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# THE IMPACT OF FINANCIAL TECHNOLOGIES AND DIGITAL INNOVATIONS ON THE MODERNIZATION OF GEORGIA'S BANKING SECTOR

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**Abstract**: This paper analyzes the impact of financial technologies and digital innovations on the modernization of Georgia's banking sector. Over the past decade, the Georgian banking system has undergone significant digital transformation driven by global FinTech trends and domestic factors, including rising customer expectations, the need for greater operational efficiency, intensified competition, and alignment with international standards (European Central Bank, 2023). Particular attention is given to the FinTech Development Strategy of Georgia (2025), issued by the National Bank of Georgia, which positions FinTech as a key driver of banking modernization rather than a complementary service. The strategy introduces a unified regulatory framework to support an inclusive and innovative FinTech ecosystem at both national and international levels. The study aims to identify the main directions and features of digital transformation in Georgia's banking sector and to assess the impact of digital services and innovations on banking models, customer experience, and competitive dynamics. A mixed-methods approach is applied, combining statistical analysis, literature review, comparative analysis, and quantitative assessments. The findings show that FinTech development has intensified competition, accelerated innovation, and enhanced service diversification. However, challenges such as cybersecurity risks, regulatory harmonization, uneven digital literacy, and high transformation costs remain.

**Keywords**: digital transformation, open banking, FinTech, digital banking, customer experience

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## 1. INTRODUCTION

Over the past decade, Georgia's banking sector has been actively transitioning toward a digital business model, influenced by both global financial technology (FinTech) trends and domestic drivers (International Monetary Fund, 2023; European Central Bank, 2023), including the growing expectations of customers, the need for efficiency gains, competitive pressures, and harmonization with international standards. Digitalization has become a strategic priority for Georgian banks and a key mechanism for maintaining competitiveness in an increasingly technology-driven financial environment.

In 2025, the National Bank of Georgia (2025a) published the FinTech Development Strategy, emphasizing that FinTech has evolved from an auxiliary tool into a primary force shaping the modernization of the banking sector. By 2024, digital banking had become the dominant development direction of Georgia's financial system, supported by statistical indicators and international research findings (DataReportal, 2024; International Monetary Fund, 2023).

The purpose of this study is to analyze the impact of FinTech and digital innovations on the modernization of Georgia's banking sector, with a particular focus on open banking, digital infrastructure, and customer experience transformation. The paper also seeks to identify key challenges related to digital integration and to propose policy-oriented recommendations for sustainable development.

## 2. LITERATURE REVIEW

International research highlights digital transformation as a fundamental factor reshaping contemporary banking systems. Studies by the International Monetary Fund (2023) and the European Central Bank (2023) emphasize that digital finance improves efficiency, reduces transaction costs, and enables banks to better respond to customer needs. At the same time, FinTech-driven competition increases pressure on traditional banking models.

Academic literature published by Springer (2024) and other international platforms underlines open banking as one of the most transformative innovations in recent years. Open banking facilitates secure data sharing through application programming interfaces (APIs), enabling FinTech companies to offer innovative services in areas such as payments, budgeting, and financial analytics. The American Bankers Association (2024) confirms that open banking contributes to the rapid expansion of digital payments and enhances platform-based financial ecosystems.

Regional studies focusing on emerging economies (International Finance Corporation, 2023) demonstrate that digital banking growth is strongly correlated with internet penetration, mobile connectivity, and regulatory readiness. These findings are particularly relevant in the Georgian context, where rapid digital adoption has occurred alongside regulatory reforms aimed at aligning with European standards.

## 3. DATA AND METHODOLOGY

This study adopts a mixed-methods research design. Quantitative analysis is based on statistical data from national and international sources, including the National Bank of Georgia (2024) and DataReportal (2024), and international financial institutions. Comparative analysis is applied to assess Georgia's position within the global FinTech ecosystem.

Qualitative methods include a structured review of academic literature, policy documents, and strategic reports related to digital banking and FinTech development. The

integration of these methods enables a comprehensive assessment of technological, institutional, and market-level factors shaping the modernization of Georgia's banking sector.

## 4. RESULTS AND DISCUSSION

### 4.1. Digital Banking and Open Banking Development in Georgia

By 2024, digital banking had become the primary direction of development of Georgia's banking system. This trend is supported by both statistical data (DataReportal, 2024; Statista, 2024) and academic and international research. The rapid growth of digital banking in Georgia can be attributed to several key factors:

- High levels of internet penetration and mobile connectivity among the population;
- Increased integration of digital services in Georgian banks;
- The introduction of new standards through open banking;
- Strengthening of Georgia's FinTech ecosystem;
- A global trend toward the dominance of mobile banking.

