

# Changes and Challenges of Financial Technology (FinTech) for the Banking Industry

Ruofei Wu

University of Toronto, Toronto, M4Y0H2, Canada

Roffey2003@gmail.com

**Abstract.** With the rapid development of financial technology (FinTech), the traditional banking industry is facing unprecedented changes and challenges. This paper firstly discusses the definition, development history and key technologies of FinTech, and analyses its impact on the banking industry, including innovations in the areas of payment, lending and investment. At the same time, FinTech also brings challenges in various aspects such as regulation, security and privacy, competitive pressure and technological risks. To meet these challenges, traditional banks need to actively pursue technological innovation, optimise their business models, strengthen regulation and compliance, enhance their risk management capabilities, and continuously improve the customer experience. By establishing personalised services, optimising digital platforms and enhancing customer interactions, banks are able to better meet customer needs and enhance market competitiveness. This paper argues that in the era of fintech, traditional banks must respond flexibly to changes and seize market opportunities through innovation and cooperation to achieve sustainable development. Ultimately, the positive interaction between fintech and traditional banks will drive the continued progress of the entire financial industry.

**Keywords:** Fintech; traditional banks; risk management; customer experience

## 1. Introduction

The rapid development of financial technology (FinTech) is profoundly changing the landscape of the global banking industry. With the advancement of technology, FinTech companies continue to eat into the market share of traditional banks by virtue of their flexibility and innovation. The pressure on the traditional banking industry is increasing day by day, and how to adapt to this new wave of technology has become a pressing issue for the banking industry. Fintech provides more efficient and convenient financial services through big data, artificial intelligence, blockchain and other technologies, making financial services more inclusive and personalised. The purpose of this paper is to explore the changes and challenges of FinTech to the banking industry, and to analyse how the banking industry can cope with these changes and be invincible in the fierce market competition. Through analysing relevant literature and cases, we will discuss in detail the definition, development history and key technologies of FinTech, analyse the far-reaching impact of FinTech on the banking industry's operation model, customer experience and risk management, and reveal the strategies and measures that the banking industry may adopt in dealing with the challenges posed by FinTech.

## 2. Overview of financial technology

### 2.1. Definition and Classification of Fintech

Financial Technology (FinTech) is an industry that improves and optimises financial services and products through innovative technological means. Its core lies in the use of advanced information technology, such as big data analytics, artificial intelligence, blockchain and cloud computing, to improve the efficiency of financial services, reduce costs and provide a more personalised user experience[1]. Fintech has not only changed the model of traditional financial services, but also triggered the rise of new types of financial business and services.

Fintech can be divided into the following broad categories:



- (1) Payment technologies, including mobile payments, e-wallets and digital currencies, aim to provide convenient payment solutions.
- (2) Lending and credit, covering P2P lending, online microfinance, etc., through the Internet platform to achieve efficient matching of funds.
- (3) Investment and wealth management, such as robo-advisors and smart advisors, which use algorithms and data analysis to provide investment advice and asset management services to users.
- (4) InsurTech, which optimises insurance product design, risk assessment and claims processes through big data and artificial intelligence.
- (5) Blockchain and distributed ledger technology, applied to cryptocurrencies, smart contracts and decentralised finance (DeFi) to improve transparency and security.

## **2.2. The evolution of fintech**

The evolution of fintech can be traced back to the 1960s, when the emergence of technologies such as electronic payment systems and automated teller machines (ATMs) laid the foundation for modern fintech. By the 1990s, the rise of the Internet and e-commerce further fuelled the development of online payments and banking services, with the birth of PayPal, for example, marking an important breakthrough in the field of electronic payments. After entering the 21st century, the popularity of smartphones and the development of mobile internet greatly boosted the innovation of FinTech[2]. The crisis of trust in traditional financial institutions and changes in the regulatory environment after the global financial crisis in 2008 provided new opportunities for the development of FinTech enterprises. At this time, P2P lending platforms and crowdfunding platforms began to emerge, providing new financing channels for individuals and small and medium-sized enterprises. In recent years, the application of cutting-edge technologies such as big data, artificial intelligence, blockchain and cloud computing has brought fintech into a new stage of development. Innovative products and services such as mobile payments, smart investment advisors, digital currencies and decentralised finance (DeFi) have been launched one after another, changing the way financial services are provided and the user experience. For example, the introduction of blockchain technology has brought about the emergence of cryptocurrencies such as bitcoin, further disrupting the traditional financial system.

