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# DIGITAL AND INTELLIGENT TECHNOLOGIES IN THE BANKING COMPLIANCE SYSTEM OF THE REPUBLIC OF UZBEKISTAN

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**ABSTRACT:** *This article examines how banking compliance in the Republic of Uzbekistan is changing under the influence of digital and intelligent technologies. While prior studies often focus on individual tools or regulatory aspects, this paper addresses the broader transformation of compliance from a narrowly control-oriented function into a strategic component of bank management. The study aims to demonstrate that RegTech solutions and artificial intelligence (AI) significantly enhance the efficiency, adaptability, and risk-oriented nature of compliance systems in commercial banks.*

*The research is based on systemic and institutional approaches and applies comparative analysis, generalization of statistical data, and expert assessments. The paper identifies key weaknesses of traditional compliance models and analyzes practical directions for implementing RegTech and AI in AML/CFT, KYC, and transaction monitoring. As a result, a three-level model of digital banking compliance is proposed, combining operational automation, analytical intelligence, and strategic decision support. The practical value of the study lies in concrete recommendations for commercial banks and the Central Bank of the Republic of Uzbekistan aimed at building a technologically sustainable and risk-oriented compliance system.*

**KEYWORDS***: banking compliance; digitalization; artificial intelligence; RegTech; SupTech; risk management; banking management.*

## 1. INTRODUCTION

The transformation of the financial system of the Republic of Uzbekistan and the rapid development of digital banking services have significantly increased the importance of an effective banking compliance system (Arner et al., 2017; Central Bank of the Republic of Uzbekistan, 2022). The expansion of remote service channels and the growth of cashless transactions impose additional pressure on internal control mechanisms and risk management frameworks.

In this context, the research objective of the article is to test the hypothesis that the implementation of digital and intelligent technologies (RegTech and AI) enables the transformation of banking compliance from a predominantly control-oriented function into a strategic instrument of

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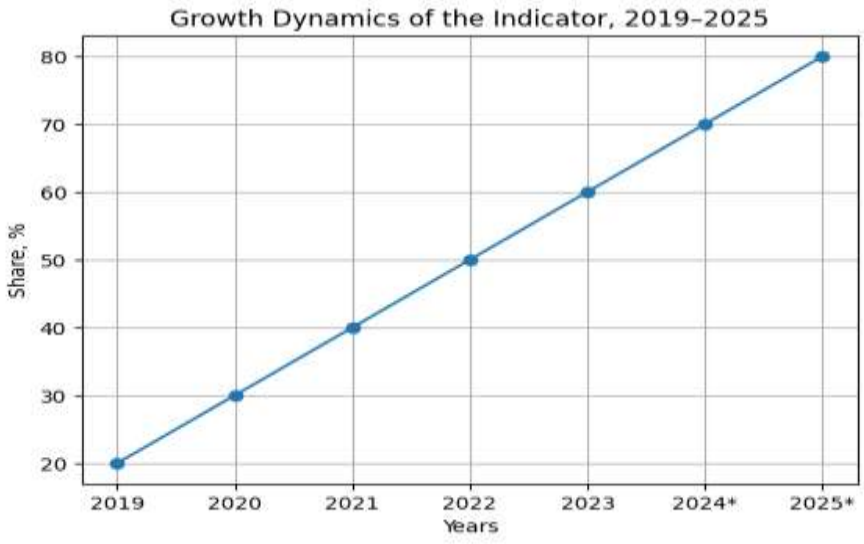
risk-oriented banking management. This hypothesis is examined through a sequential analysis of the theoretical foundations of compliance (Section 2), identification of the limitations of traditional models (Section 3), justification of the role of digital and intelligent technologies (Sections 4–5), and the development of an original model and practical recommendations (Sections 6–7).

As shown in Figure 1, during 2019–2023 the share of digital banking transactions in the Republic of Uzbekistan more than doubled, leading to increased complexity of compliance processes and necessitating the introduction of new technological solutions.

**Figure 1 — Dynamics of the Share of Digital Banking Transactions in the Republic of Uzbekistan, 2019–2025**




*Note:* Data for 2024–2025 are forecast values based on trend analysis of Central Bank statistics and expert assessments.

Source: compiled by the author based on data from the Central Bank of the Republic of Uzbekistan.

## 2. Essence and Role of Compliance in the Banking Management System

In the modern banking management system, compliance occupies a central position as a tool for ensuring the stability and reliability of commercial banks (Basel Committee on Banking Supervision, 2020; Chernobai et al., 2018). The compliance function is aimed at ensuring conformity of banking activities with legal requirements, regulatory acts, international standards, and internal corporate policies.