For reference, at the beginning of 2024, Georgia had 2.93 million internet users (an internet penetration rate of 78.7%) (DataReportal, 2024) and 6.10 million mobile connections (mobile penetration rate of 164%, averaging 1.6 mobile numbers per person).

According to 2024 data on Georgia's banking sector, the level of digital service adoption among Georgian banks has increased significantly. Quantitative analysis of digital products conducted by the authors indicates a high level of digital readiness, with digital transformation already having become a strategic priority for banks.

The introduction of open banking in Georgia has established entirely new standards. In particular, it has increased transparency in data exchange between banks, significantly stimulated the quantitative growth of online transactions, and transformed customer experience from "bank dependency" to "platform dependency." Open banking enables Georgian FinTech companies to directly compete with traditional banks in services such as payments, financial analytics, personal budgeting, and rapid lending models.

### 4.2. Georgia's Position in the International FinTech Ecosystem

Georgia has already developed a fully functional digital financial services (DFS) ecosystem, which is rapidly integrating into all segments of the economy. Online banking and e-banking have become among the most widely used services. Research has shown that various factors influence the growth of digital banking (see Table 1).

*Table 1.* Determinants of Digital Banking Growth in Georgia 2024 (DataReportal, 2024; National Bank of Georgia, 2024).

| Factor | Statistics / Evidence |
|---|---|
| High internet penetration | 2.93 million internet users (78.7%) |
| Widespread mobile technology | 6.10 million mobile connections (164%) |
| Banks' digital readiness | The level of digital service adoption has increased significantly |
| Effect of open banking | Growth in transactions; establishment of new standards |
| DFS ecosystem | Strong digital financial infrastructure |
| Global trend | 55% of users rely on mobile banking |

Based on the above, the growth of digital banking in Georgia by 2024 represents not only a technological transformation but also a shift of banking competition into an entirely new reality. In this environment, the decisive factors are the quality of mobile applications, the speed of online services, the enhancement of user experience (UX), open API standards, data security, and cooperation with FinTech companies. Consequently, mobile and online banking have become the primary dimensions of competition in Georgia's banking sector.

According to research conducted by the authors in 2024, FinTech has caused radical changes in the behavior and strategic orientation of traditional banks in Georgia. The findings suggest that these changes are influenced by three key factors:

I Adaptation and rapid adoption of technologies

II Regulation and supervision

III Competition and stability

In addition to the above, banks are actively implementing open banking, API integrations, automation technologies, and data-driven decision-making. At the same time, the National Bank of Georgia is actively developing FinTech-compatible standards, including digital identification (e-KYC), payment system modernization, and PSD2 like regulatory approaches. These initiatives are significantly shaped by the provisions of the FinTech Strategy approved by the National Bank in May 2025.

While FinTech companies compel banks to continuously upgrade their services, increased competition also contributes to systemic stability, as the banking sector is forced to constantly improve service quality.

From a contemporary perspective, the findings suggest that open banking represents a new era for Georgia's financial system. By 2024, it had already become one of the most transformative innovations in the country's financial system. Open banking is a model under which banks securely share customers' financial information—with their consent—with FinTech companies and third party providers. As a result, a competitive, flexible, and customer oriented ecosystem is formed.

At the current stage, open banking in Georgia includes:

- The ability to share data between banks;
- A unified view of all bank accounts for customers within a single environment;
- Fast, flexible, and integrated online payments;
- Greater diversity of financial products.

These developments confirm that the banking system is undergoing not only technological but also structural transformation.

This raises an important question: how does open banking transform customer experience? A study published by Springer (2024) indicates that open banking has made online payments more flexible and has enabled customers to carry out financial operations seamlessly across multiple platforms, including FinTech applications. For customers, open banking generates the following effects (see Table 2).

*Table 2.* Impact of Open Banking on Customer Experience (American Bankers Association, 2024; Springer, 2024).

