stage framework and Process Automation Priority Score, beginning with customer onboarding, retail lending and complaint handling.

2. Introduce process-efficiency indicators into supervisory reporting. The Central Bank should collect and publish bank-level indicators, including the straight-through processing rate, turnaround times for standard banking products and cost per transaction.

3. Develop shared infrastructure and human capital. Access to state databases and remote identification services should be expanded, a regulatory sandbox should be established for AI-based banking services, and employees transitioning from manual operations should receive retraining. These measures should be accompanied by mandatory controls for model-related risks and cybersecurity.

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