## **2.3. Key fintech technologies**

The rapid development of FinTech cannot be separated from the support of a variety of cutting-edge technologies, which play a crucial role in enhancing the efficiency of financial services, reducing costs and improving the user experience.

- (1) Big Data, Big Data technology helps financial institutions better understand customer behaviour, risk management and market strategies by collecting, processing and analysing large amounts of structured and unstructured data. Accurate data analysis makes personalised services and precision marketing possible.
- (2) Artificial Intelligence (AI), AI technology is widely used in fintech, ranging from automated investment advice provided by robo-advisors to credit assessment and fraud detection through machine learning algorithms. AI's self-learning capability and efficient processing power have greatly improved the intelligence of financial services.
- (3) Blockchain, blockchain technology has revolutionised fintech with its decentralised, transparent and tamper-proof features. Its application in the fields of payment, clearing, settlement and smart contracts has improved the security and efficiency of transactions and reduced intermediary costs.

### 3. Fintech's Transformation of the Banking Industry

#### 3.1. Traditional model of the banking sector

Prior to the rise of fintech, the traditional model of banking relied heavily on physical branches and face-to-face customer service. Core services provided by banks included deposits, loans, payments and clearing, wealth management and insurance[3]. Customers were required to physically visit bank branches to conduct all types of financial services, from account opening and deposits and withdrawals to loan applications and investment counselling, a process that was often cumbersome and time-consuming.

Characteristics of the traditional banking model:

- (1) Physical outlets as the centre, the bank's services are mainly carried out through branch outlets distributed in various places, this model limits the geographical coverage and time flexibility of the bank's services.
- (2) Manual processes and paperwork, Many banking operations rely on manual processes and extensive paperwork, which not only reduces efficiency but also increases the risk of errors.
- (3) Fixed office hours, bank branches usually have fixed business hours, which is not convenient for customers, especially office workers.

#### 3.2. Impact of FinTech

The rise of FinTech has had a profound impact on the banking industry, revolutionising the way traditional banking is conducted and the customer experience.

- (1) Changes in the payment system, the popularity of mobile payments and e-wallets, such as Alipay, WeChat Pay and Apple Pay, have greatly simplified the payment process and improved transaction efficiency. Consumers and merchants no longer rely on cash and bank cards, and payments have become more convenient and secure.
- (2) Loans and credit, P2P lending platforms and online microfinance companies such as LendingClub and Anthem, connect borrowers and investors through the Internet to provide faster and more flexible lending services, lowering the cost and threshold of borrowing and expanding the reach of financial services.
- (3) Investment and wealth management, robo-advisors and smart advisors such as Betterment and Wealthfront use artificial intelligence and algorithms to provide clients with personalised investment advice and automated asset management, which reduces management fees and improves investment efficiency and returns.



Figure 1 Fintech's Transformation of the Banking Industry

#### 3.3. Case studies

The impact of FinTech is being felt across a number of sectors, and here are a few prime examples of how FinTech is transforming the banking industry's operating model and customer experience[1].

(1) Ant Financial: As one of the world's largest fintech companies, Ant Financial has revolutionised China's payment ecosystem through its mobile payment platform Alipay. Ant Financial not only provides convenient payment services, but also launched the credit products "Chanting" and "Borrowing", which use big data and artificial intelligence technology to assess users' credit, making micro-credit efficient and transparent. Through this model, Ant Financial Services has helped hundreds of millions of users access financial services and promoted the development of inclusive finance.

