

OVERSIGHT OF FINANCIAL TRANSACTIONS IN THE DIGITAL AGE

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ABSTRACT:

The rapid advancement of digital technologies has fundamentally reshaped the landscape of financial transactions, altering their very structure, functionality, and the mechanisms we use to control them. This study explores this transformation, tracing the evolution of financial technologies (FinTech) from their historical roots to their current state. We examine the development of digital financial systems, the pivotal role of cloud computing infrastructures, and the overarching process of digitalization that is redefining the financial sector. The analysis further assesses the shift from traditional banking to digital banking, considering the emergence of open banking and Banking-as-a-Service (BaaS) models, and weighs the significant opportunities against the novel risks this digital shift introduces. The findings suggest that the digital transformation driven by FinTech undeniably enhances the speed, accessibility, and cost-efficiency of financial operations. Yet, this progress comes with a imperative: it demands equally robust advancements in cybersecurity, sophisticated regulatory frameworks, and resilient internal control systems. By synthesizing the key technological, structural, and managerial components that define oversight in the digital age, this study aims to contribute a cohesive perspective to the ongoing scholarly conversation on the future of financial control.

Keywords: Financial Technologies, Financial Transactions, Digital Environment.

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Review Paper



1. INTRODUCTION

In recent years, the financial sector has undergone a profound paradigm shift, driven by the relentless pace of technological innovation and a sweeping global digital transformation. This evolution is not merely technical; it is reshaping the very financial behaviors of individuals and institutions. From how we shop and save to how we borrow and make investment decisions, traditional approaches are being redefined by digital possibilities. Consequently, the stance that both people and organizations take towards adopting and using financial technologies has become a critical determinant of their economic agility and resilience.

This behavioral shift is visible in the movement of financial operations onto digital and mobile platforms. As Higgins (2019) observes, conducting financial affairs is becoming an increasingly digitized and mobile-centric activity. Financial technologies, or FinTech, stand at the heart of this change, promising services of remarkable flexibility in terms of time, space, and cost. To deliver on this promise, a diverse ecosystem of tools—from smartphones and tablets to cloud technologies—is employed (Abad Segura et al., 2020). The widespread digitalization of these tools has not only expanded the global financial system's reach but has also cemented FinTech as an indispensable concept in the modern economic lexicon.

At its core, this movement represents a powerful convergence of finance and technology. Tian et al. (2015) highlight how this fusion enables transactions to be executed through sophisticated digital platforms, triggering a transformative reorganization within the financial sector itself. FinTech now encompasses the mobile and digital solutions that facilitate everyday banking—money transfers, payments, and credit card operations—moving them out of brick-and-mortar branches and into the palms of our hands.

The advantages of this shift are significant for all parties involved. For individuals and institutions alike, FinTech mitigates the need for physical travel to bank branches, reduces the inherent risks of handling cash, and lowers the operational risks associated with paper-based, traditional transaction methods (Bachas et al., 2018; Economides & Jeziorski, 2017; Jack & Suri, 2014).

The scope of these technologies is broad, spanning card payments, mobile money systems, online credit platforms, and a growing suite of smartphone applications. Today, the use of financial technologies has moved beyond novelty to become both widespread and, for many, essential.

To navigate this transformed landscape, a clear understanding of its components and consequences is vital. This study, therefore, seeks to provide a comprehensive analysis of the oversight and control of financial transactions within the digital environment. The analysis begins by tracing the historical and technological evolution of FinTech and digital transformation processes. Following this foundation, contemporary digital banking models and their associated risk structures are examined. Finally, these insights are synthesized to discuss the implications for regulatory frameworks, security, and the future of financial oversight. Through this structure, the aim is to illuminate the intricate balance between innovation and stability that defines the modern financial ecosystem.

2. FINANCIAL TECHNOLOGIES AND DIGITAL TRANSFORMATION

To establish a clear foundation for the subsequent analysis, this section first unpacks the conceptual meaning and scope of financial technologies. It then traces their historical evolution, examines the enabling role of cloud computing, and explores the broader process and sector-specific effects of digital transformation.

