

# Financial Innovation and Digital Technology in the Banking System: An Institutional Perspective

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**Abstract.** The emergence of digital technologies has significantly impacted the global banking system, leading to the development of innovative financial products and services. This article provides an overview of the impact of digital financial technologies on the banking systems of developed and developing countries. Through case studies, the article examines the adoption of mobile banking, blockchain technology, and robo-advisors by various banks around the world, highlighting the benefits and risks associated with each innovation. The research suggests that while these technologies have led to greater efficiency and access to financial services, they also pose challenges such as data security and privacy concerns. The article concludes that the adoption of digital financial technologies is crucial for developing countries to remain competitive in the global interregional banking markets. This can be achieved through the implementation of supportive regulatory frameworks, investment in infrastructure, and capacity building to enhance digital literacy and skills.

## 1 Introduction

The impact of financial innovation on the banking system has been a topic of great interest in recent years. Financial innovation is the process of creating new financial products, services, and technologies that aim to meet the evolving needs of the market. While financial innovation has the potential to increase efficiency and lower costs, it also poses significant challenges for the banking system. This essay will explore the impact of financial innovation on the banking system, the challenges it poses, and possible solutions.

Financial innovation and digital technology have revolutionized the banking industry, transforming the way banks operate, interact with customers, and compete with one another. The emergence of new financial products and services, such as online banking, mobile payments, and digital currencies, has opened up new opportunities for banks to expand their customer base and increase their profits. Moreover, the rapid pace of technological change has led to the development of advanced analytical tools and algorithms that allow banks to better manage risks, streamline operations, and enhance the customer experience.

One of the key drivers of financial innovation and digital technology in the banking system is the increasing demand from consumers for faster, more convenient, and more personalized banking services. With the proliferation of smartphones and other mobile devices, customers now expect to be able to access their banking information and perform

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transactions on the go, from anywhere and at any time. Banks that fail to keep pace with these changing customer preferences risk losing market share to more agile and innovative competitors.

Digital innovations have also facilitated the development of new business models, such as peer-to-peer lending and crowdfunding, which have challenged traditional banking models. These models have disrupted traditional lending practices, allowing individuals and businesses to access financing directly from investors, rather than going through banks.

Moreover, financial innovation and digital technology have important implications for financial stability and the broader economy. On the one hand, they can help to promote financial inclusion, by providing access to banking services to previously underserved populations, such as the unbanked or underbanked. On the other hand, they can also give rise to new risks and challenges, such as cyber threats, data privacy concerns, and the potential for financial contagion in the event of a systemic failure.

Against this backdrop, the purpose of this research is to examine the impact of financial innovation and digital technology on the banking system from an institutional perspective. The objectives of the research are to identify the key drivers of financial innovation and digital technology in the banking system, to analyze the effects of these innovations on bank behavior and performance, and to assess the implications of these developments for financial stability and regulation. The objectives of this research are to:

- Analyze the institutional drivers of financial innovation and digital technology in the banking system.
- Investigate the impact of financial innovation and digital technology on the behavior of banks, consumers, and regulators.
- Explore the challenges and opportunities of financial innovation and digital technology for the banking system.
- Evaluate the regulatory response to financial innovation and digital technology in the banking system.

Several key literature sources have contributed to the understanding of the impact of financial innovation and digital technology on the banking system from an institutional perspective. Notable examples include the work of Barth, Lin, and Song [1] on the impact of financial innovation on bank risk-taking behavior, the research of Claessens, Glaessner, and Klingebiel [2] on the impact of technological change on the banking industry, and the work of Böhme and Oskarsson [3] on the regulatory challenges of digital currencies. These studies provide important insights into the drivers and implications of financial innovation and digital technology on the banking system.

Despite the growing importance of financial innovation and digital technology in the banking system, there are still many controversial issues and open questions that remain understudied. For example, there is debate about the extent to which digital currencies, such as Bitcoin, can replace traditional currencies as a medium of exchange and a store of value, and whether they pose a threat to the stability of the financial system. There are also questions about the optimal regulatory framework for these new technologies, including the role of central banks and international organizations such as the IMF and the Financial Stability Board.

There is also debate about the role of regulation in promoting or hindering financial innovation and digital technology in the banking system.

Despite the growing interest in the topic of financial innovation and digital technology in the banking system, there remain several understudied areas. These include the impact of cultural norms on the adoption of financial innovation and digital technology, the role of network effects in the diffusion of financial innovation and digital technology, and the impact of financial innovation and digital technology on financial inclusion.

