

**EFFECTS OF DIGITAL TRANSFORMATION ON
BANKING SECTOR PERFORMANCE IN CHINA:
MODERATING ROLE OF FINANCIAL
INCLUSION AND MARKET POWER**

YANG FAN

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**EFFECTS OF DIGITAL TRANSFORMATION ON
BANKING SECTOR PERFORMANCE IN CHINA:
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INCLUSION AND MARKET POWER**

by

YANG FAN

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LIST OF ABBREVIATIONS

CBIRC	China Banking and Insurance Regulatory Commission
CEBN	China Electronic Banking Network
DIF-GMM	Difference GMM
DIG	Digital Transformation
FINC	Financial Inclusion
GMM	Generalized Method of Moments
MC	Market Concentration
SASAC	State-owned Assets Supervision and Administration Commission of the State Council
SCP	Structure-Conduct-Performance
SYS-GMM	System GMM

**KESAN TRANSFORMASI DIGITAL KE ATAS PRESTASI SEKTOR
PERBANKAN DI CHINA: PERANAN PENYEDERHANAAN
KERANGKUMAN KEWANGAN DAN KUASA PASARAN**

ABSTRAK

Era pasca-COVID telah mempercepatkan transformasi digital dalam sektor perbankan, khususnya di negara sedang membangun seperti China. Walaupun pelaburan besar telah dilakukan, prestasi bank perdagangan tradisional di China masih rendah. Kajian ini meneliti kesan transformasi digital terhadap prestasi bank, dengan mengambil kira peranan pengantara oleh inklusi kewangan dan kepekatan pasaran—dua faktor konteks yang kurang dikaji dalam literatur terdahulu. Berasaskan Teori Pergantungan Sumber, kajian ini menggunakan penganggar GMM sistem dua langkah ke atas data panel daripada 114 buah bank di China bagi tempoh 2014 hingga 2021. Dapatan menunjukkan bahawa transformasi digital memberi kesan negatif yang signifikan terhadap prestasi, mencadangkan bahawa pendigitalan semata-mata mungkin tidak meningkatkan kecekapan tanpa sokongan institusi dan pasaran yang sesuai. Inklusi kewangan mempengaruhi hubungan ini secara positif dengan mengurangkan risiko pengecualian dan memperluas asas pelanggan, manakala kepekatan pasaran melemahkan hubungan tersebut akibat persaingan yang terhad dan insentif inovasi yang rendah. Penemuan ini memberikan implikasi penting kepada penyelidik dan pembuat dasar. Strategi digital perlu digabungkan dengan dasar kewangan inklusif dan rangka kerja kawal selia yang menggalakkan persaingan pasaran terbuka. Kajian ini amat relevan kepada penggubal dasar dan pemimpin sektor perbankan di China serta ekonomi membangun lain yang berusaha mengimbangi inovasi digital dan kestabilan kewangan.

EFFECTS OF DIGITAL TRANSFORMATION ON BANKING SECTOR PERFORMANCE IN CHINA: MODERATING ROLE OF FINANCIAL INCLUSION AND MARKET POWER

ABSTRACT

The post-COVID era has accelerated digital transformation in the banking sector, particularly in emerging economies such as China. Despite significant investments, traditional Chinese commercial banks continue to underperform. This study examines how digital transformation affects bank performance, while considering the moderating roles of financial inclusion and market concentration—two underexplored contextual factors. Grounded in Resource Dependence Theory, the study employs a two-step system GMM estimator using panel data from 114 Chinese banks (2014–2021). The results show that digital transformation has a significant negative direct effect on performance, suggesting that digitalization alone may not enhance efficiency without supportive institutional and market conditions. Financial inclusion positively moderates this relationship by reducing exclusion risks and broadening the customer base, while market concentration weakens it due to reduced competition and innovation incentives. These findings offer valuable implications for academics and policymakers. Digital strategies should be coupled with inclusive financial policies and regulatory frameworks that promote open market competition. The study is especially relevant for regulators and banking leaders in China and other emerging economies seeking to align digitalization with financial stability.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The financing environment's intricacy impeded companies' ability to secure funds during the nascent phases of China's capital market. Extensive financing conditions, lengthy delays, and exorbitant costs have become unavoidable for many businesses. This circumstance compels many companies to seek loans from commercial banks. Nevertheless, the performance of banks is a considerable determinant not only of the stability of financial markets but also of the nation's economy's sustained expansion and overall stability (Bouheni et al., 2014; Grżeta et al., 2023; Antunes et al., 2024). Conducting comprehensive research on the determinants of bank performance and optimization strategies is paramount in the present circumstances.

Theoretically, Yan (2022) points out that ensuring a bank's steady, healthy, and sustained performance is crucial not only for avoiding and regulating financial risks and maintaining the healthy operation of the financial market but also for macroeconomic stability and general social growth. Tan (2016) show that higher profitability in highly competitive financial markets can strengthen a bank's competitive position and respond more effectively to market shifts. Empirically, Ali & Puah (2019) investigates the profitability of 24 commercial banks in Pakistan from 2007 to 2015 and claims that a well-performing banking system can better withstand financial hardship. Alyousfi (2022) studied 2,446 banks in 47 Asian countries from 1995 to 2017 and believed that profitability is essential to economic development. It

can be said that for commercial banks, profitability is a booster for their sustainable development (Qi, 2023).

With the rapid changes in the global financial environment and the advancement of technological innovation, digital transformation has become an effective way for the banking industry to improve performance (Xie & Wang, 2023a). Global enterprises and governments are embracing digital trends across industries (Zhai et al., 2022). As a result, digital transformation has emerged as the dominating trend in recent years (Nguyen et al., 2023). Digital transformation was defined by Fitzgerald et al. (2014) as the implementation of novel digital technologies to enhance an organization's business operations. The authors of this study employed this definition.