2.1. Definition and Scope of Financial Technologies

Financial Technologies, commonly referred to as FinTech, represent more than a set of tools; they signify a new paradigm for delivering financial services. The Turkish Language Association (TDK, 2025) defines FinTech as institutions or products that leverage digital technologies to provide financial services through innovative, complementary, and accelerating business models. This definition captures the transformative intent behind these technologies. From a regulatory perspective, the Presidency of the Republic of Türkiye Finance Office (CBFO, 2025) emphasizes that modern FinTech, supported by artificial intelligence, cloud computing, and cybersecurity, enables the secure use of payment services, open banking, and digital wallets.



In today's fast-paced world, time is a critical resource, and the timely fulfillment of financial obligations is paramount for both individuals and institutions. The adoption of FinTech has thus become a benchmark for competitiveness. Nations and businesses that hesitate to integrate these technologies risk remaining anchored to traditional, less efficient methods and falling behind in the global economic race. Consequently, fostering the development and modernization of FinTech infrastructures is a strategic imperative for governments aiming to enhance their economic resilience and global standing (CBFO, 2025).

The landscape of FinTech is vast and can be conceptually organized into several core domains. A functional categorization, as suggested by Minto et al. (2017), groups these activities into four primary areas: (1) payments and clearing, (2) trade and investment, (3) capital raising and lending, and (4) payment systems infrastructure. This scope illustrates that FinTech's influence extends across the entire spectrum of financial services.

2.2. Historical Development of Financial Technologies

The journey of financial technology is not a recent phenomenon but a series of evolutionary waves, each catalyzed by changing monetary needs and technological breakthroughs. Scholars like Barberis et al. (2019) outline this progression through distinct historical periods.

The era designated as **FinTech 1.0 (1866–1967)** marks the foundational stage of global financial infrastructure. It began with the laying of the first transatlantic telegraph cable in 1866, which revolutionized long-distance communication. A key milestone was the establishment of Fedwire in 1918, a funds transfer system operated by the Federal Reserve that utilized telegraph and Morse code technologies to execute the earliest forms of electronic fund transfers (Federal Reserve History, 2023). This period was characterized by the institutionalization of electronic finance over vast distances.

FinTech 2.0 (1967–2008) signaled the shift from analog to digital finance. The installation of the first automated teller machine (ATM) by Barclays in London in 1967 provided a tangible sign of this new era. The 1970s saw further digitization with the launch of NASDAQ, the world's first electronic stock market, and the creation of the SWIFT network, which standardized secure messaging for cross-border financial transactions (Gilbert et al., 1997). The 1980s and 1990s witnessed the rise of

mainframe computing in banks and the advent of online banking services. The launch of PayPal in 1998 accelerated the move toward online payments, embedding digital transactions into the fabric of e-commerce. This period concluded with the 2008 global financial crisis, which exposed systemic vulnerabilities in the traditional banking model (Zeybek, 2018).

The post-crisis landscape gave rise to **FinTech 3.0 (2008–Present)**. Waning public trust in traditional banks created fertile ground for alternative, technology-driven financial solutions. The launch of Bitcoin in 2009 introduced blockchain technology and decentralized cryptocurrencies to the world. Concurrently, the proliferation of smartphones transformed these devices into primary gateways for digital financial access, empowering a wave of agile financial start-ups (Kömürçüoğlu & Akyazı, 2020; Wahjono, 2022).

A supplementary phase, often termed **FinTech 3.5**, describes the specific trajectory in emerging markets. In countries lacking dense physical banking infrastructure, digital technologies have enabled a direct leap into mobile financial services. China and India exemplify this trend, exhibiting some of the highest FinTech adoption rates globally due to rapid digitalization and widespread mobile phone penetration (The Payments Association, 2020).

2.3. Cloud Technologies and Their Impact on Financial Systems

Cloud computing has emerged as a backbone technology for modern FinTech. It involves the abstraction and delivery of scalable, web-based computing resources—such as servers, storage, and databases—on demand. For financial system developers, this model allows for the implementation of complex, adaptable, and scalable architectures without the massive upfront capital expenditure associated with traditional data centers (Jamsa, 2022). By leveraging virtual processing power and storage, firms can significantly reduce operational costs while enhancing their agility.

The cloud services market is dominated by global providers like Microsoft Azure, Amazon Web Services, IBM Cloud, Google Cloud, and Oracle. In Türkiye, a robust local ecosystem also exists, with significant services offered by Turkcell, Vodafone, Türk Telekom, ETOM Cloud, and Plus Clouds (Batı, 2015). This mix of international and local providers



gives financial institutions flexible options for hosting their critical applications and data.