## **2 Materials and Methods**

The "Materials and Methods" section of this research paper describes the data sources, research methods, and analytical techniques used to study the impact of financial innovation and digital technology on the banking system from an institutional perspective.

**Data Sources.** The main data sources for this study were publicly available financial data from a variety of sources, including bank regulatory reports, central bank reports, and industry surveys. We also collected data from other secondary sources such as academic journals, books, and media articles.

**Research Methods:** this study used a combination of qualitative and quantitative research methods, including a literature review, case study analysis, and econometric analysis. We conducted a comprehensive review of the existing academic literature on financial innovation and digital technology in banking, focusing on the institutional aspects. We also analyzed the cases of banks that have successfully implemented financial innovation and digital technology to identify the key success factors and challenges faced by banks in this area.

## **3 Results and Discussion**

### **3.1 Financial Innovation in the Banking System**

The development of financial innovation is crucial in the banking system, as it enables banks to diversify their product offerings and adapt to changing market conditions, thereby enhancing their competitiveness and profitability. Financial innovation refers to the creation of new financial products, services, and processes, as well as the modification of existing ones, with the aim of improving efficiency and increasing revenue streams [4]. Financial innovation can take various forms, such as securitization, derivatives, and structured finance.

The history of financial innovation in the banking system can be traced back to the Middle Ages, when Italian merchant bankers invented the concept of bills of exchange. Since then, financial innovation has continued to evolve, driven by technological advancements, changing regulatory environments, and shifts in customer demand. In the modern era, financial innovation has become synonymous with digital technology, which has transformed the way banks operate and interact with their customers.

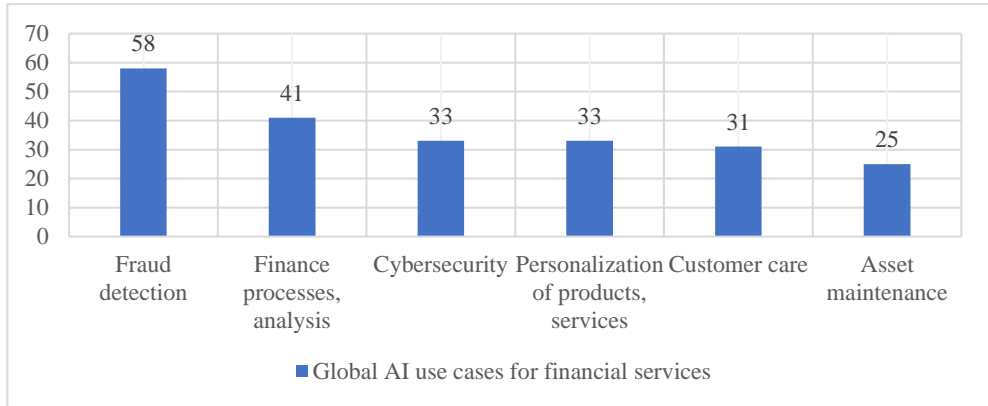
Financial innovation can be categorized into several types, including product innovation, process innovation, and business model innovation. Product innovation involves the creation of new financial products or services, such as credit cards, online banking, and mobile payments. Process innovation, on the other hand, focuses on improving the efficiency and effectiveness of existing processes, such as underwriting, credit risk assessment, and loan servicing. Business model innovation involves the redesign of the bank's overall strategy and operating model, with the aim of achieving a sustainable competitive advantage.

The impact of financial innovation on the banking system is multifaceted. On the one hand, it can improve the efficiency and effectiveness of banks' operations, reducing costs and increasing profitability. On the other hand, it can also increase risk, particularly when new financial products or services are poorly understood or regulated. Financial innovation can also have broader implications for the stability and integrity of the financial system, as evidenced by the 2008 financial crisis, which was in part triggered by the proliferation of complex financial instruments.

One of the positive aspects of financial innovation in banking is increased access to financial services. For example, mobile banking has allowed millions of people to access financial services that they did not have access to before. Also, digital payments have made transactions faster and more convenient, reducing the need for cash and checks. According

to a McKinsey report, the digital revolution has already changed the shape of retail banking, with global online banking revenues growing 6% annually from 2014 to 2021 and digital sales growing 10% per year over the same period [5]. According to a PwC survey, mobile banking usage has grown to 46% worldwide, with 82% of mobile banking users accessing their accounts at least once a week. In addition, the same survey showed that digital banking has increased customer satisfaction by 13% and reduced the customer churn rate by 15% [6].