(2) Square: Square is an American fintech company specialising in payment solutions for small businesses. Its mobile payment terminals allow merchants to accept credit and debit card payments quickly and easily. In addition, Square offers a microfinance service to help small businesses obtain financing when they are in dire need of capital. This innovation has allowed small businesses to manage their cash flow more flexibly, driving business growth.

(3) Robinhood: Robinhood is an investment platform that subverts the traditional securities trading model, attracting a large number of young investors through commission-free trading. Its user-friendly interface and mobile trading functions have lowered the investment threshold, enabling more people to participate in the stock market. Robinhood's success has prompted traditional brokerages to adjust their fee strategies, driving competition in the entire securities industry.

## 4. Challenges posed by fintech

### 4.1. Regulatory challenges

#### (1) Regulatory frameworks in different countries and regions

The rapid development of fintech globally has led to significant differences in regulatory policies across countries. Some countries actively support fintech innovation and encourage entrepreneurship and technology adoption through the development of relatively loose regulatory policies, while others take a more conservative approach and impose stringent regulatory measures[4]. This regulatory inconsistency may lead to compliance challenges for market participants and limit the conduct of cross-border business.

#### (2) Development of Regulatory Technology (RegTech)

With the rise of FinTech, Regulatory Technology (RegTech) is emerging as an important tool to address compliance challenges. RegTech improves the compliance efficiency of financial institutions by leveraging big data analytics, artificial intelligence and blockchain technology to help them better comply with regulations. However, the implementation of RegTech also faces data privacy and security issues. How to protect user data while ensuring compliance has become a challenge that regulators and financial institutions must face together.



Figure 2 Challenges posed by fintech

## **4.2. Security and Privacy Challenges**

### **(1) Network security threats**

Fintech companies often rely on cloud computing and big data technologies, which makes them prime targets for cyberattacks. Hackers use various means, such as phishing attacks, malware and distributed denial of service (DDoS) attacks, which can lead to customer information leakage, account theft and loss of funds. Financial institutions need to adopt multi-layered cybersecurity measures, such as encryption technology, intrusion detection systems and continuous monitoring, to ensure the security of customer data and funds.

### **(2) Data privacy protection**

Fintech companies collect and analyse large amounts of user data to provide personalised services. However, data collection and use must comply with relevant laws and regulations, such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA). Users are becoming more aware of the privacy protection of their personal data, and financial institutions need to transparently inform their customers about the purpose of data use and processing, and provide clear choices and control to avoid triggering customer mistrust.

## **4.3. Competitive pressures**

### **(1) Competition between traditional banks and fintech companies**

Fintech companies are rapidly taking over the market and challenging the position of traditional banks with their flexible business models and rapid innovation. Many fintech companies have attracted a large number of customers by offering lower fees, more convenient services and faster response times. Traditional banks are facing difficulties in customer acquisition and retention, especially for the younger generation of users, who are more inclined to use digital and mobile financial services.

### **(2) Pressure for innovation and transformation within banks**

Faced with strong competition from fintech companies, traditional banks have been forced to undergo digital transformation to improve their technological capabilities and innovation. However, banks are usually large organisations with complex decision-making processes, and the pace of internal innovation often lags behind market demand. Traditional banks need to invest more in improving efficiency, streamlining processes and driving technological innovation in order to adapt more quickly to market changes.

## **4.4. Technical risks**

### **(1) Technical failures and system vulnerabilities**

Fintech relies on complex technical systems and platforms, and any system failure or vulnerability may lead to service disruption and user information leakage. For example, a technical failure in a trading platform may result in customers being unable to trade, leading to financial losses. In addition, system vulnerabilities may be exploited by hackers, leading to leakage of sensitive data and loss of funds. Therefore, financial institutions need to conduct regular technical audits and vulnerability testing to ensure system security and reliability.

### **(2) Artificial Intelligence and Algorithmic Bias**

Many fintech applications rely on artificial intelligence and machine learning techniques for decision-making, such as credit assessment and risk management. However, the design of algorithms and selection of data may be biased, leading to unfair decision-making outcomes. For example, certain user groups may be incorrectly assessed as high-risk customers due to biased historical data. This not only affects the user experience, but may also raise legal and reputational risks.