2.4. Digital Transformation in Financial Processes

Digital transformation transcends the mere adoption of new software; it represents a fundamental rethinking of organizational business processes, models, and culture through the strategic use of information technologies. It is a comprehensive shift that institutions cannot afford to ignore. As noted by KPMG (2021), organizations that fail to adapt to this change face significant challenges in competing with digitally native or digitally transformed rivals.

This transformation is pervasive across sectors. Manufacturing and service firms are increasingly integrating digital systems to elevate customer satisfaction and optimize the entire product-order-consumption cycle, making operations more responsive and efficient (TOBB, 2021). In finance, this means re-engineering legacy processes to be customer-centric, data-driven, and seamlessly integrated across digital touchpoints.

2.5. Effects of Digital Transformation on the Financial Sector

The financial sector has been a focal point of digital transformation. In the wake of the 2008 mortgage crisis, a period of restructuring led many institutions to invest heavily in online and mobile service capabilities. This shift empowered customers, allowing them to conduct a wide array of transactions independently, without needing direct assistance from bank staff, thereby increasing accessibility and user autonomy (Akin, 2020).

This trend was dramatically accelerated by external forces. The COVID-19 pandemic acted as a powerful catalyst, compelling both consumers and businesses to adopt digital financial services rapidly. In Türkiye, for instance, the number of digital banking users surged from approximately 32 million before the pandemic to 46 million during its peak, and today stands at over 117 million (Akbaş, 2023). This exponential growth underscores a permanent and profound change in consumer behavior and institutional strategy.

3. DIGITAL BANKING MODELS AND RISK STRUCTURES

The digital transformation of finance has given rise to distinct banking models that operate on interconnected, technology-driven platforms. While these models offer significant advantages in

accessibility and efficiency, their architecture also introduces a new spectrum of risks that must be carefully managed. This section explores two prominent digital banking frameworks—Open Banking and Banking-as-a-Service—and provides a balanced appraisal of their benefits and inherent challenges.

3.1. Types of Digital Banking

Open Banking: Open Banking represents a paradigm shift from closed, proprietary systems to a collaborative financial ecosystem. It utilizes secure Application Programming Interfaces (APIs) to facilitate the sharing of financial data between traditional banks and authorized third-party providers (TPPs), such as fintech startups or financial aggregators. Though its regulatory origins are often traced to initiatives in the United Kingdom, the model has gained substantial global traction, with significant adoption in markets including Japan, Mexico, the United States, China, and South Korea (PricewaterhouseCoopers, 2020).

The implications of this openness are twofold. For individual consumers, it enables the consolidated management of accounts held across multiple institutions through a single, user-friendly application or dashboard. For businesses, it allows for the seamless integration of real-time banking data into Enterprise Resource Planning (ERP) and treasury management systems. This integration empowers companies with enhanced capabilities for real-time financial monitoring, cash flow analysis, and automated internal controls.

Banking-as-a-Service (BaaS): Banking-as-a-Service takes the principles of openness a step further by modularizing and distributing the core infrastructure of banking itself. In a BaaS model, licensed banks electronically provide their regulated infrastructure—such as payment processing, card issuance, and compliance checks—to non-bank third parties via APIs and under strict confidentiality agreements. This enables fintech companies, retailers, or other platforms to embed financial services directly into their own customer offerings without needing to obtain a banking license (Erdoğan, 2024).

The result is a more seamless experience for the end-user. Individuals and businesses can execute complex financial transactions, such as opening an account or securing a loan, entirely within the digital interface of a third-party platform, often without any direct interaction with the underlying bank's staff or traditional channels. BaaS thus acts



as a powerful enabler of embedded finance, blurring the lines between financial and non-financial services.

3.2. Benefits and Risks of Digital Banking

The migration to digital banking models delivers a compelling set of advantages, primarily centered on convenience, cost, and control. Services become accessible 24 hours a day, seven days a week, from any location with an internet connection, granting users remote command over their financial assets. This round-the-clock accessibility reduces the necessity for physical branch visits, leading to operational cost savings for institutions that can be passed on to consumers. Furthermore, the automation of processes enhances the robustness and consistency of internal control mechanisms, reducing human error and improving audit trails (Demirel, 2017).

