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Enhancing SMEs Development Through Fintech: Insights from China's Economic Transformation

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Abstract

Small and Medium-sized Enterprises (SMEs) are pivotal in driving domestic innovation and play a crucial role in China's economic transformation and industrial upgrading. Despite their importance, Chinese SMEs face persistent challenges, including constrained access to external funding, limited financing channels, and high borrowing costs, which hinder their development. Addressing these issues has become a critical concern in ensuring sustainable economic growth. In recent years, the rapid advancement of financial technology (fintech) has provided new opportunities to mitigate the financing constraints of SMEs. Emerging technologies such as blockchain, big data, and cloud computing have become integral components of fintech, fostering the continuous innovation of financial models. These advancements offer novel solutions to reduce financing costs, diversify funding sources, and improve SMEs' access to capital. This study systematically investigates the interplay between China's fintech innovation and SME development. It begins by assessing the current state of SMEs and fintech innovation, providing a comprehensive overview of their respective progress. Subsequently, the study evaluates the multifaceted impacts of fintech on SME operations, financing, and growth potential. Finally, the research identifies practical pathways to leverage fintech innovation in addressing SMEs' challenges, including policy recommendations and technological applications. The findings underscore the transformative potential of fintech in enhancing financial inclusivity and operational efficiency for SMEs. Policymakers and industry stakeholders are encouraged to promote fintech-driven solutions to foster a resilient and inclusive SME ecosystem, contributing to China's broader economic modernization agenda.

Keywords: Fintech, SMEs, Financing Challenges, Blockchain, Economic Development.

A. Introduction

With the further deepening China's Industry 4.0 era, China is accelerating a major strategic shift from traditional machinery manufacturing to modern enterprise-independent innovation. This development trend has brought new opportunities for technology-based SMEs. In recent years, SMEs have, to some extent, promoted the rapid growth of China's economy and alleviated the employment problem, becoming a solid force in promoting the stability of the market economy. However, due to the limited financing channels of SMEs and the difficulty in obtaining financial support, it is challenging for SMEs to achieve long-term development, which is the financing problem that plagues society. In recent years, China's socialist market economy has shifted from a high-speed growth stage to a high-quality development stage. The market economic structure in China needs to be rapidly transformed and upgraded. Coupled with many obstacles in external international trade and investment, the overall economic benefits of SMEs are low. Especially in the current severe macroeconomic downturn, some large and well-reputed

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private SMEs are more likely to obtain social resources. At the same time, small and micro enterprises with a lower scale find it even more difficult to access social resources. The financing problem has become more severe. Meanwhile, fintech is developing rapidly in China, and banks have played a good exemplary role in applying fintech innovation. They have successively launched new financing schemes such as supply chain financing, intellectual property pledge financing, and bank-tax interaction. At the same time, innovative financing channels such as P2P online lending and equity crowdfunding have also emerged continuously. According to data, fintech development has helped SMEs solve the financing problem to a certain extent. On the one hand, SMEs have improved their information transparency through fintech innovation. For example, through big data or other channels, banks can determine credit costs by combining the tax payment information of SMEs. On the other hand, fintech development has provided SMEs with many financing methods and promoted their rapid financing. However, it is still necessary to clarify the advantages and disadvantages of fintech in SME financing at the intrinsic level to help improve the development of SMEs in China.

Lian Libin (2015) studied and concluded that small and micro enterprises in China are developing rapidly and their contribution to society is increasing. Wu Diliang (2020), Guo Lei, Tang Qi (2019), and other scholars researched the financing difficulties of SMEs and small and micro enterprises in China. Scholar Wu Diliang (2020) believes that there are three reasons for the financing difficulties of SMEs. First, the financing amount of SMEs in China is relatively small. Second, the borrowing cycle of SMEs from banks and other financial institutions is relatively short. Third, the credit rating standards of banks or other financial institutions for SME financing are relatively high, and the procedures are relatively cumbersome. In addition, financial institutions also need to conduct a comprehensive assessment of the credit of SMEs and require collateral or guarantors, which is relatively complex for SMEs.