Digital transformation is inseparable from solid technical support. The mature development of underlying and emerging technologies has become a booster for banks' digital transformation. The increasingly mature big data, cloud computing, AI, and emerging technologies derived from digital scenarios complement each other and empower many banking business scenarios. For example, intelligent customer service: dialogue robots based on natural language understanding can replace some manual customer service, reduce labor costs, and improve problem-solving efficiency. Intelligent clearing: build a supply chain financial platform based on blockchain to complete the trusted flow of data, allowing corporate customers to achieve more convenient and safe automatic clearing.

Theoretically, Zhai et al. (2022) suggest that when a corporation owns digital technology, it acquires cheaper expenses, more efficient operations, and a greater rate of innovative success, all contributing to improved performance. Verhoef et al. (2021)

suppose corporations use digital transformation to generate strategic behavioral changes and obtain competitive advantages by measuring corporate resources against the external environment. In practice, the implementation of digital transformation is complex due to the significant costs, learning curves, and adjustments involved (Zhai et al., 2022). On the one hand, China has a vast customer base and highly developed financial technology applications, such as mobile payments, which provide fertile ground for the digital transformation of the banking industry (Nguyen et al., 2023; Tsou & Chen, 2023; Verhoef et al., 2021a). On the other hand, rapid market changes, an increasingly stringent regulatory environment, and uncertainty in domestic and foreign economic policies have complexly impacted bank performance (Drechsler et al., 2020; Singh et al., 2021). To sum up, the banking industry urgently needs to improve performance, and digital transformation is regarded as one of the solutions. In-depth research on the impact of digital transformation on bank performance can provide strong support for the sustainable development of the banking industry.

1.2 Background of Study

According to King (2018) in his book *Bank 4.0: Banking Everywhere, Never at a Bank*, BANK 1.0 (1472-1980) was a stage in which commercial banks vigorously expanded their physical outlets based on physical outlets. BANK 2.0 (1980-2007) was when electronic banking and physical outlets coexisted. Telephone banking and online banking began to appear in people's fields of vision at this stage, and users gradually started to perform operations such as transfer, remittance, and account opening online. BANK 3.0 (2007-2017) is the stage of comprehensively using Internet technology to provide financial services. The number of physical commercial bank outlets has been reduced since this stage, and mobile banking and online banking have become the

main ways people obtain financial services. BANK 4.0 (2017-present) is the era of digital banking. Commercial banks have begun to build omnichannel banks and jointly develop financial services through multiple channels, such as online banking, mobile apps, and offline outlets. Currently in the critical period of BANK 4.0 digital banking, driven by emerging technologies, the digital transformation of China's commercial banks is developing rapidly (Fasnacht, 2021).

1.3 Bank Performance

Bank performance reflects how a bank operates in a specific banking operating environment (Herrero et al., 2009; Tan, 2016). China faces internal challenges such as recurring epidemics and real estate market adjustments, as well as external instability factors such as high inflation, continuous interest rate hikes by the Federal Reserve, and geopolitical conflicts, and the momentum of economic growth has weakened. Against the background of slowing economic growth, the operating environment of commercial banks is severe, and operating income is under more significant pressure. In 2022, commercial banks will achieve a cumulative net profit of 2.30 trillion yuan, a year-on-year increase of 5.4% (CBIRC, 2022), as shown in Figure 1.1.

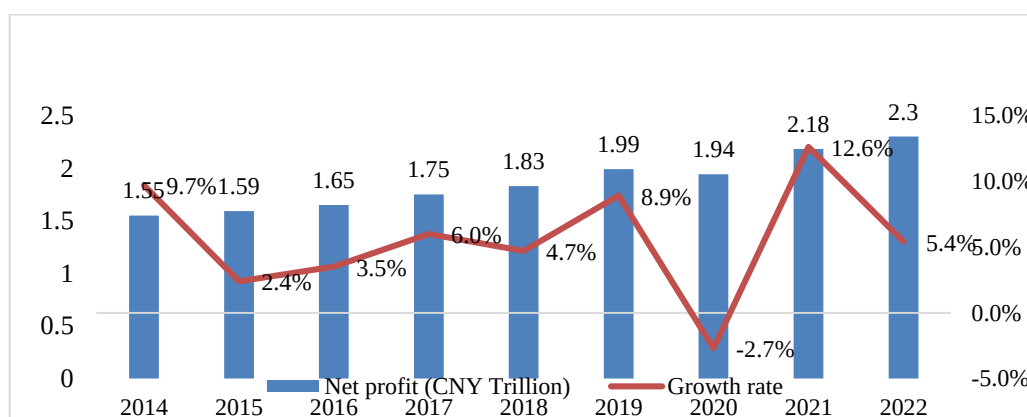


Figure 1.1 China net profit and growth rate of commercial banks
[Source: CBIRC (<https://www.nfra.gov.cn>)]

The net profit of Chinese commercial banks climbed from 1.55 trillion yuan in 2014 to 2.35 trillion yuan in 2022 despite fluctuating growth rates in specific years. Even though the growth rate 2020 was -2.7 percent, indicating a fall, it soon returned in 2021, reaching as high as 12.6 percent. This swift recovery demonstrates the resilience of Chinese commercial banks in the face of economic crises. The digital transformation that Chinese commercial banks have undertaken over the past few years is, nevertheless, a significant contributor to this increase in profitability. It is not a coincidental development. Amid the digital transformation initiative, Chinese commercial banks have embraced sophisticated technological methods to enhance their operations' efficacy, risk management capabilities, and service provision quality. This revolution enables financial institutions to react with greater agility to fluctuations in the market and promptly adjust to evolving consumer demands. Despite experiencing a modest decline in net profit growth rate in 2019 due to various factors, including the epidemic, Chinese commercial banks swiftly rebounded in 2020 owing to the adaptability and efficacy facilitated by digital transformation (Nguyen et al., 2023). The bank achieved a growth rate of 12.6%.

