MODERN MECHANISMS FOR INCREASING OPERATIONAL EFFICIENCY OF COMMERCIAL BANKS BASED ON DIGITAL TECHNOLOGIES

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Abstract

This article examines modern mechanisms for improving the operational efficiency of commercial banks through robotic process automation, artificial intelligence, process analytics, cloud technologies, open software interfaces, and centralized data management. It argues that digitalization should be viewed not as the localized automation of individual operations, but as a comprehensive transformation of end-to-end business processes, organizational models, and risk control systems. It systematizes the application of digital technologies in the bank's front, middle, and back offices, and proposes an operational efficiency management framework based on a combination of a process-based approach, measurable KPIs, and principles of operational sustainability. Practical proposals for commercial banks in the Republic of Uzbekistan are formulated, including the creation of an operational excellence center, the implementation of process mining, intelligent KYC/AML automation, the development of API architecture, data quality management, and the evaluation of digital projects based on their overall economic impact.

Keywords: commercial bank, operational efficiency, digital transformation, RPA, artificial intelligence, process mining, cloud technologies, API, data management, cost-to-income.

Introduction.

The banking sector is currently evolving amidst the growth of digital transactions, increased competition from fintech companies, heightened customer expectations for speed of service, and simultaneously stricter requirements for cybersecurity, data protection, and operational resilience. Under these circumstances, traditional efficiency improvement methods, primarily based on staff and administrative cost reductions, are having limited impact. Sustainable efficiency gains require changes to the very processes of banking service creation, their standardization, digitalization, and subsequent continuous improvement.

A commercial bank's operational efficiency characterizes its ability to transform human, technological, financial, and information resources into banking products and services with minimal necessary costs, an acceptable level of risk, and a specified quality of service. In practice, it is assessed not by a single indicator, but by a system of interconnected indicators: the cost-to-income ratio, the cost of one transaction, the time it takes to complete a process cycle, the productivity of one employee, the share of transactions without manual intervention, the error rate, the number of returns and complaints, the availability of digital channels, and losses from operational events.

Theoretical basis of the research.

The theoretical basis for digital efficiency improvement is the process approach. M.Hammer and J.Champy[1]. They linked radical productivity gains to process reengineering, that is, to a revision of work logic, and not just to the automation of existing procedures. T. Davenport emphasized the need to combine information technology and process change[2]. Therefore, digitalizing an inefficient process without prior analysis often only leads to the acceleration of redundant approvals and the transfer of organizational deficiencies to the information system.

The Basel Committee on Banking Supervision views digitalization as a transformation of the entire banking value chain, driven by APIs, artificial intelligence and machine learning, distributed ledgers, cloud computing, and technology providers. Digital technologies not only create economic advantages but also new dependencies, including cloud provider concentration, model risk, cyber threats, and outsourcing vulnerabilities[3]. Therefore, efficiency improvements must be achieved simultaneously with the development of corporate governance, data management and operational resilience.

Research methodology.

The first mechanism is robotic process automation (RPA) and digital workflow management. RPA is effective in high-volume, standardized, and rule-based operations: transferring data between systems, generating reports, reconciling accounts, processing applications, verifying document completeness, sending notifications, and performing standard control procedures. Economic benefits are achieved through the reduction of manual labor, fewer errors, and the ability to perform operations continuously. However, robotic process automation should be implemented after eliminating unnecessary steps, as automating duplicate operations does not create sustainable efficiency.

The second mechanism is artificial intelligence and machine learning. The OECD notes that AI is used

[1]Hammer M., Champy J. Reengineering the Corporation: A Manifesto for Business Revolution. New York: Harper Business, 1993.

[2]Davenport TH Process Innovation: Reengineering Work through Information Technology. Boston: Harvard Business School Press, 1993.

[3]Basel Committee on Banking Supervision. Digitalization of Finance. Basel: Bank for International Settlements, 2024.https://www.bis.org/bcbs/publ/d575.htm.

in banking for credit scoring, fraud detection, KYC/AML, credit loss prediction, customer service, text processing, and back-office optimization[4]. The greatest impact is achieved by combining AI with RPA: an intelligent model recognizes a document, classifies a request, or identifies an anomaly, and a software robot performs further operations according to an approved scenario. This model is called intelligent automation.