Song Ke (2019) believes that fintech refers to financial innovation brought about by technology, which can create new models, businesses, processes, and products. We need to apply technological innovation throughout the financial field. Xie Xiaolu (2020), Song Ke, Shen Qing, Fu Xinghu (2019), and others believe that fintech has undergone three stages. Fintech 1.0 is the initial stage, and the most significant feature is that traditional financial institutions in China have shifted from offline to online. Fintech 2.0 is the so-called online finance stage, during which we witnessed the birth of Alipay. The characteristics of this stage are the financialization of Internet companies and the mobility of banking businesses. Fintech 3.0 is the current hottest "fintech" stage. Fintech has created new business models, processes, and products, which have significantly impacted China's financial market, financial institutions, and products. Scholar Wu Guanghan (2019) believes that "fintech" was born in some financially developed countries in Europe and America. Compared with them, fintech development in China started relatively late, but it has shown a trend of catching up from behind, especially in fintech and fintech giant enterprises. Scholar Zhang Jian (2019) also said that in recent years, fintech has developed rapidly in China and has profoundly impacted the global financial industry. On the one hand, relying on the advantages of big data and technology, fintech companies represented by Ant Financial and Tenpay have occupied a place in the consumption field. On the other hand, major banks have also accelerated the integrated development with fintech and successively established fintech companies. Although fintech innovation has injected new vitality into the development of China's financial industry, it has also brought new challenges to China's stable financial environment.

Wu Diliang (2020) studied and concluded that many SMEs in China cover a wide range of fields. Although this has promoted the development of China's market economy to a certain extent, due to the relatively small capital amount and weak risk-bearing ability of SMEs in China, they have difficulties in obtaining loans from commercial banks. Moreover, most SMEs have short-term loans, so the loan cycle is relatively short. As we all know, the longer the loan

cycle, the higher the profit obtained by the bank. Banks usually lend to enterprises with relatively long loan cycles to get higher profits. Foreign scholar Henry Pooley (2020) found that the financing review requirements of SMEs in banks or other financial institutions are relatively high, which takes much time. In addition, banks also need to conduct a comprehensive assessment of the credit rating of SMEs and require collateral, which increases the repayment pressure and makes SMEs give up loans. Fan Jingyi (2019) said that many non-bank entities have emerged with fintech. They can provide customers with high-yield financial products and various services through third-party payment platforms to attract customers, enriching the financing methods of SMEs. Guan Qigu (2019) studied and concluded that fintech innovation has brought a variety of financing channels to SMEs. In addition, fintech companies can also provide some credit services required by small and micro enterprises and reduce the financing cost of SMEs to a certain extent. With the rapid development of fintech, the banking industry has continuously used scientific and technological means to transform its business digitally. Therefore, the supply of financial services closely integrated with fintech has increased significantly. Liu Yueping (2019) believes this is due to two reasons. First, with fintech development, the market competition in China has become increasingly fierce, and financial services have continuously innovated. Customers now have higher demands for more convenient and cheaper financial services. Second, with the decline in the popularity of tools and smart devices such as the Internet, smartphones, and tablets and the continuous improvement of the processing capacity of China's computer system, it has provided technical support for the efficient financial services of banking institutions. With the rapid development of fintech, the banking industry has continuously used scientific and technological means to transform its business digitally. Therefore, the supply of financial services closely integrated with fintech has increased significantly. Liu Yueping (2019) believes this is due to two reasons. First, with fintech development, the market competition in China has become increasingly fierce, and financial services have continuously innovated. Customers now have higher demands for more convenient and cheaper financial services. Second, with the decline in the popularity of tools and smart devices such as the Internet, smartphones, and tablets and the continuous improvement of the processing capacity of China's computer system, it has provided technical support for the efficient financial services of banking institutions.