The use of financial technology (fintech) and digital solutions has enabled banks to improve their operational efficiency and reduce costs. For example, the use of robotic process automation (RPA) and artificial intelligence (AI) has allowed banks to automate routine processes, resulting in cost savings of up to 80% [6].



**Fig. 1.** AI use cases in financial services industry worldwide as of 2020.

Source: MIT Technology Review Insights; Genesys; Philips; Amazon

Within the financial services industry, most respondents state that improvements in fraud detection is the most important use case of artificial intelligence. Artificial intelligence improves fraud detection by combining supervised learning algorithms with unsupervised learning to the effect of gaining a better understanding of customers' behaviors. A better understanding of customers' behaviors allows organizations to better identify and prevent unauthorized activity.

According to a McKinsey report, global investment in fintech reached \$105 billion in 2020, a 10% increase over the previous year. In addition, the same report found that digital adoption in financial services accelerated by three to four years because of the COVID-19 pandemic, with a 5% increase in digital customer interactions and a 20% increase in new digital customers.

Financial innovation has also led to the introduction of new banking products and services. For example, the use of mobile banking has grown exponentially in recent years. According to a Federal Reserve survey, the percentage of U.S. adults using mobile banking increased from 43% in 2015 to 63% in 2019 [7]. The introduction of peer-to-peer (P2P) lending platforms has also disrupted the traditional lending market. In 2020, P2P lending platforms in the U.S. helped generate more than \$22 billion in loans [8].

However, financial innovation also poses certain risks to the banking industry. According to the Financial Stability Board report, some of the risks associated with fintech include operational risk, cyber risk, data privacy risk and regulatory risk. For example, there were 2,935 data breaches in the financial sector in 2020, exposing more than 140 million records [9]. In addition, financial innovation could also lead to increased competition and market fragmentation, which could result in smaller banks struggling to keep up with larger competitors.

One negative consequence is that traditional banks face competition from non-bank financial intermediaries, such as fintech companies. These non-bank intermediaries offer financial services that are more innovative, cheaper, and more convenient than traditional banking. According to a World Bank report, fintech has helped expand access to financial services for low-income people. Between 2014 and 2017, the number of adults with a bank account in sub-Saharan Africa rose from 34 percent to 43 percent, thanks in part to the use of mobile money services [10]. In developed countries, the growth of neobanks and other fintech startups has increased competition in the banking sector, resulting in better products and services for consumers.

While digital banking has made banking services more accessible and convenient for customers, it also comes with significant risks, including operational risk, cyber risk, data privacy risk, and regulatory risk. Therefore, banks must strike a balance between innovation and risk management to ensure long-term success in a rapidly changing financial landscape.

Studying financial innovation in the banking system is a complex and challenging task, due to the rapid pace of change in the industry, as well as the difficulties in measuring the impact of financial innovation on bank performance. It is also difficult to disentangle the effects of financial innovation from other factors that affect bank performance, such as changes in the macroeconomic environment and shifts in customer behavior. Despite these challenges, the study of financial innovation is crucial for understanding the dynamics of the banking system and identifying strategies for achieving sustainable growth and competitiveness.

Schmukler provides a comprehensive overview of financial innovation, examining its definition, historical evolution, and impact on the financial system. Srinivasan explores the role of digital technology in driving financial innovation, highlighting the opportunities and challenges associated with technological disruption [11]. Böhme et al. categorize financial innovation into different types, providing a framework for analyzing the various forms of innovation in the banking system [12].

### **3.2 Bank Financial Innovations Through the Prism of Institutional Economics**

Institutional economics is a branch of economics that examines the ways in which institutions - including formal and informal rules, social norms, and organizations - affect economic behavior and outcomes. In the context of financial innovation in the banking system, institutional economics is particularly relevant because it emphasizes the importance of understanding the broader institutional context in which banks operate, and how this context shapes their behavior and the outcomes they produce [13].

One key concept in institutional economics is that of formal and informal rules. Formal rules are the explicit legal and regulatory frameworks that govern banking operations, such as capital requirements, lending standards, and consumer protection laws. Informal rules, on the other hand, refer to the unwritten social norms and expectations that influence behavior within the banking industry. For example, the norm of maintaining high creditworthiness may be an informal rule that shapes the behavior of bankers.