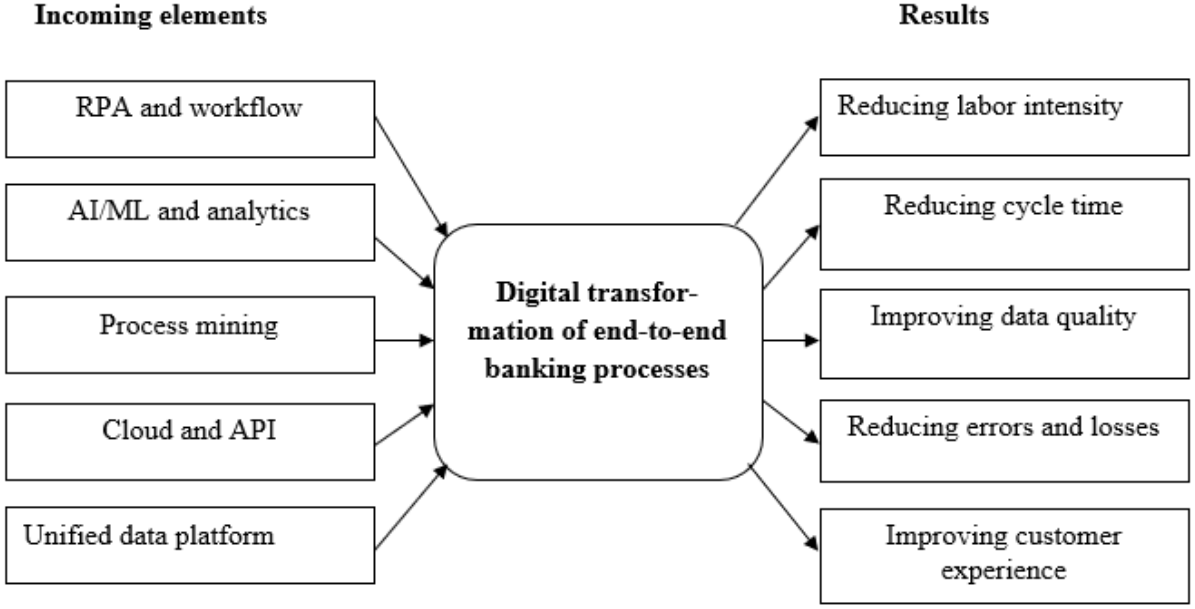

Figure 1. A mechanism for improving the operational efficiency of a commercial bank using digital technologies5

The third mechanism is process mining reconstructing the actual flow of a process based on digital logs from information systems. Traditional process descriptions often reflect approved regulations, while process mining reveals the actual number of routes, repeat actions, returns, rejections, and waits. This allows for the identification of bottlenecks in lending, payments, account opening, application processing, and compliance checks. Based on the data obtained, the bank can determine which steps should be eliminated, combined, standardized, or automated.

The fourth mechanism is the transition to a modular cloud and API-oriented architecture. Monolithic banking systems hinder rapid process changes and the integration of new services. APIs allow for the reuse of identification, payments, limit calculation, data exchange, and notification functions across various products and channels. Cloud technologies provide scalability of computing resources and accelerate the implementation of analytical solutions. However, the Basel Committee notes that reliance on external technology providers requires enhanced controls over concentration risk, business continuity, and contractual data access mechanisms[6].

The fifth mechanism is centralized data management. The lack of unified reference books, duplicate client records, and data differences between departments increase transaction times and reduce the quality of management decisions. The Chief Data Officer function should establish rules for data quality, origin, accessibility, security, and use. A unified data platform creates the foundation for automated reporting, service personalization, risk monitoring, and process performance measurement.

The sixth mechanism is omnichannel service. Separately developing branches, contact centers, mobile apps, and online banking creates duplicate data entry and disruptions in the customer journey. The omnichannel model provides a unified customer profile, a shared history of interactions, and the ability to continue a transaction in another channel without repeating previous steps. This simultaneously reduces operating costs and improves the customer experience.

International research experience.

International practice shows that digital operational efficiency results from coordinated changes in technologies, processes, and organizational models.

[4]OECD. Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges and Implications for Policy Makers. Paris: OECD Publishing, 2021.https://doi.org/10.1787/98e761e7-en; OECD. Generative Artificial Intelligence in Finance. OECD Artificial Intelligence Papers, No. 9. Paris: OECD Publishing, 2023.https://doi.org/10.1787/ac7149cc-en.

[5]Developed by the author based on a summary of the approaches of BIS, OECD and World Bank.

[6]Basel Committee on Banking Supervision. Digitalization of Finance. Basel: Bank for International Settlements, 2024.https://www.bis.org/bcbs/publ/d575.htm.