ROA and ROE are indicators for evaluating bank performance (Jigeer & Koroleva, 2023). As shown in Figure 1.2, the total assets of commercial banks at the denominator end continue to multiply while the net profit growth rate of commercial banks at the molecule end retraces, resulting in a decline in ROA and ROE. According to the China Banking Industry Survey Report 2023, the return on assets (ROA) of commercial banks decreased by 0.03 percentage points from 0.79% in the previous year to 0.76% in 2022; Return on equity (ROE) decreased by 0.3 percentage points from 9.6% in the last year to 9.3% in 2022.

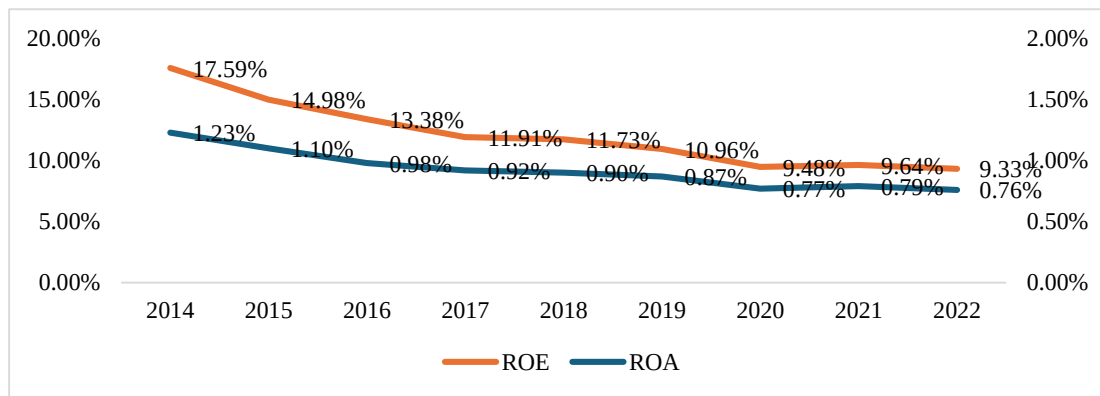


Figure 1.2 ROE and ROA of China commercial banks
[Source: CBIRC (<https://www.cbirc.gov.cn/>)]

Generally, ROE keeps more than 9%. Compared to Indian banks (around 7%), Chinese are higher. Although ROE is dropping yearly, even in 2022, it is still as high as 9.33 percent, demonstrating that the bank's profitability is still significant. At the same time, although ROA has not increased considerably, its consistency at approximately 1% indicates that banks have maintained some consistency in leveraging their assets to create earnings. Solid performance is partly attributable to Chinese commercial banks' successful application of digital transformation.

Commercial banks have used intelligent customer care systems and chatbots to enhance customer experience, satisfaction, and service efficiency as part of the digital transformation process. The newly available mobile banking applications empower users to conveniently transfer funds, make bill payments, and effectively manage their accounts anytime and from any location. The loan approval process has been streamlined using big data and artificial intelligence technology, significantly reducing consumer waiting time. Utilizing blockchain technology has streamlined the complexity of cross-border payment procedures, considerably decreasing the time required for settlement and associated expenses. The expenses related to IT infrastructure have been diminished through cloud computing technologies, while the

effectiveness of data processing and storage has been enhanced. Banks have implemented automation and robotic process automation technology to streamline their back-end operations, decreasing manual mistakes and operational expenses. Banks can effectively evaluate consumer credit risks and create tailored risk management plans using advanced data analysis techniques. Artificial intelligence technology actively observes and assesses transaction behaviors in real-time to detect and thwart fraudulent activity. By using advanced data analysis techniques, banks may effectively create detailed profiles of consumers, offer tailored financial products and services, and enhance the effectiveness of their marketing campaigns.

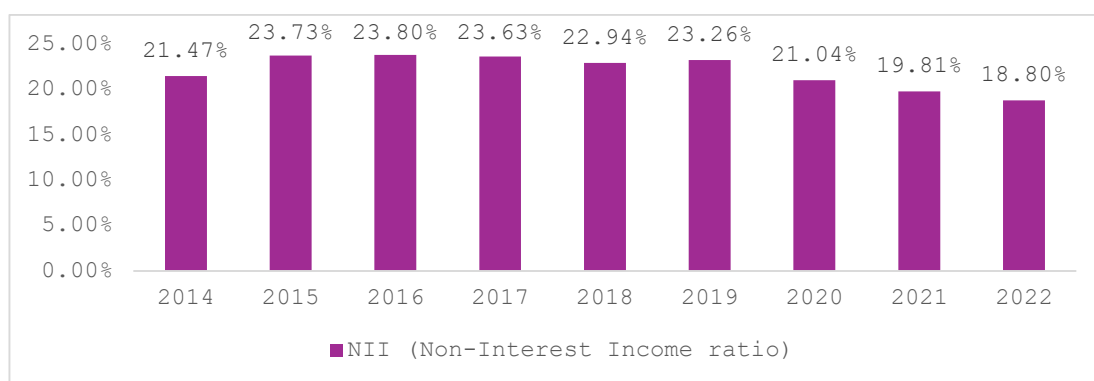


Figure 1.3 NII of China commercial banks
[Source: CBIRC (<https://www.cbirc.gov.cn/>)]

If they continue to use the traditional deposit-loan interest rate spread as their sole profit model to enhance their competitiveness and achieve their long-term strategic goal of increasing profits, they will inevitably be unable to attain their high-yield profit targets (Li et al., 2020). The Chinese banking industry is steadily shifting from traditional sources of income to a diversified income structure of net interest and non-interest income (Li & Zhang, 2013). As shown in Figure 1.3, from 21.47% in 2014 to 18.8% in 2022, the proportion of non-interest income of Chinese commercial banks has shown inevitable fluctuations and generally indicates a gradual downward trend.