Another important concept in institutional economics is that of incentives. Institutions can create incentives that encourage or discourage certain types of behavior. In the context of the banking system, the incentives created by regulatory frameworks and market competition can influence the level of risk-taking and innovation among banks [14]. For example, if regulators adopt a lax approach to risk management, banks may be more inclined to engage in risky behavior in order to maximize profits.

Path dependence is also a central concept in institutional economics. It refers to the idea that past decisions and actions can create a path that influences future decisions and actions [15]. In the banking system, this can be seen in the ways in which banks respond to new

financial innovations. For example, a bank that has historically invested heavily in traditional lending products may be less likely to adopt new fintech innovations, due to path dependence and the sunk costs associated with their existing business model.

Institutional economics can be applied to the study of financial innovation in the banking system by examining how institutional factors shape the adoption and diffusion of new financial technologies and products. For example, institutional factors such as regulatory frameworks, industry norms, and consumer expectations can influence whether or not banks choose to adopt new fintech products. Understanding these institutional factors can help to explain why some financial innovations are more successful than others, and how the broader institutional context affects the outcomes produced by banks.

### **3.3 Drivers of Financial Innovation in the Banking System**

The drivers of financial innovation in the banking system are multifaceted, and understanding them is crucial in predicting and assessing the effects of financial innovation. The factors that drive financial innovation in the banking system are both internal and external. The internal factors relate to the bank's strategies and its organizational structure. The external factors include the regulatory environment, the competitive landscape, and technological advancements.

Regulation is a crucial driver of financial innovation in the banking system. Banking regulations have a significant impact on the types of products and services that banks can offer to their customers. For instance, Basel II and III regulatory frameworks introduced new capital and liquidity requirements, which led banks to develop new financial products and services to meet these requirements [16]. Furthermore, regulations can also encourage or discourage financial innovation. For example, regulations aimed at promoting competition in the banking sector can drive innovation.

Competition is another key driver of financial innovation in the banking system. Competition can motivate banks to develop new financial products and services to meet the changing demands of customers. Increased competition in the banking sector can also lead to the emergence of new players, including fintech companies, which can introduce new and innovative financial products and services. A study by Barth et al. found that increased competition in the banking sector was positively associated with innovation [17].

Technological advancements have also played a significant role in driving financial innovation in the banking system. Technological advancements have enabled banks to develop new financial products and services, streamline their processes, and expand their reach. For example, mobile banking, contactless payments, and online banking have all emerged as a result of technological advancements. According to Martinez Peria and Schmukler, technological advancements have played a significant role in the growth of financial innovation in emerging markets [18].

The drivers of financial innovation in developed and developing countries differ. In developed countries, regulation and competition are the primary drivers of financial innovation. In contrast, developing countries are more driven by technological advancements due to the potential for leapfrogging traditional banking infrastructure. In emerging markets, financial innovation has played a critical role in promoting financial inclusion, improving access to credit, and fostering economic growth.

For instance, in the United States, the introduction of online banking services and mobile banking applications by commercial banks was driven by regulatory requirements such as the Gramm-Leach-Bliley Act (GLBA) of 1999, which allowed banks to expand their service offerings beyond traditional banking activities. This has led to the growth of fintech companies that partner with banks to provide innovative products and services, such as peer-to-peer lending and digital payments.

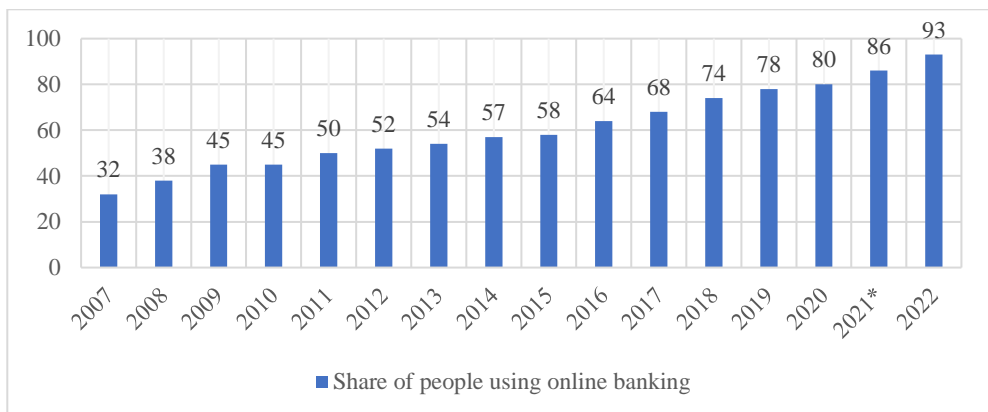
In contrast, developing countries are more driven by technological advancements in the banking sector. In these countries, traditional banking infrastructure is often underdeveloped or non-existent, providing an opportunity for the rapid adoption of innovative financial technologies. For example, in Kenya, the introduction of mobile money services such as M-PESA has revolutionized the country's financial sector, providing financial access to millions of people who were previously unbanked [19].