1-table.

The Impact of Digital Technologies on Commercial Bank Operational Processes[7]

Technology	Main area of application	Operational effect	Key KPIs
RPA and workflow	Reconciliations, reporting, data entry, notifications	Reducing manual operations and errors	STP share; cycle time; errors per 1,000 operations
AI/ML	Scoring, fraud detection, KYC/AML, forecasting	Improving decision accuracy and processing speed	Resolution time; false positive rate; fraud losses
Process mining	Analysis of actual process routes	Identifying bottlenecks, returns and duplications	Number of process variants; rework rate; waiting
Cloud and API	Integration of systems, scaling of services	Speed up development and reuse of functions	Time-to-market; availability; integration cost
Data governance	Unified reference books, data quality and availability	Reduced re-entry and discrepancies	Data quality score; number of duplicates; reporting timeframe
Omnichannel	Unified customer journey and customer profile	Reducing the workload on branches and the contact center	Share of digital transactions; first contact resolution; NPS

The European Central Bank notes the growth of digital banking models operating without a developed branch network. According to the ECB, by the end of 2024, approximately 60 digital-only banks were identified in the eurozone, and their share of total assets increased from 3.1% in 2019 to 3.9% in 2024[8]. While digital banks don't always demonstrate sustainable profitability, their model demonstrates the potential for lower fixed costs and rapid scalability, provided risk and well managed customer acquisition costs.

In countries with advanced digital financial services, banks are transitioning bulk transactions to straight-through processing, whereby transactions proceed from initiation to accounting without manual intervention. Employees focus on exceptions, complex cases, advisory services, and risk management. The World Bank notes that digital financial services can reduce transaction costs through economies of scale, increase transaction speed and transparency, and provide more targeted services[9].

2-table.

International approaches to digital improvement of banks' operational efficiency[10]

Approach	Content	Advantage	Condition of effectiveness
Digital-only model	Service provided primarily through remote channels	Low dependence on branch infrastructure	A sustainable IT platform and effective customer acquisition
Straight-through processing	End-to-end automated processing of standard operations	Minimizing time and manual labor	Standardized data and exception handling rules
Automation Center of Excellence	Centralized management of the automation portfolio	Reuse of solutions and control of the effect	Unified architecture, methodology and process owners
Open banking / API	Integration of the bank with partners and digital ecosystems	Reducing product launch time	Managing access, consent, and cyber risk
AI-enabled operations	Application of AI in fraud, AML, scoring, and maintenance	Increased accuracy and productivity	Data quality, explainability, and model management

[7]Compiled by the author.
[8]Garcia T., Grodzicki M., Radulova P. Digital Banking: How New Bank Business Models Are Disrupting Traditional Banks. ECB Financial Stability Review, May 2025.https://www.ecb.europa.eu/press/financial-stability-publications/fsr/focus/2025/html/ecb.fsrbox202505_04~17b39a3c1a.en.html.
[9]Pazarbasioglu C., Mora AG, Uttamchandani M., Natarajan H., Feyen E., Saal M. Digital Financial Services. Washington, DC: World Bank, 2020. https://www.worldbank.org/en/topic/financialsector/publication/digital-financial-services.
[10]Systematized by the author based on materials from BIS, OECD, World Bank and ECB.

Approach	Content	Advantage	Condition of effectiveness
Operational resilience by design	Embedding sustainability into digital architecture	Reducing losses from failures and third parties	Mapping critical operations and testing scenarios

Leading banks are also establishing Operational Excellence Centers (OECs) or Automation Centers of Excellence (ACEs). These centers establish uniform project selection standards, calculate economic impact, maintain a library of reusable components, monitor technological and modeling risks, and share expertise across departments. This prevents each department from purchasing separate solutions without a common architecture and unified performance evaluation system.

Analysis and results of the research.

During the course of the research, we put forward the following proposals for improving the operational efficiency management mechanism:

First, commercial banks should create a unified register of end-to-end processes covering customer acquisition, identification, account opening, lending, payments, collections, claims processing, and product closure. For each process, the owner, cost, duration, risks, and target indicators must be defined.

Secondly, it makes sense to select digitalization projects not based on technological innovation, but rather on their overall economic impact. Priority should be given to processes with a high volume of operations, significant manual labor, frequent errors, long wait times, and high monitoring costs.

Third, process mining must be implemented as a continuous tool for monitoring actual process execution. Its results should be reviewed by the operational efficiency committee and used to eliminate deviations from the target model.