There were some years in which the proportion increased, such as 23.73% in 2015 and 23.80% in 2016. The actual conditions reflected by these fluctuations demonstrate the complexity and variability in banking business operations. First, digital transformation plays a vital role in the share of non-interest income. Through the extensive application of digital technology, banks can more flexibly carry out diversified financial services, such as electronic payments, online financial management, etc., thereby expanding the sources of non-interest income. Secondly, intensified market competition is also an important factor affecting the proportion of non-interest income. As the financial market opens and competition increases, banks need to continuously innovate services and improve customer experience to maintain and increase non-interest income.

It is important to note that the entire non-interest income channel is based on technological advancements in the financial sector (Beck et al., 2016). In 2022, the number of off-the-counter transactions by banking financial institutions will reach 450.644 billion. The total number of off-the-counter transactions reached 2375.89 trillion yuan, and the industry's average electronic channel diversion rate was 96.99% (CBA, 2023). The ultra-high electronic channel diversion rate is reshaping banks' digital development routes. Banks must continue accelerating digital transformation and developing digital channels to create higher profit margins for banks (Babarinde et al., 2021).

1.3.1 Digital Transformation

Sadeghi et al. (2021) and Tsou & Chen (2023) agree that digital transformation is a revolutionary revolution that accelerates an organization's activities, processes, and capacities. Digital transformation may be seen as an extension of the continual

development of financial technology, which represents the union of "finance" and "information technology."(Nambisan et al., 2019; Sadeghi et al., 2021). In addition, the digital transformation process cannot be completed just via digital technologies. The acquisition of digital skills of digital skills, digital strategy, digital culture, and digital talent is also essential (Drechsler et al., 2020). Under the COVID-19 pandemic, commercial banks are digitizing faster and using financial technology to alter the banking system. Large commercial banks, such as state-owned and national joint-stock banks, use their resources to rebuild their technical architecture and deploy digital finance, while small and medium-sized banks use technology companies or collaborate with large banks to differentiate and localize. Technology and finance have moved from "complementing" to in-depth integration, spanning financial and non-financial services, covering a broad financial ecosystem of production and life, and enabling digital competitiveness.

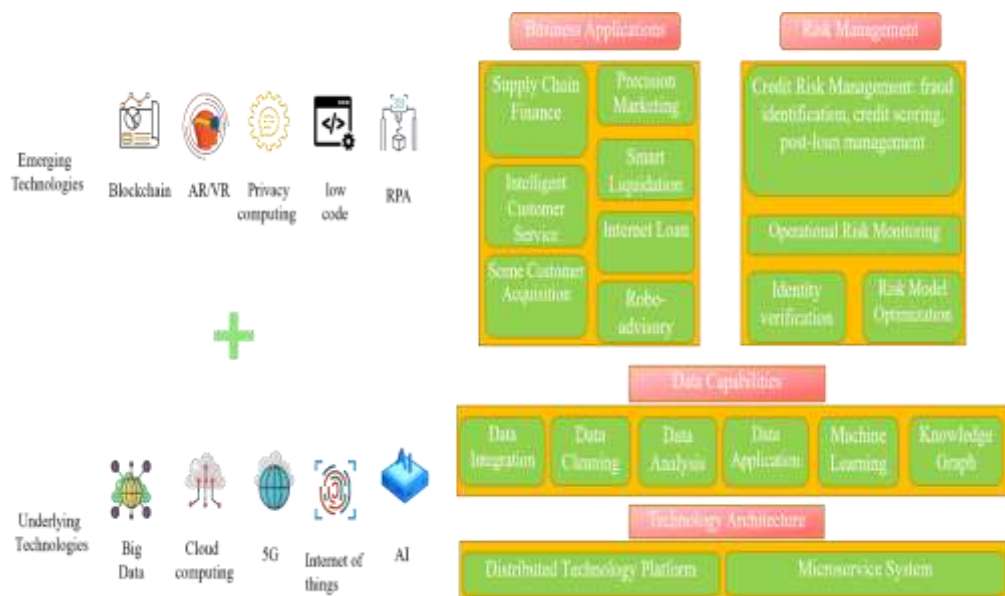


Figure 1.4 Digital Technology and Digital Architecture
[Source: i-research (<https://www.iresearch.com.cn/>)]

As shown in Figure 1.4, the digital transformation combines emerging technologies and underlying technologies, using big data, artificial intelligence, cloud computing, blockchain, 5G, Internet of Things, and other technologies to reconstruct the existing architecture and realize the transformation of financial infrastructure. The specific applications of digital transformation of commercial banks include business applications, risk management, data capabilities, and technical architecture. China's banking industry is accelerating the construction of a comprehensive and wide-coverage data system, unifying data standards, data cleaning models, and data security systems, mining massive inter-temporal and multi-dimensional internal data, increasing the integration of external data sources, and promoting in-depth data management.

Digital transformation has become a strategic imperative for commercial banks (Xie & Wang, 2023). FinTech leads digital transformation and drives business growth as the banking industry's top profit growth driver going forward (PwC, 2023). As Figure 1.5 shows, global IT spending in the financial sector will grow 7.1 percent year-on-year in 2022, surpassing 7 percent for the first time since 2018, a five-year high. IT spending as a share of operating income ranges between 3.6 percent and 16.5 percent, with a median of 8.2 per cent, which is the first time in nearly five years that it has broken 8 percent (Gartner, 2023). The world is ushering in a new technological revolution and industrial change. Digital transformation, as a technology-driven financial innovation in the era of digitalization, is increasingly becoming an essential part of the construction of a modern economic system and a key driving force.