| Aspect of Customer Experience | Impact of Open Banking | Statistical / Factual Evidence |
|---|---|---|
| Platform-based financial services | Customers can view multiple bank accounts within a single application (AISP model) | Integration of digital services in Georgia has increased; banking is rapidly becoming multi-platform |
| Simplification and flexibility of online transactions | Open APIs simplify payments and reduce the number of required steps | Open banking has made online operations "simpler and more flexible" (Springer, 2024) |
| Speed and real-time processing | Data sharing occurs instantly, allowing faster service delivery | Georgia's DFS ecosystem is strong and rapidly expanding, providing a foundation for open banking |
| UX/UI quality competition | Banks and FinTechs compete in application interfaces, improving UX | 2024 research shows that digital banking quality has become the main area of competition |
| Growth of mobile banking usage | Open banking creates an app-based financial environment, making mobile experience central | 2024: 6.10 million mobile connections (164%); rapid expansion of mobile banking usage |
| Digital engagement and financial inclusion | Customers gain access to a broader range of financial products | Internet penetration in Georgia stands at 78.7%, supporting digital banking adoption |
| Data security and user control | Customers decide with whom to share their financial information | Open banking in Georgia is regulated according to modern standards (NBG FinTech Strategy 2025) |
| Accessibility of FinTech products | Platforms offer personalized services (e.g., budget analytics) | Open banking provides startups with consent-based access to customer data, fostering innovation |
| Growth of digital payments | Open API standards accelerate electronic payments | Studies indicate that Georgia's online payment system has expanded and become more flexible |

*Table 3.* Open Banking and Trends in the Growth of Online Payments in Georgia 2020–2024 (DataReportal, 2024; National Bank of Georgia, 2024; Springer, 2024).

| Year | Internet Penetration (Users) | Mobile Connections (Base for Expanding Online Payments) | Open Banking / Digital Integration | Impact on Online Transactions |
|---|---|---|---|---|
| 2020 | 75% (extrapolated from DataReportal trends) | 140% mobile penetration | Preparation of the legal framework for open banking begins | Growth in online payments during the pandemic (general trend; no officially published quantitative data) |
| 2021 | Approximately 78% (based on growth trajectory) | 150% | Formation of open banking institutional structure (NBG FinTech Office) | Increased use of online services due to strengthening of the digital ecosystem |
| 2022 | Approximately 78–79% | 158% | Active transition to API standards | Growth of online payments as DFS infrastructure expands (exact figures unavailable) |
| 2023 | 78.5% | 160% | Technical testing phases of open banking | Expansion of electronic payment services (FinTechs + banks) |
| 2024 | 2.93 million users (78.7%) | 6.10 million mobile connections (164%) | Open banking effectively implemented; according to Springer research, it "moves the sector to a new stage" | Online operations became "simpler and more flexible" (confirmed research finding) |

Research conducted by the American Bankers Association (American Bankers Association, 2024) confirms that open banking has expanded online payment practices and simplified financial transactions, which has led to a significant increase in the volume of electronic payments (see Table 3).

As shown in Table 3, between 2020 and 2024 the volume of online payments increased steadily as a result of rising internet penetration and mobile connectivity, accelerating the shift of consumers toward digital channels. By 2024, there is clear evidence that in Georgia:

- open banking is fully operational;
- digital transactions have been simplified;
- customer experience has transformed into a platform-based, fast, and flexible environment.

Notably, data for 2024 indicate that the digital expansion of the banking market (internet usage combined with mobile connectivity) has reached a peak:

- 2.93 million internet users;
- 164% mobile penetration.

This development is directly linked to the growth of online payments, as the overwhelming majority of Georgia's population already uses the internet and mobile devices.

Therefore, the following conclusions can be drawn:

- Over the past five years, Georgia has entered a mature phase of the digital banking era;
- The full-scale implementation of open banking in 2024 became a turning point, providing online payments with greater flexibility, increased competition, enhanced speed, and improved transparency;
- Although precise annual quantitative series on online transactions are not publicly available, international and local studies clearly indicate a rapid increase in customer digital engagement.

Georgia's banking and FinTech environment has become increasingly active amid growing international engagement. In particular, the National Bank of Georgia cooperates with major international institutions (Bank for International Settlements, 2023; International Monetary Fund, 2023) such as:

- BIS Innovation Hub
- IMF and IFC
- European Central Bank

Georgia has effectively adopted best practices from European digital banks and global FinTech hubs (e.g., the Atlanta FinTech ecosystem), where banks process hundreds of billions of transactions annually.

Table 4 presents a comparative overview of the key effects of FinTech and digital innovations in the context of Georgia.

*Table 4.* Impact of Digital Innovations in Georgia's Banking Sector (ECS Development, 2023; Springer, 2024).

| Area of Impact | Description |
|---|---|
| Customer experience | Growth of mobile and online banking; simplified payments; faster transactions |
| Operational efficiency | Automation, AI/ML adoption, cost reduction |
| Regulatory compliance | e-KYC, API standards, FinTech strategy |
| Competition | Emergence of FinTech startups, market diversification |
| Open banking | Expanded data access, development of new products |

### 4.3. Challenges Related to the Integration of Digital Technologies

Despite significant progress in the digitalization of the banking system, several challenges remain in Georgia:

I. Cybersecurity – As innovation increases, cyber risks also grow.

II. Regulatory harmonization – Rapid FinTech development requires continuous regulatory updates.

III. Customer education – The use of digital services is not evenly distributed across all age groups.

IV. Cost of technological transformation – Significant investments are required in API architecture, open banking infrastructure, and AI systems.