## **5. Coping strategies of the banking sector**

### **5.1. Technological innovations**

In responding to the challenges posed by FinTech, the traditional banking industry must actively engage in technological innovation to enhance its competitiveness and market adaptability.

(1) Digital transformation: Traditional banks should accelerate their digital transformation by leveraging advanced technologies such as cloud computing, big data and artificial intelligence to optimise internal operations and customer services[5]. For example, through big data analytics, banks can more accurately understand customer needs, provide personalised financial products and services, and improve customer satisfaction. Meanwhile, cloud computing technology can reduce IT infrastructure costs and improve business flexibility.

(2) Artificial intelligence and automation: The introduction of artificial intelligence technology can help banks automate areas such as customer service, risk management and compliance review. For example, chatbots can handle common customer enquiries and improve customer service efficiency; intelligent risk control systems can monitor and assess risks in real time and reduce credit losses.

(3) Blockchain technology applications: Blockchain technology has broad application prospects in payment clearing, identity verification and smart contracts. Banks can use blockchain technology to improve the transparency and security of transactions while reducing transaction costs and time.

### **5.2. Business model adjustments**

Faced with the challenges of FinTech, traditional banks need to adjust their business models in a timely manner in order to adapt to the rapidly changing market environment and customer needs. This adjustment involves not only the way services are delivered, but also the reshaping of overall strategies.

(1) Customer-centric service model: Traditional banks used to be typically product-centric, with an emphasis on sales and marketing. However, fintech companies emphasise a customer-centric service model that focuses on user experience and needs. Therefore, banks should reshape their business models to gain a deeper understanding of customer preferences and behaviours and enhance customer satisfaction through personalised products and services. For example, banks can use data analytics to provide customised financial advice and product portfolios to customers.

(2) Online-offline integration: Traditional banks relied on physical branches for services in the past, but with the development of fintech, more and more customers tend to do their financial business online. Therefore, banks should promote the integration of online and offline to create an omni-channel service platform and provide a seamless customer experience. This includes enhancing the functionality of mobile apps, optimising website interfaces and improving the responsiveness of online customer service.

(3) Flexible pricing strategies: Fintechs have attracted a large number of customers through innovative pricing strategies, such as commission-free transactions and low-interest loans. Traditional banks need to reassess their pricing models to attract customers with more competitive pricing while ensuring profitability.

### **5.3. Strengthening Regulation and Compliance**

Against the backdrop of the rapid development of fintech, traditional banks are facing increasingly severe regulatory and compliance challenges. Therefore, strengthening regulation and compliance is not only a necessary measure to ensure the stable operation of financial institutions, but also an important way to enhance customer trust and protect consumer rights.

(1) Establishing a robust compliance framework: Banks should adjust and improve their compliance framework in a timely manner in light of the new FinTech environment. This includes clarifying

compliance responsibilities and formulating corresponding policies and procedures to ensure that all business activities comply with relevant laws and regulations. At the same time, banks need to regularly assess the effectiveness of their compliance policies and make dynamic adjustments in light of market changes and technological developments.

(2) Strengthening the risk management system: Fintech innovations are often accompanied by new risks, so banks must strengthen their risk management systems to identify, assess and monitor all types of risks, including technology risks, credit risks and compliance risks. By implementing a comprehensive risk management process, banks can reduce potential risks in technology applications and ensure business security and compliance.

(3) Adoption of RegTech: Banks can use RegTech to improve compliance efficiency. RegTech automates compliance processes such as customer due diligence, anti-money laundering (AML) monitoring and transaction monitoring through technologies such as big data analytics and artificial intelligence. This not only reduces compliance costs, but also improves the timeliness and accuracy of monitoring.

#### **5.4. Risk management**

Against the backdrop of the rapid development of financial technology, traditional banks are facing increasingly complex risk management challenges. In order to ensure business stability and sustainable development, banks must establish a comprehensive and dynamic risk management system to identify, assess and respond to a wide range of potential risks.