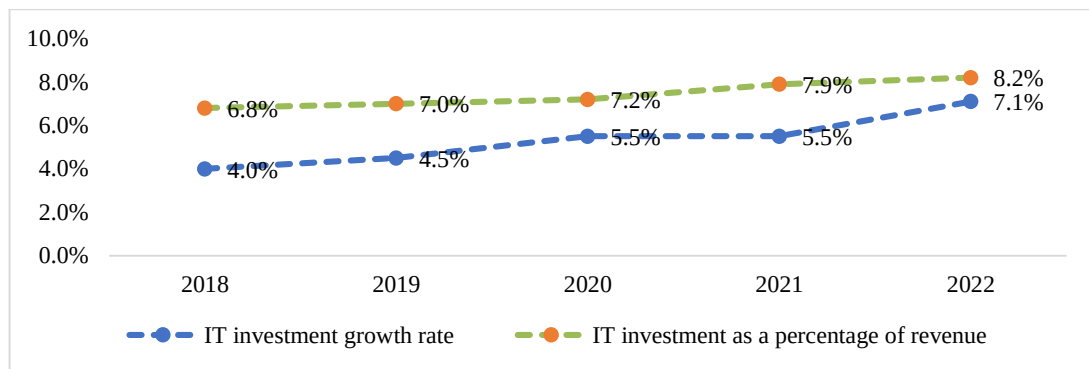


Figure 1.5 Global Financial Industry IT Investment 2018-2022
[Source: Gartner 2023 (<https://www.gartner.com/en>)]

According to the "2022 China Digital Finance Survey Report," as banks' digital transformation accelerates and the online financial business presses the fast-forward button, the proportion of users in retail digital finance channels continues to rise. Figure 1.6 shows that the usage proportion of personal Online Bank users will reach 66% In 2022, a 3% year-on-year increase; the usage proportion of personal Mobile Bank users will reach 86%, a 5 percent year-on-year increase; the usage proportion of WeChat Bank users will reach 55%, a 3% year-on-year increase; and the usage ratio of Telephone Bank users is only 23%, a 1% year-on-year increase.

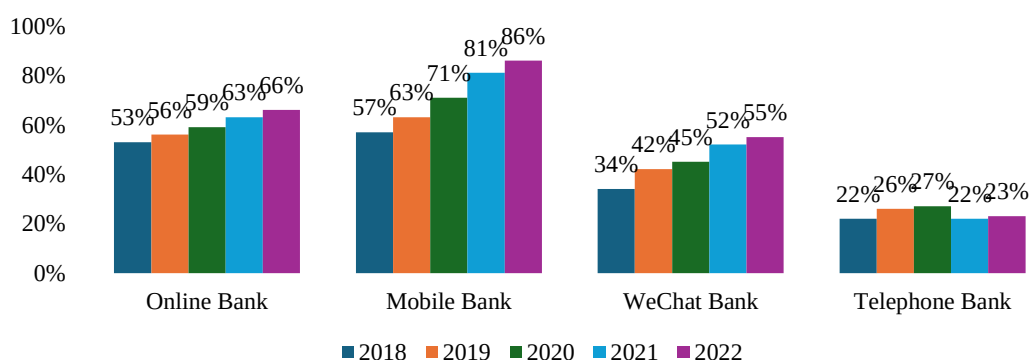


Figure 1.6 Retail digital finance bank usage proportion 2018-2022
[Source: CEBNET (<https://www.cebnet.com.cn/>)]

From 2018 to 2022, most digital financial services will exhibit a growth trend, indicating that more consumers are beginning to accept and utilize digital financial services. The utilization rate of mobile banking will expand significantly from 53 percent in 2018 to 86 percent in 2022. Figure 1.6 demonstrates that mobile banking has become the preferred financial service channel for most individuals because of the proliferation of smartphones and enhancements to mobile networks. Diverse digital financial services, like WeChat banking and phone banking, have been created to provide consumers with more options and fulfill the demands of various demographics. Even if the online banking usage rate fluctuates somewhat, online banking maintains a particular market share, demonstrating its solid position in the digital financial industry. The percentage of customers that utilize telephone banking will decrease from 26 percent in 2018 to 23 percent in 2022. Although the drop is modest, it may signal that alternative digital services are gradually supplanting traditional telephone banking services as their popularity increases. In general, the beneficial function of digital transformation in the financial sector is to expand service possibilities and satisfy the modern consumer's desire for ease and efficiency. As technology advances, this study can anticipate that digital financial services will continue to extend their market share and provide customers with greater convenience.

1.3.2 Financial Inclusion

Financial inclusion refers to providing essential financial services to marginalized and excluded members of society and ensuring that vulnerable groups can reasonably access sufficient lines of credit (Malladi et al., 2021; Rumbogo et al., 2021). Regional disparities in traditional commercial banks' distribution of financial resources can be addressed through digital financial inclusion (Vincent & Cull, 2011).

Leveraging digital technology in the financial sector can substantially reduce the cost of financial services, extend financial coverage, and increase penetration (Ankita & Debabrata, 2020). Wang & Xie (2021) also argue that regional digital finance expansion enhances innovation among commercial banks, promoting product and management innovations. Banks can reach these customers more efficiently through digital channels and expand their customer base. Banks will mean more savings accounts, loan applications, and other financial products, thus increasing potential profit opportunities. As financial inclusion grows, the amount of risk carried by commercial banks will stabilize, and the development of inclusive finance allows more poor people and small businesses in need of lending to resolve their financial difficulties in a stable manner (Ahamed & Mallick, 2019; Demirgüç-Kunt et al., 2020; Marcelin et al., 2022).