Financial innovation has played a critical role in promoting financial inclusion and improving access to credit in developing countries. For example, in India, the introduction of Aadhaar, a unique identification number, has enabled the creation of digital identities that facilitate access to financial services, including bank accounts, insurance, and credit [20]. This has contributed to India's economic growth by promoting entrepreneurship and job creation.

Following the collapse of the Soviet Union, Russia's banking system underwent significant transformation as it moved towards a market-based system. In the early 2000s, regulatory reforms were implemented to promote competition and encourage innovation, leading to the emergence of new financial products and services [21]. However, the country has also faced challenges such as corruption and lack of trust in the banking system, which have hindered further progress in financial innovation [22].

The German banking system is known for its traditional model of universal banking, in which banks offer a wide range of financial services to both individuals and businesses. However, recent years have seen the emergence of new fintech companies in the country, which have introduced innovative solutions such as digital banking platforms and peer-to-peer lending [23]. This has been driven by both regulatory changes aimed at promoting competition and technological advancements in the financial sector.

The UK has been at the forefront of financial innovation, with London being a hub for fintech startups and innovation labs. Regulatory changes such as the introduction of open banking and the establishment of a regulatory sandbox have encouraged the development of new financial products and services [24]. The country has also seen significant investment in areas such as blockchain and digital currencies, which are expected to drive further innovation in the future.



**Fig. 2.** Online banking usage in Great Britain from 2007 to 2022.

Source: *Office for National Statistics (UK)*

This statistic illustrates the online banking usage in Great Britain increased steadily since 2007, when only around one third used online banking, up to over 90 percent as of 2022. Banking and financial services are typically among the first industries to embrace technological advances; starting as far back in time as the appearance of automated teller

machines (ATMs) and credit cards. Ever since the first secure Internet systems for financial operations became available on a large scale, accessing of one's bank account online to carry out transactions, pay off credit cards, establish credit lines or invest savings became one of the fastest growing areas of Internet activities [25].

The Chinese government has made a concerted effort to promote financial innovation as a means of driving economic growth and promoting financial inclusion. This has included regulatory changes to encourage the development of new fintech companies and the introduction of innovative financial products such as mobile payment platforms [26]. The country has also been a leader in areas such as blockchain and digital currencies, with the government exploring the potential of a central bank digital currency (CBDC).

In recent years, Brazil has seen a significant increase in the number of fintech companies operating in the country, driven in part by regulatory changes aimed at promoting competition and innovation [27]. This has led to the development of new financial products and services aimed at improving access to credit and promoting financial inclusion, particularly for underserved segments of the population. The country has also seen significant investment in areas such as blockchain and digital currencies.

Overall, these examples illustrate the complex interplay between regulatory changes, competition, and technological advancements in driving financial innovation in different countries and regions.

### **3.4 Financial Innovation in the Banking System**

In recent years, financial institutions have increasingly been adopting new technologies to improve the efficiency and effectiveness of their operations. Among the most significant of these technologies are mobile banking, blockchain, and robo-advisors. Mobile banking has become an essential tool for many consumers, enabling them to access their bank accounts, make transactions, and even obtain loans through their smartphones. This technology has the potential to transform the way people bank, particularly in developing countries where traditional banking infrastructure is lacking.

For example, JPMorgan Chase launched its mobile banking app, which allows customers to check account balances, pay bills, and transfer funds using their smartphones. The bank has reported that its mobile banking app has been downloaded over 37 million times and has been used to deposit over \$50 billion in checks [28]. Similarly, BBVA, a Spanish bank, has launched a mobile banking app that enables customers to open accounts, apply for loans, and make payments from their smartphones. The app has been downloaded over 36 million times and is available in multiple languages [29]. The benefits of mobile banking include increased convenience for customers, lower costs for banks, and increased access to financial services for underbanked populations. However, some of the challenges include security concerns, such as the risk of fraud and data breaches, and the need for reliable internet connectivity.

Blockchain, on the other hand, has the potential to revolutionize the way financial institutions handle transactions, from payments to settlements. Blockchain technology is a distributed ledger system that allows multiple parties to have access to the same ledger and can prevent the need for intermediaries in transactions. This technology has the potential to reduce transaction costs, improve transparency, and increase the efficiency of financial institutions.

