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Analysis of the Impact of China's Digital Technology on Inclusive Finance

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Abstract

This paper focuses on the impact of digital technology on inclusive finance in China. By reviewing existing literature, it systematically analyzes the current development status, specific impacts, and challenges of digital technology (including big data, artificial intelligence, and mobile payments) empowering inclusive finance. This review of existing literature and current research reveals that digital technologies such as big data and artificial intelligence have significantly improved the coverage, convenience, efficiency, and risk management capabilities of inclusive finance by breaking through geographical limitations, optimizing service processes, and improving risk control systems. This has driven the transformation and innovation of traditional financial institutions and expanded their service coverage. However, the application of digital technology also faces certain practical challenges. These include the digital divide faced by some elderly and low-income groups due to device access barriers, uneven development across provinces and regions, and regulatory loopholes and user data security issues arising from the development and application of emerging digital technologies, which continue to hinder the further development of digital inclusive finance. By conducting a literature review, this paper systematically analyzes and summarizes the dual impacts of digital technology on inclusive finance and anticipates its trend toward precision and intelligent development. This paper provides theoretical references for promoting the high-quality development of digital inclusive finance.

Keywords

digital technology, inclusive finance, digital inclusive finance, financial technology

1. Introduction

In recent years, digital technologies (including big data, artificial intelligence, cloud computing, and mobile payments) have played an increasingly important role in inclusive finance. With the rapid development and widespread adoption of digital technologies in China, they have become a key driver of transformation in the financial industry. Before the advent of digital technology, traditional inclusive finance relied on a model of "deployment of branch locations, manual due diligence+and fiscal subsidies" to achieve the goal of enabling more people to obtain financial services that meet their needs at an affordable cost and conveniently. However, this reliance on physical branches and manual labor led to high service costs and difficulty meeting the financial needs of a long-tail customer base, such as small and micro enterprises, rural residents, and low-income groups. Limited business processes and approval cycles also led to low service efficiency. Furthermore, due to severe information asymmetry and insufficient credit reporting coverage in some regions, risks can be excessively high. The rapid development of digital technologies has provided new approaches to breaking through traditional bottlenecks in inclusive finance.

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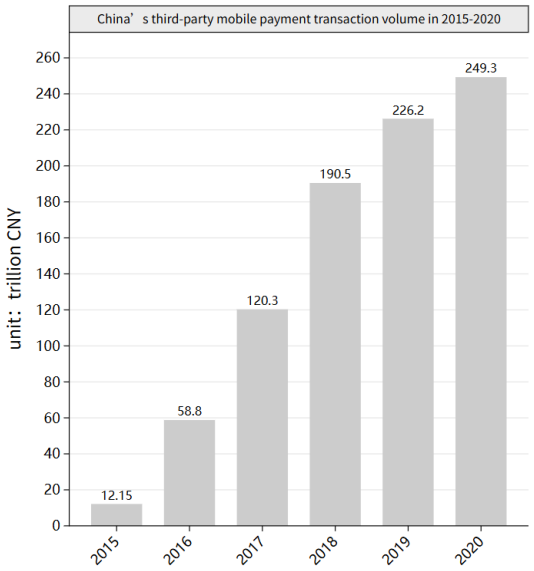
As the core driving force behind the transformation of the financial industry, digital technologies such as artificial intelligence, cloud computing, big data, and blockchain are reshaping service models by broadening customer reach, developing mobile apps, and launching online businesses. By harnessing massive amounts of real-time, continuous, and multi-dimensional data, they are applying big data analytics and algorithms to optimize risk control systems. Through data-driven, algorithmic iteration and ecosystem integration, they are transforming traditional financial products from a static, standardized form to a dynamic, algorithmic, scenario-embedded, and programmable one. This has a profound impact on the breadth of coverage, depth of services, and sustainability of inclusive finance. Currently, China is a global leader in the development of digital inclusive finance. However, the digital technology empowering inclusive finance also faces challenges: a digital divide caused by device access barriers for some elderly and low-income groups, uneven development across provinces and regions, and regulatory loopholes and user data security issues arising from the development and application of emerging digital technologies.

The nature of China's Digital Financial Inclusion (DFI) model is unique globally. Unlike many developing countries, particularly in Africa (e.g., Kenya or Ghana), where financial inclusion is primarily driven by mobile-first services to fill a significant gap left by traditional financial institutions, China exhibits a relatively high level of both traditional and digital financial inclusion. This dual strength means that digital services in China often complement, rather than completely substitute, the existing financial infrastructure, leading to a more complex and integrated ecosystem. The widespread adoption of third-party mobile payment platforms (such as Alipay and WeChat Pay) provided a robust digital foundation for this rapid expansion. This robust infrastructure has facilitated rapid scaling and the deployment of sophisticated financial technology (FinTech) solutions, making China a crucial case study in the comprehensive integration of technology and traditional finance for achieving inclusion objectives.