B. Methods

The methodology of this study combines qualitative and quantitative approaches to comprehensively analyze the impact of fintech innovation on the financing of small and medium-sized enterprises (SMEs) in China. The research design integrates a literature review and empirical modeling to address the dual objectives of identifying key internal and external factors affecting SME financing and quantifying the role of fintech innovation. The qualitative component involves synthesizing scholarly insights to establish a theoretical framework. At the same time, the quantitative analysis employs a multiple linear regression model to assess the relationship between fintech innovation and SME financing. This mixed-methods approach ensures a robust and multi-dimensional understanding of the subject.

The study procedures are organized into several systematic steps. First, a thorough literature review uses academic databases such as CNKI and VIP, focusing on domestic and international studies exploring fintech innovation and SME financing. This review identifies internal factors, such as SME size, unstable earnings, poor credit status, and non-standardized management practices, alongside external factors, including banking practices, capital market constraints, and inadequacies in the legal framework. These factors are integrated into the study's analytical framework. Second, a multiple linear regression model is developed to empirically examine the relationship between fintech innovation (as the explanatory variable) and the SME financing

scale (as the dependent variable) while controlling for variables such as the asset-liability ratio, profitability, enterprise scale, and external financing environment.

The study employs secondary data collection methods to gather relevant information for analysis. Academic articles, industry reports, and statistical databases provide data on the FinTech Innovation Index, SME financing trends, and control variables. A detailed review of prior research highlights theoretical concepts and empirical findings that support the study's objectives. Additionally, specific case studies of SMEs utilizing fintech solutions are examined to provide contextual insights into how fintech innovations address traditional financing barriers. This comprehensive data collection ensures the analysis captures theoretical nuances and practical realities of SME financing in China.

Data analysis involves a step-by-step process using a multiple linear regression model to evaluate the relationship between variables. Descriptive statistics, such as means, medians, and standard deviations, are calculated to provide an overview of the data. The regression analysis estimates the impact of fintech innovation on SME financing while controlling for other influential factors. Diagnostic tests, including checks for normality, multicollinearity, and heteroscedasticity, are conducted to ensure the reliability and validity of the model. By combining theoretical synthesis and empirical testing, the study provides actionable insights into how fintech innovations can be leveraged to overcome SME financing challenges and foster financial inclusion in China's evolving economic landscape.

C. Findings and Discussion

In 2020, China emerged as a global leader in fintech financing, securing the top position in the number of fintech financing projects and the second position in total financing amounts. This remarkable achievement underscores China's pivotal role in the global fintech landscape, reflecting the country's capacity to foster technological innovation and attract substantial investments. According to the Zero One Think Tank, the combined fintech financing activities in China and the United States constituted approximately 50% of all global fintech projects, highlighting the dominance of these two nations in driving technological and financial advancements. The global distribution of fintech financing in 2020 spanned 56 regions and countries, with the United States, China, the United Kingdom, India, and Germany ranking as the top five contributors. This regional concentration indicates that fintech innovation is most pronounced in countries with robust digital infrastructure, supportive regulatory environments, and significant market potential. China's leadership in this domain can be attributed to several factors, including its large domestic market, high internet penetration rate, and the rapid adoption of digital payment systems such as Alipay and WeChat Pay. These platforms have created a fertile ground for fintech companies to thrive, attracting domestic and foreign investments.

Theoretically, the Diffusion of Innovation Theory (Rogers, 1962) explains China's success in fintech financing. This theory posits that adopting innovation is influenced by relative advantage, compatibility, and observability. China's fintech sector demonstrates a clear relative advantage by addressing critical gaps in financial inclusion and providing scalable solutions for consumers and businesses. Furthermore, the Network Effect Theory highlights the role of interconnected firms and users in amplifying the value of digital financial platforms, further solidifying China's global position. The dominance of China and the United States in fintech financing reflects a broader trend of technological hegemony, as described by economic theorists such as Joseph Schumpeter. His concept of creative destruction elucidates how technological advancements disrupt traditional industries to create new economic paradigms. In this context, fintech innovation in China has revolutionized financial services, from credit allocation to peer-to-peer lending, making conventional financial institutions reimagine their business models to remain competitive. The distribution of global fintech financing not only underscores the

competitive edge of leading nations but also illustrates the importance of fostering ecosystems that blend technology, capital, and innovation to drive sustainable economic growth.