From a managerial perspective, compliance constitutes an element of corporate governance and internal control. An effective compliance system contributes to the reduction of regulatory and reputational risks, increases business process transparency, and fosters a culture of prudent banking conduct. In the banking sector of the Republic of

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Uzbekistan, compliance gains particular importance in the context of the gradual transition to a risk-based supervisory model and stricter requirements for financial stability.

**3. Problems and Limitations of Traditional Compliance Systems**

The institutional and operational limitations of traditional compliance approaches identified below objectively necessitate a transition toward digital and intelligent solutions capable of providing higher adaptability, analytical depth, and risk-oriented management.

Despite the institutional development of the compliance function, commercial banks in the Republic of Uzbekistan continue to face a number of challenges inherent in traditional compliance control models (Chernobai et al., 2018; Zetzsche et al., 2019). A significant share of procedures relies on formal regulatory adherence and manual data processing. According to expert assessments, the share of manual operations in compliance processes in some banks reaches 60–70%, which not only increases the likelihood of operational errors but also leads to higher compliance risks and costs, while reducing the speed and quality of violation detection.

Moreover, traditional compliance systems are limited in their capacity to process large volumes of data generated by the digitalization of banking services. Insufficient integration between IT systems, risk management units, and internal control functions results in fragmented risk assessment and a predominantly reactive compliance management model.

**4. Digital and Intelligent Technologies in the Banking Compliance System**

Unlike the previous section, which focused on institutional constraints of traditional compliance systems, this section conceptually concentrates on technological instruments of their transformation and the transition to a risk-oriented digital model.

In contemporary research, the digitalization of the compliance function is regarded as a key direction in the development of risk-oriented banking management (Arner et al., 2017; Basel Committee on Banking Supervision, 2020; Zetzsche et al., 2019). The use of automated monitoring systems, big data analytics, and machine learning enables a shift from selective control toward continuous transaction analysis.

The practice of commercial banks in the Republic of Uzbekistan indicates gradual implementation of digital solutions in customer identification, transaction monitoring, and regulatory reporting. However, most existing systems remain rule-based, limiting their adaptability to changing patterns of customer financial behavior.

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**Application of Artificial Intelligence in Banking Compliance**

**Figure 2 — Effects of Artificial Intelligence Implementation in Banking Compliance**

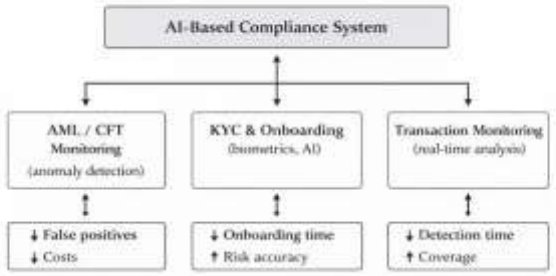


Figure 2. AI-Based Compliance System in the Banking Sector

Source: developed by the author based on (Bussmann et al., 2021; FATF, 2020).

Artificial intelligence and machine learning technologies represent a new stage in the evolution of compliance systems, transforming them from auxiliary control mechanisms into analytical and predictive tools of banking management (Bussmann et al., 2021; Restoy, 2021). Unlike traditional rule-based models, intelligent systems are designed to detect hidden patterns and anomalies in large datasets.

**Empirical Effects of AI Implementation in Compliance Practice**

According to aggregated evidence from international and regional banking practice, the application of AI in AML/CFT reduces false-positive alerts by an average of 20–30% (Bussmann et al., 2021; FATF, 2020), significantly decreasing the workload of compliance units and improving the quality of suspicious transaction analysis. For banks in the Republic of Uzbekistan, this effect is particularly relevant given the rapid growth of cashless and remote transactions.

In KYC procedures, intelligent algorithms enable automated verification of customer data, biometric parameters, and behavioral characteristics, reducing customer onboarding time by 30–40% while simultaneously increasing the accuracy of risk profiling. Under conditions of digital banking, these effects enhance financial inclusion while maintaining the required level of regulatory control.

Intelligent transaction monitoring and dynamic risk scoring facilitate a transition toward continuous compliance control. Expert assessments indicate that AI-based systems can cover 90–95% of transactions, while reducing the detection time of potential violations to less than one working day.

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**Table 1 — Key Performance Indicators of the Compliance System Before and After AI Implementation**

| Indicator | Traditional model | Intelligent model |
|---|---|---|
| False-positive rate | 40–50% | 15–25% |
| Transaction monitoring coverage | up to 60% | 90–95% |
| Violation detection time | 2–5 days | less than 1 day |
| Operational costs | baseline | reduction by 20–25% |

**Role of the Central Bank of the Republic of Uzbekistan and SupTech**

The Central Bank of the Republic of Uzbekistan plays a pivotal role in creating conditions for the development of digital banking compliance (Basel Committee on Banking Supervision, 2018; Bank for International Settlements, 2021; Central Bank of the Republic of Uzbekistan, 2022). The transition to risk-based supervision and the introduction of SupTech elements enhance supervisory efficiency and transparency of the banking sector.