Therefore, systematically analyzing the impact mechanisms and current research status of digital technology on inclusive finance is crucial for deepening theoretical understanding and optimizing practical approaches. Based on existing literature, this article conducts research and analysis from the aspects of China's digital technology empowering inclusive finance, the impact of digital technology on inclusive finance, the current challenges it faces and future development trends, to provide a theoretical reference for the high-quality development of digital inclusive finance.

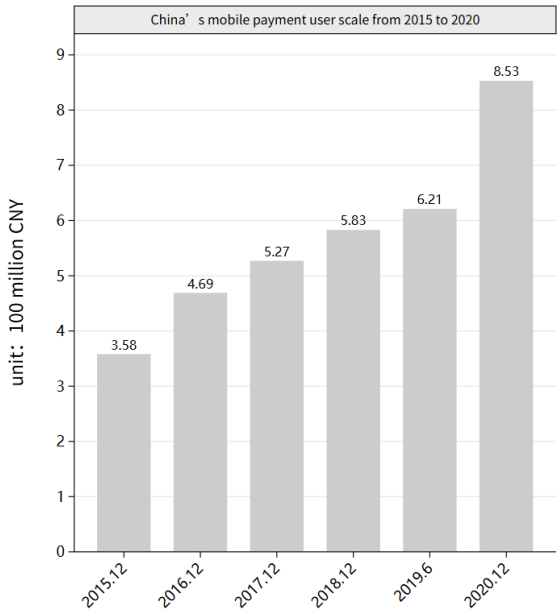
The current status of China's digital technology empowering inclusive finance

Figure 1: China's third-party mobile payment transaction volume from 2015 to 2020



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Figure 2: China's mobile payment user scale from 2015 to 2020



2. China's Digital Inclusive Finance Has Shown Rapid Development in Recent Years

In terms of coverage scale, China's mobile payment has grown rapidly in terms of both user scale and transaction scale between 2015 and 2020. As early as 2018, China's mobile payment penetration rate exceeded 90%, and the transaction amount and number of transactions ranked first in the world [1]. As shown in figure 1 and figure 2, by the end of 2020, the number of mobile payment users in China had reached 853 million CNY, and the scale of third-party mobile payment transactions reached 249.3 trillion CNY [2]. The balance of inclusive micro and small enterprise loans reached 15.10 trillion CNY, representing a year-on-year increase of over 30 percent, demonstrating robust growth momentum [3]. From the perspective of technology application, digital technologies such as artificial intelligence, cloud computing, big data, and blockchain have been widely infiltrated into areas such as credit rating, risk control, and product design, promoting innovation in financial service models [3]. From the perspective of regional development, referring to the index system of the Peking University Digital Inclusive Finance Index (2011-2020) compiled by the Digital Research Center of Peking University, which is currently more authoritative [4]. China's digital inclusive finance index shows a spatial difference characteristic of "high in the east and low in the west, high in the south and low in the north". Developed regions such as Shanghai, Beijing, and Zhejiang are in the leading position, central provinces such as Henan and Jiangxi have seen significant growth, with some regions growing more than 10 times, and the regional gap is gradually narrowing [3]. From the perspective of financial institutions, traditional financial institutions are actively transforming. For example, the Industrial and Commercial Bank of China has established 230 specialized institutions for small and micro financial services. At the same time, the participation of technology platforms has also enriched the service supply [2, 3].

Overall, China's digital inclusive finance is shifting from a scale expansion stage to an optimization and deepening stage, with continuous optimization in terms of coverage breadth and depth of use. However, there is still room for improvement in the integration of digitalization level and application efficiency [3].

3. The Impact of Digital Technology on Inclusive Finance

3.1 Service Coverage

In terms of service coverage, traditional financial institutions and their services have gradually broken the geographical constraints of offline services with the help of powerful digital technologies such as big data and