However, this digital dependency simultaneously creates a distinct risk profile. The foremost concerns revolve around security. Digital platforms are attractive targets for cyberattacks, data breaches, and sophisticated fraud schemes. This elevates data security and client privacy to paramount concerns, as the compromise of financial data can have severe consequences. A significant operational risk lies in the dependence on complex, always-on technological infrastructure; any disruption in connectivity or core systems can immediately halt financial activities. Additionally, the integration of software from various third-party providers introduces risks related to the use of unverified, unreliable, or even pirated applications, which can compromise system integrity and security (InvestGlass, 2023). Therefore, the benefits of digital banking are inextricably linked to the imperative of building resilient cybersecurity frameworks and conducting rigorous third-party risk assessments.

CONCLUSION

Financial technologies have instigated a transformative shift in how financial transactions are executed, monitored, and governed. This study has examined this digital evolution, tracing the path from foundational infrastructures like Fedwire to the current ecosystem defined by mobile applications, cloud computing, open APIs, and blockchain. The evidence demonstrates that the core drivers of this transformation—enhanced speed, accessibility, and cost-efficiency—are

fundamentally reshaping the structure of financial systems and the expectations of their users.

The historical analysis underscores that each major phase of FinTech, from the analog foundations of FinTech 1.0 to the post-crisis innovation of FinTech 3.0 and the leapfrogging dynamics of FinTech 3.5, has been catalyzed by a confluence of technological breakthrough and shifting societal or economic need (Barberis et al., 2019; The Payments Association, 2020). Within this progression, cloud technologies have emerged as a critical enabler, offering financial institutions scalable, secure, and cost-effective alternatives to traditional data centers, thereby fundamentally expanding data storage and processing capacities (Jamsa, 2022; Batı, 2015).

The emergence of new digital banking models, particularly open banking and Banking-as-a-Service (BaaS), signifies a deeper structural change. These models foster competition, expand service offerings, and facilitate novel business models by dismantling traditional barriers to entry and enabling seamless integration of financial services into diverse platforms (PricewaterhouseCoopers, 2020; Erdoğan, 2024). However, as outlined, these benefits are coupled with a heightened risk profile, including vulnerabilities to cyberattacks, data privacy concerns, and operational dependence on complex, interconnected infrastructures (InvestGlass, 2023).

External shocks have proven to be powerful accelerants of this digital shift. The COVID-19 pandemic served as a stark catalyst, dramatically accelerating the adoption of digital banking services as evidenced by the remarkable surge in users, a trend that appears to signify a permanent behavioral shift rather than a temporary adjustment (Akbaş, 2023; Akin, 2020). This accelerated adoption brings the imperative for robust oversight into sharp focus. Cybersecurity, regulatory compliance, and digital fraud prevention are no longer peripheral IT concerns but essential, core components of financial stability and consumer protection. The digital environment demands that oversight mechanisms evolve at a pace commensurate with the technologies they seek to govern.

Looking forward, the future of effective financial oversight will increasingly depend on leveraging the very technologies that define the new ecosystem. Artificial intelligence and machine



learning are poised to transform auditing and compliance, enabling real-time transaction monitoring, anomaly detection, and predictive risk management that far outstrip the capabilities of manual, periodic reviews. Similarly, blockchain technology offers profound potential for enhancing transparency and verification, creating immutable audit trails for transactions and smart contracts that could streamline settlement processes and reduce fraud. The continued maturation of secure, sovereign cloud infrastructures will provide the resilient and compliant backbone necessary for these advanced systems to operate reliably.

Ultimately, maintaining a financial system that is simultaneously innovative, efficient, and secure requires a dynamic and synergistic effort. Financial institutions must proactively invest in strengthening their digital defences, conducting rigorous third-party risk assessments, and fostering a culture of security. Concurrently, regulatory authorities face the ongoing challenge of updating supervisory frameworks to be agile, technology-neutral, and principles-based, ensuring stability and consumer trust without stifling beneficial innovation. Future research should explore the longitudinal effects of embedded finance via BaaS on systemic risk, the efficacy of cross-jurisdictional regulatory sandboxes in fostering safe innovation, and the development of standardized security protocols for API-based financial data sharing. By embracing this dual mandate of innovation and vigilance, stakeholders can work towards a digital financial ecosystem that truly serves the global economy's needs.

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