Supervisory technologies enable regulators to analyze large volumes of reporting data, identify anomalies, and detect potential systemic risks. The coordinated development of SupTech at the regulatory level and RegTech solutions at the bank level forms an integrated digital compliance ecosystem.

**5. Research Methodology**

The methodological framework of the study is based on systemic and institutional approaches, which allow banking compliance to be examined as an element of the financial ecosystem and banking management system (Arner et al., 2017; Basel Committee on Banking Supervision, 2020). The systemic approach considers compliance in relation to risk management, corporate governance, and digital transformation processes, while the institutional approach is applied to assess the role of regulatory requirements and supervisory mechanisms.

The study employs comparative analysis of traditional and digital compliance models, structural-functional analysis, and methods of scientific generalization and classification. The empirical base is formed using statistical data from the Central Bank of the Republic of Uzbekistan, analytical reports of the Bank for International Settlements, FATF, and the World Bank. Economic modeling and expert assessment methods were applied to develop the original three-level digital compliance model and to evaluate the effects of intelligent technology implementation.

**6. Author's Model of Digital Banking Compliance**

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This study proposes an original model of digital banking compliance based on the integration of RegTech and AI solutions into the banking management system. The model consists of three interrelated levels: operational (automated transaction monitoring and KYC), analytical (machine learning, risk scoring, anomaly detection), and strategic (managerial decision support and interaction with the regulator).

**Figure 3 — Author's Model of Digital Banking Compliance**


Source: developed by the author.

**Scientific Novelty of the Study**

The scientific novelty of the research is as follows:

1. The concept of digital banking compliance is substantiated as a strategic element of banking management rather than solely a control function.

2. The directions of AI application in compliance activities of commercial banks are systematized with regard to the specific features of the banking sector of the Republic of Uzbekistan.

3. An original three-level model of digital banking compliance integrating operational, analytical, and strategic elements of compliance risk management is proposed.

4. The quantitative effects of intelligent technology implementation in compliance systems are identified and justified, including cost reduction and enhanced control efficiency.

**7. Practical Recommendations**

To enhance the applied value of the research results, practical recommendations are structured according to implementation horizons and expected effects.

**Short-term perspective (1–2 years)**

*For commercial banks:* – implementation of intelligent monitoring systems in high-risk areas (AML/CFT, KYC), reducing false positives and

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operational workload; – integration of compliance platforms with core IT systems to improve data completeness and timeliness.

*Expected effect:* improved detection efficiency and reduced compliance-related operational costs.

**Medium-term perspective (3–5 years)**

*For commercial banks:* – transition from rule-based models to machine learning algorithms and dynamic customer risk scoring; – development of compliance staff competencies in data analytics and AI.

*For the Central Bank of the Republic of Uzbekistan:* – expansion of SupTech tools for risk-based and remote supervision; – establishment of unified methodological requirements for AI use in banking compliance systems.

*Expected effect:* creation of a resilient and adaptive compliance control system responsive to behavioral and regulatory changes.

**Long-term perspective (over 5 years)**

*For banks and the regulator:* – development of a unified digital compliance ecosystem integrating RegTech and SupTech solutions; – implementation of predictive compliance risk models and advanced big data analytics; – support for innovative RegTech and AI projects within regulatory sandboxes.

*Expected effect:* transition to a proactive compliance risk management model, increased financial stability, and enhanced market confidence.

**Conclusion**

The results of this study show that digital and intelligent technologies act as a decisive driver of change in the banking compliance system of the Republic of Uzbekistan. As the volume of digital transactions grows and financial products become more complex, traditional compliance models increasingly fail to provide timely, comprehensive, and cost-effective risk control.

The use of artificial intelligence in AML/CFT, KYC, transaction monitoring, and risk scoring enables banks to move from reactive responses to proactive compliance risk management. In practice, this leads to faster detection of violations, lower operational and reputational risks, greater transparency of banking operations, and higher confidence among customers and investors.

At the system level, the Central Bank of the Republic of Uzbekistan plays a key role not only as a supervisor but also as a catalyst for digital transformation. The parallel development of SupTech at the regulatory level and RegTech within commercial banks creates the foundation for an integrated digital compliance ecosystem.

Overall, the findings confirm the hypothesis formulated in the introduction: the adoption of digital and intelligent technologies transforms banking compliance into a strategic, risk-oriented management instrument and becomes a necessary condition for the long-term

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financial stability and competitiveness of the banking system of the Republic of Uzbekistan.

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