(1) Risk identification and assessment: Banks should regularly conduct comprehensive risk identification and assessment, covering technology risk, market risk, credit risk and compliance risk. Through big data analysis and risk modelling, banks are able to identify potential risk points more accurately, assess their impact on business and formulate appropriate countermeasures.

(2) Strengthening technology risk management: With the widespread use of financial technology, technology risk is increasingly becoming an important threat to banks. Banks should strengthen the management of their IT infrastructure and conduct regular security tests and vulnerability assessments to ensure the security and reliability of their systems. In addition, the establishment of an emergency response mechanism can enable them to take swift action to reduce losses in the event of a technical failure or security incident.

(3) Implementation of comprehensive compliance management: Compliance risk is one of the important risks for financial institutions. Banks should strengthen compliance management to ensure that all business activities follow relevant laws and regulations, and conduct regular compliance reviews and training to raise employees' awareness of compliance.

#### **5.5. Customer Experience Enhancement**

Against the backdrop of the rapid development of financial technology, enhancing customer experience has become an important strategy for traditional banks to cope with competition. By improving service quality, optimising product design and enhancing user interaction, banks are able to better meet customer needs and increase customer satisfaction and loyalty[6].

(1) Personalised services: Using big data analytics and artificial intelligence technology, banks can gain insight into customers' behaviour and preferences in order to provide personalised financial products and services. For example, based on a customer's consumption habits and financial situation, banks can recommend tailored financial solutions and loan products to enhance the customer experience.

(2) Optimising user interfaces: Modern customers have rising expectations of digital services, so banks need to optimise the user interfaces of their mobile apps and online platforms. Simple and intuitive design, smooth operating experience and fast response time can significantly improve user satisfaction and make financial transactions easier for customers.

(3) Enhanced customer interaction: Through multi-channel customer service (e.g., phone, online chat, social media, and mobile apps), banks can provide more timely support and assistance. The introduction of smart customer service and chatbots can quickly respond to customer enquiries, solve common problems and enhance customer experience.

## 6. Conclusion

The rapid development of FinTech is reshaping the landscape of the banking industry, and traditional banks are facing unprecedented challenges and opportunities. Through in-depth analyses of FinTech, we can see that FinTech not only promotes innovation in payment, lending, investment and other businesses, but also prompts banks to re-examine their operation models, customer relationships and risk management strategies. Facing the challenges of FinTech, traditional banks must make positive technological innovations and business model adjustments to enhance their market competitiveness. By introducing advanced technologies, optimising customer experience, and strengthening compliance management and risk control, banks are able to adapt to changing market demands in the course of digital transformation. In addition, the cooperation between banks and fintech companies will help jointly build an open financial ecosystem and realise resource sharing and complementary advantages. However, the rapid development of fintech has also brought many issues to the banking industry, such as security and privacy, competitive pressure and regulatory challenges. Banks need to attach great importance to these challenges and take practical and effective measures to ensure business sustainability and customer trust.

## References

- [1] Claessens S , Cong L W , Moshirian F ,et al.Opportunities and challenges associated with the development of FinTech and Central Bank Digital Currency[J].Journal of Financial Stability[2024-08-01].
- [2] Hu D , Zhao S , Yang F .Will fintech development increase commercial banks risk-taking? Evidence from China[J].Electronic Commerce Research:1-31[2024-08-01].
- [3] Panos G , Wilson J ,The European Journal of Finance,et al.Financial literacy and responsible finance in the FinTech era: capabilities and challenges[J].The European Journal of Finance[2024-08-01]
- [4] Lee I , Shin Y J .Fintech: Ecosystem, business models, investment decisions, and challenges[J].Business Horizons, 2018, 61..
- [5] Vincenzo B .Financial Intermediation in the Age of FinTech: P2P Lending and the Reinvention of Banking[J].Oxford Journal of Legal Studies, 2021(1):1.
- [6] Bollaert H , Silanes F L D , Schwiendbacher A .Fintech and access to finance[J].Journal of Corporate Finance, 2021(2):101941.