

IMPROVING THE USE OF NEW DIGITAL TECHNOLOGIES IN THE FIELD OF FINANCIAL TECHNOLOGIES

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Abstract

This thesis examines practical ways to improve the adoption and governance of emerging digital technologies in financial technology (FinTech). It considers artificial intelligence, distributed ledger technologies, open banking, application programming interfaces, cloud computing, and digital identity as mutually reinforcing components of modern financial infrastructure. Drawing on international institutional research, it identifies efficiency gains and risks associated with innovation, including cyberattacks, data misuse, algorithmic discrimination, market concentration, and operational outages. Particular attention is paid to a phased implementation framework applicable to Uzbekistan and comparable emerging markets. The paper concludes that successful digital transformation depends not only on technical investment but also on interoperable infrastructure, proportionate regulation, measurable consumer outcomes, and digital trust.

Keywords: financial technology, digital transformation, artificial intelligence, blockchain, open banking, cybersecurity, financial inclusion, regulatory technology, Uzbekistan.

INTRODUCTION

Digital technologies are fundamentally altering how individuals, businesses, banks, and non-bank providers obtain and deliver financial services. Mobile applications have made payments more convenient, while cloud architectures, automated decision systems, and standardized interfaces are beginning to reshape lending, savings, insurance, compliance, and investment operations. FinTech should therefore be understood not merely as a collection of mobile payment products but as a structural change in the production, distribution, and regulation of financial services (Arner et al., 2016).

The public-policy relevance of these changes is substantial. The World Bank's Global Findex 2025 documents both progress in account ownership and persistent barriers involving income, gender, digital connectivity, and safety (World Bank, 2025). Digital service availability alone does not establish genuine inclusion: users also require affordability, reliable access, meaningful transparency, and effective means of redress. At the same time, advances in artificial intelligence can improve information processing but may introduce problems of opacity, biased outcomes, cybersecurity, and correlated financial risks (Boukherouaa & Shabsigh, 2023).

The objective of this thesis is to develop an integrated set of organizational, technological, and regulatory measures that can improve the effective use of new digital technologies in FinTech. The study applies qualitative comparative analysis and a synthesis of published institutional and academic literature. Its contribution is a practical implementation framework with proposed performance indicators, rather than an empirical claim that a specific technology has already caused measurable improvements in Uzbekistan.

MAIN PART

1. The technological foundations of modern FinTech

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Artificial intelligence and machine learning support automated fraud detection, document processing, customer assistance, risk segmentation, and early-warning models. Their value depends on data quality, appropriate model validation, and careful alignment between business objectives and consumer protection. In credit assessment, for example, predictive accuracy must be assessed alongside fairness, explainability, data minimization, and customers' ability to challenge decisions. Human oversight remains important for high-impact outcomes. Research by the Bank for International Settlements emphasizes that AI may improve financial intermediation, insurance, asset management, and payments while generating new coordination and risk-management challenges (Aldasoro et al., 2024).

Distributed ledger technology can facilitate shared records, programmable business processes, and certain forms of cross-border settlement. However, a blockchain is not automatically superior to a conventional database. It is most appropriate when multiple parties need a shared auditable state without relying entirely on a single intermediary. Institutions must evaluate finality, governance, privacy, technical throughput, legal enforceability, and costs before deployment. The broader evolution of digital finance illustrates how technology and regulatory design interact rather than develop in isolation (Arner et al., 2016).

Open banking enables approved third parties to access financial data or initiate specified services through secure application programming interfaces, subject to legal safeguards and valid customer authorization. Such infrastructure can promote competition, enable account aggregation, improve small-business cash-flow assessment, and reduce dependence on closed proprietary ecosystems. Yet insecure interfaces can expose sensitive data. Strong authentication, granular consent, revocation mechanisms, audit trails, and clear allocation of liability are essential (Financial Stability Board, 2019).

2. Digital infrastructure, interoperability, and inclusion

A competitive FinTech ecosystem requires stable payment rails, interoperable systems, digital identity services, accessible connectivity, and well-defined operational standards. Without interoperability, network effects can lock consumers into dominant platforms and force merchants to support several incompatible payment solutions. Common technical specifications for messaging, dispute management, authentication, and settlement can reduce fragmentation while preserving room for innovation. The financial-inclusion literature stresses that payment services often act as an entry point to broader formal financial participation (Demirgüç-Kunt et al., 2022).

For Uzbekistan, a phased approach could prioritize secure connections among licensed banks, payment service providers, and eligible technology firms. Initial pilots should address frequent use cases such as merchant payments, remote onboarding, consent-based account information, and small-business financial management. Rural connectivity, disability-accessible interfaces, multilingual support, and transparent pricing should be integrated at the design stage. Evaluation should differentiate registration figures from active use, transaction success, and actual improvements in customers' financial well-being.