The 2014 "Government Work Report" added "developing financial inclusion" to the expression "deepening financial system reform." The 2015 "Government Work Report" proposed vigorously developing financial inclusion so that all market entities can share the rain and dew of financial services. Beginning in 2019, the "Government Work Report" has made precise requirements for financial inclusion for financial institutions, substantial state-owned banks, for three consecutive years, requiring their annual financial inclusion loan growth rate to be no less than 30%. The 2021 "Government Work Report" once again clearly stated that it is necessary to "improve a modern financial system that is highly adaptable, competitive, and inclusive" (Zhang et al., 2023). In recent years, the concept and practice of financial inclusion in China have seen significant changes. Various financial service providers, including traditional financial institutions and technology companies, have emerged one after another. A series of policies and methods introduced at the national level has gradually

shown their effects. China has made significant achievements in financial inclusion. According to the 2022 World Bank Global Financial Inclusion Survey, in 2021, China's financial account ownership rate was 89%, its financial lending participation rate was 56%, and its digital payment service usage rate was 86%.

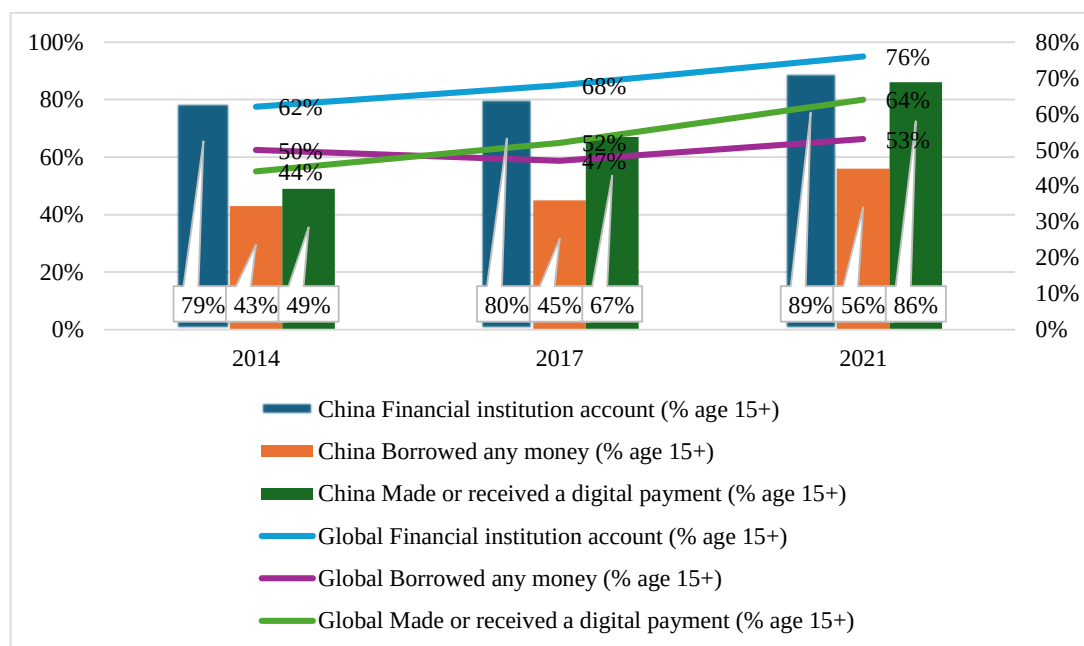


Figure 1.7 Financial Inclusion China vs Global
[Source: Global Findex Database (<https://www.worldbank.org/>)]

As depicted in Figure 1.7, by the conclusion of 2021, many of China's indicators had been steadily increasing annually, ranking first globally. The "digital financial inclusion" era began in China (Zhang et al., 2023). Financial inclusion has significantly improved the gap between the rich and the poor in the distribution of financial resources. Financial inclusion can effectively penetrate various regions, provide a wide variety of financial products, and improve the efficiency of financial services. Financial inclusion will help narrow the urban-rural income gap, promote coordinated regional economic development, and improve the current situation of unbalanced urban-rural development. Financial inclusion has changed from solving

"financial availability" to a comprehensive ecosystem covering multiple fields such as mobile payment, credit lending, and financial allocation. Financial inclusion has enhanced the depth, breadth of coverage, and intensity of services of financial services. The in-depth application of financial technology has created an inclusive financial ecosystem with rich products, interactive intelligence, and efficient processes. The content and products of financial inclusion are constantly innovating with the development of digital technology. Digital technologies such as big data, cloud computing, machine learning, artificial intelligence, and blockchain have improved financial services' convenience, availability, and coverage, innovated the supply of financial products, and improved the quality and efficiency of financial services (Zhang et al., 2023).

Significant market power and inefficiency were prevalent in the historical context of China's banking industry, characterized by government ownership and a limited number of large-sized companies. However, with the implementation of several waves of banking reforms aimed at improving performance and fostering competitiveness (Tan, 2016a), the landscape has begun to shift. With the development of financial technology, many financial institutions have emerged, using advanced technologies such as blockchain, artificial intelligence, and big data to provide customers with faster, cheaper, and personalized services. These fintech companies account for a sizeable industry share, particularly in transactional financial services such as payments, lending, and wealth management. This trend illustrates that China's financial sector's ongoing growth and transformation led to market competitiveness. The emergence of financial technology (fintech) has further accelerated this transformation. As the number of organizations expands, consumers can access various financial institutions and services. High market rivalry frequently compels businesses

to innovate to distinguish themselves from rivals. Moreover, an increase in the number of legal entities will result in a greater variety of financial instruments, goods, and services, which will contribute to the maturation and expansion of the capital market and the provision of more robust and efficient financial support for the real economy.