China's fintech industry has played a transformative role in expanding access to credit, particularly consumer credit. According to data from iResearch, in 2016, China's penetration rate of narrow consumer credit was only 0.18, compared to the United States at 0.34. By 2020, these rates had converged significantly, underscoring the rapid development of China's fintech sector. This progress highlights how fintech innovations have reshaped the financial landscape, enabling China to catch up with advanced economies in financial inclusion and credit accessibility. Theoretical frameworks such as Schumpeter's theory of innovation emphasize that technological disruption fosters new avenues for growth and efficiency. In the context of fintech, innovations like mobile payment systems, peer-to-peer (P2P) lending platforms, and digital credit scoring have revolutionized the distribution of financial services by reducing transaction costs and overcoming information asymmetry (Schumpeter, 1934).

This expansion of consumer credit aligns with the goals of inclusive finance, which the World Bank defines as providing affordable and accessible financial services to underserved populations. China's fintech ecosystem, led by major players such as Ant Group's Alipay and Tencent's WeChat Pay, has achieved this by leveraging big data and artificial intelligence to create scalable, low-cost digital platforms (World Bank, 2017). These innovations have facilitated financial inclusion, particularly in rural and low-income urban areas, fostering broader economic activity and consumption growth. Furthermore, the government's proactive policies, such as the "Internet Plus" strategy, have encouraged fintech innovations supporting financial inclusion and economic modernization (Chen et al., 2020).

Comparing China with the United States reveals how institutional differences influence fintech adoption. While the United States benefits from a mature financial system, China's fintech sector has leapfrogged traditional banking infrastructure, a phenomenon supported by Rogers' diffusion of innovation theory (Rogers, 2003). This theory suggests that late adopters can achieve rapid progress by adopting cutting-edge technologies, bypassing earlier stages of development. However, challenges remain in regulating the rapidly evolving sector, ensuring data security, and preventing over-leveraging. Despite these challenges, China's fintech-driven credit expansion demonstrates how technology can promote systemic financial change, contributing to broader economic development and social equity.

The integration of financial and technology enterprises marks a significant evolution in China's fintech ecosystem, fostering collaboration and innovation across various market segments. This convergence has led to diversifying participants within the fintech market, which now includes financial institutions at the forefront, technology companies providing technological and data solutions at the back end, and fintech solution service providers acting as intermediaries. Each entity plays a specialized role, creating a dynamic and interdependent ecosystem that enhances the efficiency and scalability of financial services (Zhang et al., 2021).

At the back end, technology companies leverage advancements in big data, blockchain, artificial intelligence, and cloud computing to deliver cutting-edge technological infrastructures (Chen & Xu, 2020). These solutions are utilized by fintech service providers in the middle, who develop customized business applications tailored to the needs of financial institutions. These institutions, positioned at the front, integrate these solutions to optimize their operations, enhance customer experiences, and expand their market reach. This triadic structure promotes a symbiotic relationship where technology drives financial innovation, and finance provides a practical application for technological advancements. According to the Resource-Based View (RBV) theory, such strategic collaboration enables firms to combine their core competencies, creating a competitive advantage that is difficult for rivals to replicate (Barney, 1991).

Despite this progress, financial institutions in China have historically struggled with limited technological research and development (R&D) capabilities. Recognizing this gap, many institutions have significantly increased their R&D investments in recent years. By building proprietary technological infrastructures, they are closing the gap with leading technology firms (iResearch, 2021). Concurrently, technology companies have begun recruiting financial experts, reflecting a shift toward vertical integration. These companies are transforming from pure technology providers into holistic financial service providers, capable of handling both technological and operational aspects of financial businesses.