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cloud computing. By actively opening and strategically building online service platforms, they are able to significantly extend the reach of financial services to vast rural and remote areas, which greatly improves the overall coverage of their financial offerings [5]. As the world's most populous country, China's efforts and achievements in poverty alleviation have consistently attracted global attention. With the robust support of digital technology, the inherent advantages of inclusive financial services in reaching a wide demographic have played a vital and instrumental role in China's practices of precision poverty reduction [6]. Specifically, with the aid of big data technology, financial institutions are capable of gathering and deeply analyzing multi-dimensional data, including population structure, industrial distribution, consumption habits, and transaction status, within rural and remote areas. Through the refined insights derived from this massive data, financial institutions can accurately identify the precise financial needs of local residents and the masses, determine existing gaps in critical services like payment, wealth management, and credit, and accordingly formulate tailored, regionalized products and promotion strategies. This approach truly implements a "local conditions, on-demand supply" model. Furthermore, cloud computing provides online financial platforms with tremendous computing power and massive storage capacity, which strongly supports real-time data processing and high-concurrency access. Even in rural and remote areas where network conditions may be poor, cloud computing ensures the stability and smoothness of essential services such as account opening, loan approval, and mobile payment. Through the sophisticated insights of big data and the high-availability support of cloud computing, traditional financial institutions can quickly establish remote service platforms at a lower cost without relying on a large number of physical outlets. This allows them to cover groups that were originally difficult to reach due to stringent geographical restrictions, effectively breaking the limitations of space and achieving truly "unlimited reach" for financial services. This shift not only enhances the accessibility of services but also significantly improves their efficiency and quality, injecting new vitality into the economic development of remote regions. --This trend has also propelled a profound transformation of the traditional financial service model, moving from a past focus on physical outlets to a new paradigm centered on digital platforms, blending online and offline operations. These platforms integrate technologies like artificial intelligence and mobile internet to handle the full service lifecycle, from simple transaction processing to complex smart consulting and risk assessment, which greatly optimizes the user experience and lowers the cost of service delivery. In this context, traditional Chinese financial institutions have keenly recognized the massive advantages embedded in online service channels and have actively responded to national strategies, initiating comprehensive digital transformation processes and significantly increasing their investment in the research and development and application of digital technologies [7]. They are not only focusing on upgrading their technical infrastructure but are also making simultaneous advancements in talent cultivation, organizational structure adjustment, and risk control system reshaping to ensure the full implementation of their digital strategies. Moving forward, as digital technology continues to mature and its application deepens, this financial service model—which merges inclusive philosophy with cutting-edge technology—is set to demonstrate even greater potential and value globally, particularly in addressing the imbalance of financial services in developing countries and regions, thereby contributing to global financial equity and inclusive growth.

3.2 Service Convenience

In terms of service convenience, mobile payment and online service platforms developed based on cutting-edge digital technology have fundamentally optimized the provision and use of financial services, thereby significantly lowering the entry threshold for accessing them. Online financial services, with their core advantages of efficiency and convenience, have compellingly demonstrated their vital significance and unique utility in recent years across various facets of socio-economic life [7]. Specifically, the innovative "face-scanning payment" model, launched by leading third-party mobile payment platforms such as Alipay and WeChat, no longer necessitates reliance on mobile phones or bank cards to complete transactions, a breakthrough that substantially enhances the overall convenience of financial services [8].

This groundbreaking model, which is centered around facial recognition technology, allows users to finalize payments in typical small-value scenarios like retail and restaurants simply through a facial scan. This eliminates the need for physical devices (such as smartphones or bank cards) and dramatically streamlines the number of steps required, leading to a marked improvement in payment efficiency and the overall user experience. Furthermore, the integration of biometric-based multi-factor encryption authentication into the

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payment process significantly enhances transactional security and effectively mitigates the risk of fraudulent activities, offering users a more reliable safeguard for their funds. This synthesis of convenience and security highlights the immense potential of digital technology in elevating the quality of financial service delivery.

Crucially, the face-scanning payment model provides an extremely simple and direct payment channel for demographic groups who may lack smartphones or are unfamiliar with operating smart devices, such as the elderly, children, and certain low-income populations. For the elderly, it removes the burden of remembering complex passwords or having to carry a mobile phone, allowing them to effortlessly partake in the benefits of digital life. For low-income individuals who may not be able to afford smart devices, it effectively lowers the "hardware threshold" for accessing modern financial services. By offering this solution, face-scanning payment successfully lowers the threshold for financial service access, enabling populations previously isolated by the digital divide to integrate into the digital economy and benefit from convenient financial services, thus promoting genuine inclusivity.

Moreover, digital technology supports the 24/7, uninterrupted operation of online financial platforms, allowing users to conduct banking transactions anytime and anywhere, completely removing the constraints of traditional bank operating hours. Whether it is cross-regional transfers, credit card repayments, utility bill payments, or purchasing wealth management products, users can complete these processes in seconds with just a few taps. By leveraging digital technology to reduce service thresholds and significantly boost service convenience, innovative models like face-scanning payment have optimized the user experience and powerfully driven the further development of inclusive finance in China. This optimization represents not only technical advancement but also a commitment to social inclusion.