1.3.3 Market Concentration

Market concentration refers to the share occupied by the leading companies in the market and is usually used to measure the degree of competition within the industry (Arif & Awwaliyah, 2019). The lower the market concentration, the more intense the market competition (Jiang et al., 2019). For a long time, there has been a view in the theoretical and practical circles that the Chinese banking industry is characterized by monopoly, inefficiency, and insufficient competition (Chen & Xiong, 2021). Initially, just four significant state-owned banks existed. Since the deregulation of China's banking industry in 1987, joint-stock and city commercial banks have risen proportionally. Chinese banking industry strives for both reform and development simultaneously. The competition structure of the banking industry has changed dramatically, mainly as the number of banks continues to expand, the degree of concentration continues to diminish, and the degree of market competition continues to strengthen.

On the one hand, the number of financial institutions in China continues to rise. As of 2021, the number of legal persons institutions in the Chinese financial industry reached 149,813. On the other hand, the Chinese banking industry's monopolistic condition has improved. Under the impact of four forces, including "interest rate marketization reform," "financial disintermediation," "financial technology development," and "circumvention of supervision" (Qi, 2020), along with intense

market competition, large Chinese commercial banks continue to hold a substantial market share. As shown in Figure 1.8:

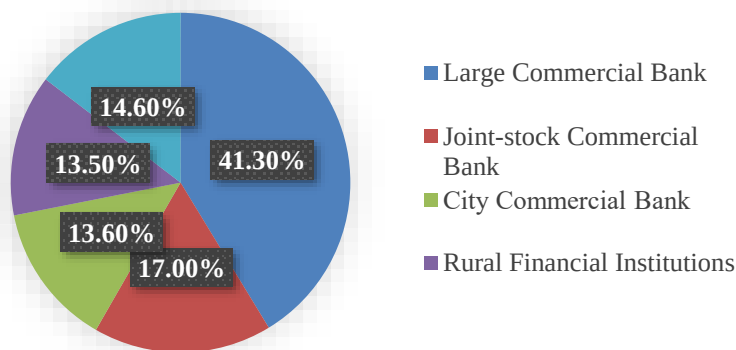


Figure 1.8 Asset share chart of banking financial institutions in 2023
[Source: SASAC (<https://www.samr.gov.cn/>)]

Although large banks account for a larger share of the market (41.3%), digital transformation provides opportunities for other types of banks to break through traditional limitations, increasing the diversity and competition in the market. Urban commercial banks may offer services that are better suited to the needs of urban customers, while rural commercial banks may provide financial services that are better suited to the needs of rural communities. Rural commercial banks have lost market share, but they are still likely to play a critical role in rural areas, providing financial services to populations challenging to serve by larger banks. This trend helps financial services expand and enables more people to experience their advantages. It is particularly worth noting that digital transformation helps broaden the coverage of financial services and makes financial services more inclusive. Banks can better reach remote areas and people through digital technology and provide broader financial services. Although large banks still occupy a significant market share, other types of banks, such as joint-stock banks (17%), city commercial banks (13.5%), and other financial institutions (14.6%), are also able to expand their market coverage through

digital transformation. Therefore, digital transformation not only increases the diversity and competition of the market but also makes financial services more favored, further shortening the distance between banks and customers.

1.4 Problem Statement

Referring to Figure 1.1, banks net profit growth rate drops from 9.7% in 2014 to 5.4% in 2022. Referring to Figure 1.2, despite the effort to improve digital transformation in bank performance, the author observes that ROE is lower compared to that of the United States of America (around 10%). ROE has declined yearly from 17.59% in 2014 to 9.33% in 2022. The bank's profitability is weakening yearly, and shareholders' investment returns are decreasing. ROE and ROA have shown a continuous downward trend in the past few years, which may mean that Chinese commercial banks face increasing pressure from the economic environment or within the industry. At the same time, referring to Figure 1.3, the overall trend of NII of the China commercial bank is downward, which may imply that the bank is encountering difficulties in performance. The intensification of market competition, the rapid development of financial technology, and the emergence of new financial formats may squeeze business, causing bank performance to continue to be challenged.

Conceptually, digitalization has benefits for companies. More and more commercial banks are beginning to use financial technology within their organizations to transform and upgrade, thereby improving their operating performance (Li et al., 2017). Mobile information communication and extensive data analysis can enhance operational performance in traditional commercial banking (Yang & Liu, 2018). Fintech applications can reshape traditional banking by reducing costs and increasing efficiency (Zhang et al., 2019). However, in practice, the implementation of digital

transformation is complex due to the significant costs, steep learning curves, and necessary adjustments to the external environment (Zhai et al., 2022). Past studies on digital transformation have mainly focused on its definition (Pagani & Pardo, 2017; Stulz, 2019; Vial, 2019; Verhoef et al., 2021a) and how digitalization directly changes the business and production model of enterprises (Singh et al., 2021; Zhai et al., 2022). Some scholars have also researched measurement methods of digital transformation (Pyun & Rha, 2021; Xue et al., 2022; Xie & Wang, 2023a; Chen & Srinivasan, 2023). However, digital transformation in the banking sector remains underexplored. Therefore, further exploration of digital transformation's impact on bank performance is necessary.

Resource dependence theory posits that an organization's behavior and strategy are constrained by its access to external resources. Organizations must adapt to the allocation and dependency of resources in their external environment to ensure their survival and efficiency. Digital transformation alone may not significantly impact bank performance. This study considers additional influencing factors to better explain improvements in bank performance. Financial Inclusion (FI), as an external factor, merits consideration in this context. Digital transformation may enable banks to better achieve financial inclusion (Abdulquadri et al., 2021; Ozili, 2021; Hakimi et al., 2022). However, the need for financial inclusion could force financial institutions to undergo more extensive digital transformation (Yang & Masron, 2023). For example, financial inclusion provides a broad customer base for digital transformation, allowing banks to collect more customer information, conduct customer profile analysis, reduce the risk of default (Guo et al., 2023), and improve profitability (Yang & Masron, 2023). As shown in Figure 1.7, financial inclusion in China is growing but remains limited in some dimensions. For instance, the proportion of adults borrowing money remains

below 60%. The limitations of financial inclusion could be one of the reasons why the effects of digital transformation have not met expectations. As a result, financial inclusion may influence the dynamic relationship between digital transformation and bank performance.