3. Regulation, cybersecurity, and responsible innovation

Digital financial ecosystems rely on complex networks of third-party providers. A cloud outage, compromised interface, poorly governed AI model, or incident at a common service vendor may affect multiple institutions simultaneously. The Financial Stability Board has highlighted the possible systemic implications of FinTech developments and the need to monitor emerging interconnections (Financial Stability Board, 2019). Resilience therefore requires asset inventories, vendor concentration assessments, tested backups, incident reporting, encryption, continuous monitoring, and recovery exercises.

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Risk-based regulation should be technologically neutral where similar activities create similar risks, while taking account of genuine differences between bank and non-bank business models. Regulatory sandboxes can permit controlled experimentation when they include clear eligibility standards, consumer safeguards, measurable pilot objectives, and transparent exit conditions. International work on central bank digital currencies also demonstrates that digital monetary innovation involves design choices affecting privacy, operational resilience, and the financial system, rather than purely software engineering (Bank for International Settlements et al., 2021).

The governance of AI requires further attention. Financial institutions should document data provenance, test disparate impacts, track model drift, distinguish automated recommendations from final decisions, and establish clear responsibility for deployment. Generative AI tools should not receive unrestricted access to confidential customer records. Human review, access control, red-team exercises, and model-specific security standards are integral to safe innovation (Boukherouaa & Shabsigh, 2023).

4. A phased improvement model for Uzbekistan

First, the sector should undertake a baseline assessment covering technical maturity, digital skills, cyber resilience, data quality, and customer needs. Such an assessment can identify high-value services and prevent expensive technology procurement without a clear operational problem. Institutions should distinguish between systems that require foundational modernization and those ready for advanced analytics or open banking integration.

Second, regulators and industry participants should establish interoperable standards for secure APIs, digital identification, service reliability, dispute resolution, and incident exchange. Common standards lower coordination costs, while proportionate authorization requirements help avoid excluding smaller innovative firms. International guidance on digital financial services indicates that policy objectives must balance inclusion, efficiency, integrity, and stability (International Monetary Fund & World Bank, 2018).

Third, limited-scope pilots should test specific hypotheses. Examples include whether AI-based anomaly detection reduces false fraud alerts, whether consent-based account data accelerates small-business credit processing, and whether simplified mobile onboarding improves sustained account use among underserved groups. A valid pilot should specify a baseline, target population, safeguards, evaluation period, and a counterfactual or credible comparison when feasible. Results should be reviewed before scaling.

Fourth, professional development and governance capacity should accompany technological deployment. Bank employees, compliance specialists, regulators, software engineers, and consumers need targeted digital skills. Organizational accountability should cover product design, procurement, model risk management, outsourcing, and consumer complaints. The OECD's digital-economy work identifies trust, skills, connectivity, and coherent governance as important conditions for broader technology adoption (OECD, 2024).

Finally, effectiveness should be monitored using a balanced scorecard. Suggested measures include transaction success rate, average payment latency, cost per transaction, active digital users, time needed to resolve complaints, confirmed fraud losses, system availability, independently tested cyber-recovery time, and the share of users who understand consent settings. These are proposed indicators, not measured outcomes. Policy makers should review them in disaggregated form to identify whether gains extend to rural populations and low-income households.

5. Constraints and future research

Several limitations require caution. FinTech adoption does not necessarily reduce inequality when broadband access, smartphone ownership, literacy, or affordable identification remain unequal. Algorithmic credit tools can reproduce historical exclusion; platform scale may encourage concentration; and cyber incidents can damage public trust rapidly. Moreover, changes in performance can reflect macroeconomic conditions or regulatory reform rather than technology alone. The Global Findex and international regulatory research provide useful comparative context, but institution-level impact evaluation requires independent local data (World Bank, 2025; Basel Committee on Banking Supervision, 2018).

Future empirical research could examine payment-cost trends, consumer complaint records, platform interoperability, credit-processing times, and experimentally evaluated digital literacy interventions. Longitudinal analysis would help separate transient adoption effects from durable gains in efficiency, competition, inclusion, and resilience.

CONCLUSION

The improvement of new digital technology use in FinTech should be approached as a coordinated institutional transformation rather than a sequence of isolated software installations. Artificial intelligence, open banking, digital identity, cloud platforms, and distributed ledgers can generate substantial operational benefits when implemented for clearly defined functions and supported by reliable infrastructure. Their deployment also creates risks that cannot be resolved by technology procurement alone.

For Uzbekistan, the most promising strategy combines interoperable payment and data standards, risk-proportionate regulation, carefully evaluated pilots, professional training, inclusive product design, and transparent performance monitoring. Strong cybersecurity, customer consent, accountability, and complaint-resolution mechanisms must be built into each implementation stage. The central practical recommendation is to measure technological success through demonstrable improvements in access, service quality, safety, competition, and efficiency rather than through the number of newly launched digital applications.

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