For example, the Australian Securities Exchange (ASX) is using blockchain technology to replace its outdated clearing and settlement system, enabling faster and more secure processing of trades. Similarly, Banco Santander, a Spanish bank, has launched a blockchain-based foreign exchange service that enables customers to complete international transfers quickly and securely [30]. The benefits of blockchain technology include increased efficiency



and security, reduced costs, and enhanced transparency. However, some of the challenges include the need for standardization, regulatory concerns, and the risk of technology failure.

Robo-advisors are automated investment platforms that use algorithms to make investment decisions. These platforms can analyze vast amounts of data to provide investors with personalized investment advice, often at a lower cost than traditional financial advisors. This technology has the potential to democratize access to investment advice and increase the accessibility of financial planning services.

Wealthfront, a US-based robo-advisor, uses machine learning algorithms to provide customers with customized investment portfolios based on their financial goals and risk tolerance [31]. Similarly, Nutmeg, a UK-based robo-advisor, offers customers low-cost investment portfolios that are tailored to their individual needs. The benefits of robo-advisors include lower costs, increased accessibility, and more personalized investment advice. However, some of the challenges include the need for human oversight, the risk of errors in algorithms, and the potential for customers to make rash decisions based on automated advice.

Overall, these digital technologies have the potential to transform the banking industry by improving efficiency, reducing costs, and enhancing security. However, they also pose significant challenges and risks, which need to be carefully managed by banks and regulators.

## **4 Conclusion**

In conclusion, financial innovation has played a critical role in shaping the banking sector, transforming the way banks operate and interact with their customers. The rise of digital technologies such as mobile banking, blockchain, and robo-advisors has opened up new opportunities for financial institutions to provide better services and products to their customers, while also improving efficiency and reducing costs.

Our examination of the case studies has highlighted the diverse ways in which financial institutions around the world have embraced these technologies. From BBVA's transformation of the traditional banking model in Spain to Wealthfront's use of robo-advisors in the United States, these innovations have been shown to provide significant benefits for banks and their customers alike.

However, we have also noted the potential risks associated with financial innovation, such as cybersecurity threats and the potential for new forms of financial exclusion. These risks must be carefully managed by financial institutions and regulators to ensure that the benefits of financial innovation are maximized while minimizing any negative consequences.

Overall, our analysis suggests that financial innovation is likely to continue to play a crucial role in shaping the future of the banking sector. The ability of financial institutions to adapt to these changes and leverage new technologies will be a critical factor in their success in the years to come. By embracing innovation and managing the associated risks, banks can position themselves at the forefront of the industry, providing better services and products to their customers while also driving economic growth and promoting financial inclusion.

Developing countries have the potential to leapfrog traditional banking systems and accelerate the adoption of digital financial technologies to gain a competitive edge in the global interregional banking markets. To achieve this, they should focus on several key areas.

Firstly, developing countries should prioritize regulatory reforms to encourage innovation, competition, and investment in digital financial technologies. This includes establishing a supportive legal framework for fintech startups and providing guidance on data protection, privacy, and security.

Secondly, developing countries should invest in digital infrastructure such as high-speed internet and mobile networks, which are essential for the adoption of digital financial

technologies. This will require collaboration between governments, private sector entities, and development partners to build robust digital ecosystems.

Thirdly, developing countries should work to promote financial inclusion, particularly for underserved populations. This can be achieved by leveraging digital financial technologies such as mobile banking and digital payments to expand access to financial services and improve financial literacy.

Fourthly, developing countries should prioritize partnerships between traditional banks and fintech companies to drive innovation and create new financial products and services. This will require a mindset shift among traditional banks, which must be willing to embrace digital technologies and collaborate with fintech startups.

Finally, developing countries should prioritize investment in human capital to build a skilled workforce that can drive digital transformation in the banking sector. This includes investing in education and training programs that equip individuals with the skills necessary to develop and manage digital financial technologies.

In conclusion, digital financial technologies have the potential to transform banking systems in developing countries, creating new opportunities for financial inclusion, innovation, and economic growth. To achieve these benefits, developing countries must prioritize regulatory reforms, digital infrastructure investment, financial inclusion promotion, traditional bank-fintech partnership promotion, and human capital investment. By doing so, they can become competitive players in the global interregional banking markets and capitalize on the opportunities presented by the digital economy.

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