Fourth, it is recommended to establish a Center for Operational Excellence and Intelligent Automation, bringing together specialists in business processes, RPA, AI, data, information technology, risk, and compliance. The center should manage a portfolio of initiatives and validate the achieved impact after implementation.

Fifth, it makes sense to move from automating individual tasks to end-to-end intelligent automation. For example, when processing a loan application, OCR recognizes documents, AI verifies data and calculates risk, workflow forwards exceptions to the responsible employee, and RPA reflects the approved decision in accounting systems.

Sixth, a minimum set of digital efficiency KPIs should be established: cost-to-income, cost per operation, average and median cycle time, straight-through processing rate, reprocessing rate, availability of critical services, error rate, employee productivity, and customer satisfaction.

Seventh, benefits realization must be implemented. After launching a digital solution, the bank must compare the actual reduction in labor costs, time, errors, and losses with the business case. Unused, freed-up resources should not be automatically considered savings without changing the workload or redistributing functions.

Eighth, digital initiatives should be classified by risk level. Simple automated reporting may require simplified approval, while an AI-based credit decision model, biometrics, or the transfer of a critical system to the cloud require extensive validation, customer impact assessment, and scenario testing.

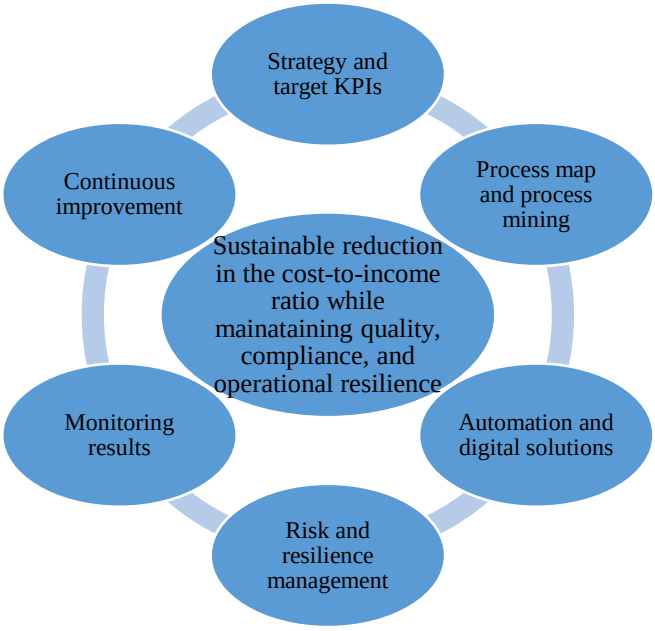

Figure 2. Digital operational efficiency management framework for a commercial bank[11]

[11]Developed by the author.

Ninth, it's necessary to develop a unified data management system and assign responsibility for critical data elements. AI-based solutions cannot be sustainably effective if there are duplicates, omissions, and inconsistencies in the source data.

Tenth, operational resilience requirements should be built into the digital process architecture: define critical operations, acceptable downtime, backup procedures, third-party dependencies, and recovery procedures. The Basel Committee principles emphasize that a bank must maintain the ability to deliver critical operations in the face of disruptions[12].

Eleventh, it makes sense to optimize the role of branches by transferring standard operations to digital channels, and turning branches into consulting centers for complex products, customer support, and sales. Branch evaluation should consider not only direct profit but also its contribution to the omnichannel customer journey.

Twelfth, the incentive system for executives should take into account not the number of IT projects implemented, but rather proven process improvements. This reduces the risk of formal digitalization and encourages departments to jointly achieve measurable results.

Conclusion.

Overall, digital technologies offer the potential to significantly improve the operational efficiency of commercial banks, but the economic impact only occurs when integrated with process management and organizational change. Local automation of individual tasks without revising the end-to-end process can perpetuate duplication of functions, unnecessary approvals, and poor data quality.

The most significant mechanisms are intelligent automation, process mining, modular API architecture, cloud services, omnichannel support, and centralized data management. Their combined use allows for shorter banking transaction times, lower service costs, reduced errors, and increased staff productivity.

A hybrid model is proposed for commercial banks in the Republic of Uzbekistan, combining digitalization of mass operations with centralized risk management, data management, and technological architecture. Practical implementation of the model requires the establishment of an operational excellence center, KPI-based performance measurement, and mandatory consideration of operational sustainability. This approach allows digital transformation to be viewed not as an expendable IT project, but as an ongoing mechanism for enhancing the bank's competitiveness and sustainability.

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