Market Concentration (MC), another external factor, also merits consideration in this context. Banks in highly competitive markets typically face higher pressures from multiple competitors, forcing them to engage in digital transformation, improve efficiency, reduce costs, and innovate to meet customer needs, leading to higher performance levels. On the contrary, in markets with high market concentration, a few leading banks may form a monopoly or oligopoly market and, therefore, may be inclined to maintain the status quo rather than innovate or improve, resulting in relatively low performance levels because of a lack of competitive motivation. Historically, as communist philosophy is dominant, many companies were government-owned, and the number of companies was limited and significant in size, resulting in market power and inefficiency. Competition drives innovation, and in a highly competitive market, banks need to focus more on performance to remain competitive. Several waves of banking reforms in China attempt to enhance bank performance and create a more competitive market (Tan, 2016). As shown in Figure 1.8, large commercial banks continue to hold a substantial market share. Other types of banks account for 60% of the market share, but at least city and rural commercial banks should be more established. The limitations of market concentration could be one of the reasons why the effects of digital transformation have not met expectations. As a result, market concentration could influence the relationship between digital transformation and bank performance dynamic shifts.

While several researchers have examined the advantages of digital transformation in general corporate environments, the banking industry in emerging nations such as China remains inadequately studied, especially concerning the discrepancies between digital investments and financial returns. Furthermore, current research frequently neglects the moderating influences of external factors like financial inclusion and market concentration, which may significantly impact the efficacy of digital transformation. This paper contends that resolving this contradiction necessitates the incorporation of Resource Dependence Theory. In banking, digital transformation may be inadequate without the foundational elements of widespread financial inclusion and competitive market frameworks. However, the moderating influences of these two characteristics have garnered scant empirical scrutiny.

1.5 Research Questions

According to the problem statement of this study, the main research question is “Role of digital transformation, financial inclusion, and market concentration on bank performance in China?”. Specifically, this study has the following sub-questions:

- i. What is the effect of digital transformation on bank performance in China?
- ii. What is the moderating effect of financial inclusion on the relationship between digital transformation and bank performance in China?
- iii. What is the moderating effect of market concentration on the relationship between digital transformation and bank performance in China?

1.6 Research Objectives

This study aims to study the role of digital transformation、 financial inclusion, and market concentration on bank performance in China. Based on this overall goal, this study will achieve the following objectives:

- i. To examine the effect of digital transformation on bank performance in China.
- ii. To investigate the moderating effect of financial inclusion on the relationship between digital transformation and bank performance in China.
- iii. To analyze the moderating effect of market concentration on the relationship between digital transformation and bank performance in China.

1.7 Scope of the Study

The data used in this study were collected from 114 Chinese commercial banks. First, from an economic standpoint, China was selected due to its rising status and influence in the global financial market, and its banking sector has also had a significant international impact. Moreover, China has many commercial banks, which provides a substantial sample pool for research. Considering the completeness and dependability of the data, 114 commercial banks with complete and representative data were ultimately chosen. Based on the distribution of total assets, the total assets of these banks represent more than 96% of the total assets of Chinese commercial banks. Hence, the sample is highly representative. In addition, the author chose the years 2014 to 2021 as the study period. During this time, the Chinese banking industry has

undergone several significant policy adjustments and technological advancements, including the rapid development of digital transformation, making this a period of great significance for Chinese commercial banks. Considering this context, the data from this period has significant reference value for studying the digital transformation of the Chinese banking industry.

1.8 Significance of the Study

Theoretically, the moderating effects of financial inclusion and market concentration have been ignored, given that the impact of digital transformation on bank performance seems ineffective. The critical contribution of this study is to fill an essential gap in the research on the impact of digital transformation on bank performance, especially in considering the moderating effects of financial inclusion and market concentration on this relationship.

Practically, government, investors, and policymakers gain the most, considering how to make good use of digital transformation with financial inclusion and market concentration on bank performance. For governments, promoting financial inclusion and competitive market conditions can amplify the benefits of digital transformation. Investors may support banks that align innovation with inclusive growth and sustainability, contributing to the long-term development of the banking sector.

Uniqueness of the study is among the first to empirically assess the interaction effects of digital transformation with financial inclusion and market concentration using a dynamic panel framework (System GMM) in the context of Chinese commercial banks. It bridges the gap between technological advancement and

institutional capacity, and provides a multidimensional view of digital transformation's impact that has been largely missing in the literature.

1.9 Definition of Key Terms

The definition of each term is based on the operational meaning of each variable for this study.

i. Digital Transformation (DIG)

Digital Transformation is the process in which enterprises apply digital technology to products, operations, organizational management, business models, and strategy formulation to transform their business activities (Xie & Wang, 2023a).

ii. Financial Inclusion (FI)

Financial Inclusion gives marginalized or left out of society access to essential financial services and ensures that vulnerable groups can get enough credit at a price they can afford (Malladi et al., 2021; Rumbogo et al., 2021).

iii. Market Concentration (MC)

Market concentration can also be used to measure competition. It is called a structural measure of competition. Higher concentration indicates lower competition (Yuanita, 2019).

iv. Bank performance (PR)

Bank performance is typically assessed using financial ratios such as ROA and ROE, as well as components like non-interest income (NII), which capture the bank's