3.3 Service Efficiency

In terms of service efficiency, the support of digital technology undoubtedly brings about a significant uplift in both the speed and quality of financial service delivery. The pervasive adoption of digital technology has allowed financial service providers to move away from a heavy dependence on cumbersome paper records and time-consuming cash transactions to maintain daily operations, which has dramatically streamlined their overall operational and service efficiency [8]. Financial institutions have achieved complete automation and electronification of the entire process, spanning from initial customer application through to approval and final loan issuance, by constructing unified digital business systems and integrated workflows.

For instance, when processing customer business, clients are now only required to upload electronic documents of necessary certificates via the online platform. The system is then able to automatically extract and cross-reference key information with the assistance of technologies such as optical character recognition (OCR) and intelligent audit systems. This capability drastically shortens the documentation review and overall business processing cycle, substantially boosting both service efficiency and accuracy. This immediate reduction in processing time is a cornerstone of the improved customer experience.

Furthermore, banks and other financial institutions can leverage digital technology to monitor the customer flow and the distribution of business types at their offline physical branches across different times of the day. They use this collected data to intelligently predict potential business needs during specific periods and subsequently optimize the branch layout, staffing levels, and resource allocation. This strategic use of data enhances the efficiency and quality of business processing in physical locations, thereby optimizing overall operational efficiency and providing customers with a superior, more predictable service experience [7]. The move towards automated and data-driven processes ensures faster turnaround times, fewer manual errors, and a more effective allocation of resources, marking a fundamental shift in how modern financial services are delivered.

3.4 Risk Prevention and Control

Digital technology also offers outstanding advantages in the critical area of risk prevention and control. Financial institutions now extensively utilize user digital footprints and vast datasets to construct detailed user profiles, which significantly enhances their ability to monitor potential risks and, consequently, helps to solve the perennial problem of information asymmetry [7].

In the specific field of small and micro loans, a complete set of scientific decision-making processes is

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established by comprehensively deploying a variety of digital technologies. This approach focuses heavily on "quantitative strategies" and managing risks through combined solutions, ultimately leading to the creation of a new generation of digital small and micro loan technology [3]. For instance, large commercial banks can build sophisticated real-time risk control models powered by big data and machine learning algorithms. These models are designed to continuously track and analyze the operating cash flows, tax filings, and transaction records associated with small and micro-enterprise loans. When the system detects anomalies or unusual patterns in a company's capital chain—such as sudden drops in revenue or irregular transactions—it can immediately issue automated warnings and allow credit officers to swiftly adjust lending or credit policies. This proactive capability is crucial for effectively avoiding potential loan losses before they materialize.

The evidence confirms that digital risk control has substantially improved the accuracy and response speed of risk identification. This improvement is achieved through several mechanisms: multi-dimensional data cross-validation, continuous real-time monitoring of transactions, and intelligent early warning systems. By providing a solid guarantee for asset security, digital risk control is indispensable for the sustainable operation and expansion of inclusive finance. These technological advancements transform risk management from a reactive process into a sophisticated, predictive defense system.

4. Conclusion

China's digital inclusive finance is currently transitioning from a phase of scale expansion to a phase of optimization and deep cultivation. Digital technology continues to improve its breadth of coverage and depth of use. By restructuring service models and innovating product forms, it has significantly increased the inclusiveness of China's inclusive finance. In terms of service availability, the application of digital technology has enabled financial services to transcend geographical limitations and reach rural and remote areas, driving the digital transformation of traditional financial institutions and lowering service barriers. Regarding service efficiency, banks and other financial institutions are leveraging digital tools to optimize business processes and branch layouts, improving operational efficiency and customer experience. In terms of risk management, insurance companies and other financial institutions are leveraging big data credit reporting and model building to effectively mitigate information asymmetry and establish a scientific risk management system for small and micro loans.

However, it's important to note that while China's digital inclusive finance has developed rapidly in recent years, achieving significant progress in both depth and breadth, the transition from high-speed to high-quality development has also brought with it a series of issues concerning regulatory mechanisms and consumer rights. First, the impact of digital technology on inclusive finance in China remains heterogeneous. Regional development disparities persist, and barriers to accessing basic technologies and related infrastructure remain significant for rural areas, the elderly, and low-income groups. The digital divide remains prominent, manifested in low internet usage and poor payment environments in these regions and populations. Secondly, data and privacy leaks arising from the application of digital technologies are gradually emerging and have become a major challenge to the development of digital inclusive finance in China. With the further development of digital technologies such as artificial intelligence and blockchain, digital inclusive finance will accelerate its evolution towards precision and intelligence. Technological applications will focus more on the personalized needs of long-tail customers, cross-regional service capabilities will continue to strengthen, and regional development gaps will gradually narrow thanks to the improvement of digital infrastructure, driving the transition of inclusive finance from rapid to high-quality development.

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Conflicts of Interest

The authors declare no conflict of interest.

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