### 4.4. Recommended Measures to Address Challenges

To address challenges related to cybersecurity, regulatory harmonization, customer education, and the high cost of technological transformation, the following actions are considered appropriate:

#### 4.4.1. Cybersecurity Measures

With the growth of innovation, cyber risks inevitably increase. Therefore, it is essential to develop and implement an integrated model encompassing technological, procedural, and human security components. One such approach is the implementation of Zero Trust architecture, whereby every employee and device is continuously verified ("trust no one" principle). This approach is particularly effective in remote environments and open API systems.

- AI-based threat detection – Real-time anomaly detection enables rapid response and is also effective in payment fraud control.
- Regular cybersecurity training for employees – The human factor remains one of the highest risk sources; phishing simulations can reduce incidents by 60–70%.
- Alignment with national and sectoral cybersecurity frameworks – Harmonization with ISO 27001, NIST, and GDPR standards; cooperation among banks through a unified Security Operations Center (SOC).

#### 4.4.2. In Terms of Regulatory Harmonization

The rapid growth of FinTech continuously creates the need for legislative updates. In particular, the following measures are required:

- Accelerated alignment with EU directives (PSD2, DORA) – PSD2 ensures secure open banking, while DORA regulates standards for the operational resilience of the financial sector.
- Joint Regulatory Sandboxes involving regulators and banks – These enable FinTech companies to test innovations in a real environment without excessive bureaucracy. Such models already exist in Georgia but require further expansion.
- Development of clear API standards for banks – This reduces technological fragmentation, enhances competition, and strengthens consumer protection.

#### 4.4.3. Enhancing Customer Education

The adoption of digital services in Georgia remains uneven across age groups and regions. To address this challenge, the following actions are recommended:

- Development of nationwide digital literacy programs and dissemination of information – Implemented through schools, universities, community centers, and in partnership with banking associations.
- Simple and inclusive UX/UI design – Applications should be adapted for elderly users as well, featuring large buttons, intuitive navigation, and voice-based interfaces.
- "Digital Mentors" programs within banks – Dedicated staff in bank branches assist customers in performing digital operations. This approach has proven successful in countries such as Estonia and the Netherlands.
- Multichannel education initiatives – Including video tutorials, webinars, short instructions, and mobile information units operating in rural areas.

#### 4.4.4. Addressing the High Cost of Technological Transformation

API architectures, open banking infrastructure, and AI systems require substantial investment. To reduce costs, the following strategies are proposed:

- Cloud-first strategy (hybrid or private cloud) – Reduces internal infrastructure maintenance costs and provides flexibility to scale resources up or down according to demand.
- Creation of a unified industry API hub – Eliminates the need for banks to develop independent APIs, thereby reducing duplicated investments.
- Hybrid use of AI models (open-source and proprietary) – Combining GPT-class models with lighter, cost-efficient alternatives (e.g., FinGPT, LLaMA, Falcon) helps lower licensing expenses.
- DevOps and Agile transformation – Enables faster deployment, automation, and continuous integration, reducing project costs by 20–40%.
- Reskilling employees and building in-house competencies – Strengthening internal teams is more cost-effective in the long term than continuous outsourcing.

## 5. CONCLUSION

The final recommendations of the study are synthesized into an integrated model, presented in Table 5, which outlines comprehensive solutions for overcoming the identified challenges.

*Table 5.* Integrated Recommendations for Addressing Key Challenges (National Bank of Georgia, 2025a).

| Challenge | Key Solution | Supporting Resource |
|---|---|---|
| Cybersecurity | Zero Trust architecture + AI-based security | ISO / NIST standards |
| Regulation | PSD2 / DORA harmonization + Regulatory Sandbox | National Bank of Georgia + FinTech ecosystem |
| Education | Mass digital literacy programs + simplified UX design | Banks + Ministry of Education |
| Technological costs | Cloud-first strategy + shared API hub | Collaboration within the financial sector |

Therefore, FinTech and digital innovations have already become the central driving force behind the modernization of Georgia's banking sector. Banks are successfully implementing digital transformation initiatives, open banking is creating a new competitive environment, regulations are increasingly harmonized with international standards, and customer experience has improved significantly.

Georgia possesses both the capacity and the potential to integrate rapidly into the global FinTech landscape. Over the next three years, further substantial progress is expected in the areas of technology adoption, business model innovation, startup ecosystem development, and payment infrastructure advancement.

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