This transformation aligns with the Dynamic Capability Theory, which emphasizes that firms must continuously adapt to changing market conditions by reconfiguring their resources and processes (Teece, Pisano, & Shuen, 1997). The recruitment of financial talent by technology companies not only diversifies their skill set but also allows them to compete in a broader spectrum of the financial market. For instance, several fintech designers have successfully acquired financial licenses, enabling them to offer comprehensive financial products and services (Zero One Think Tank, 2020). This vertical expansion blurs the boundaries between financial and technological enterprises, driving the emergence of hybrid entities that embody the principles of both domains. The ongoing integration of these entities is a testament to the strength of collaborative innovation in China's fintech sector. It underscores the potential of crossindustry partnerships to address systemic challenges, foster economic resilience, and drive the digital transformation of traditional financial systems. Future efforts should focus on policy frameworks that encourage such integration, ensuring that these collaborations are sustainable, scalable, and inclusive (Wang et al., 2022)

Small and medium-sized enterprises have an absolute advantage in number. The latest data shows that the country's total number of enterprises of all types is 15.2784 million. Among them, the number of small and micro enterprises exceeds 10 million, accounting for 0.77 of the total number of enterprises. After including 45 million individual industrial and commercial households in the statistics, it can be calculated that the proportion of small and micro enterprises reaches 94.15%, with a vast number base. The products of small and medium-sized enterprises are scattered across various industries. According to China's industry statistical data, small and medium-sized private enterprises are mainly engaged in wholesale, retail, and service industries. The scope involved is relatively broad. By the end of 2020, small and medium-sized enterprises in China were involved in more than 30 industries—analysis of the financing status of small and medium-sized enterprises. First, the state's support for the credit of small and medium-sized enterprises is insufficient. According to the statistical results of commercial personal bank loan data in 2016, in the number of loans granted by commercial banks, the ratio of the total loan amount of small and medium-sized enterprises to the total loan amount of large-scale enterprises is 3:7. In addition, according to the statistical data of the China Banking and Insurance Regulatory Commission, as shown in the following table, in recent years, the loan amount of small and medium-sized enterprises in China has increased every year. By the end of 2019, the loan amount of small and medium-sized enterprises exceeded 40 trillion yuan, with a year-onyear growth of 0.63. Among all enterprises in the country, small and medium-sized enterprises account for 99% and 60% of the country's GDP, and 50% of the tax revenue comes from these small and micro enterprises. This shows that the financing scale of small and medium-sized enterprises in China will maintain a slow upward trend.

The descriptive statistical analysis shows that the mean and median of the financing scale of small and medium-sized enterprises (L) are relatively close, indicating that the financing scale of small and medium-sized enterprises in the sample banks has shown a relatively stable change over the years. Regarding the Jarque - Bera normality test, all P - values are less than 0.05, and neither the financing scale of small and medium-sized enterprises nor the fintech innovation index follows a normal distribution. The mean of the fintech innovation index is greater than the

median, indicating that the financing scale of small and medium-sized enterprises shows an upward trend. From the standard deviation perspective, the sample banks' loan-to-deposit ratio has relatively large fluctuations. The sample's relatively large standard deviation of the enterprise scale indicates that the enterprise scale has relatively large fluctuations, and the difference between the maximum and minimum values is relatively significant.

According to the fixed effect regression, the adjusted goodness of fit of the model is 0.9891, indicating that the explanatory power of the model is relatively strong. At the significance level of 0.01, the fintech innovation index and the financing scale of small and medium-sized enterprises show a significant positive correlation; the profitability and external financing environment have a significant promoting effect on the financing scale of small and medium-sized enterprises at the significance level of 0.01, while the asset-liability ratio, enterprise scale, and financing channels have no significant impact on the financing scale of small and medium-sized enterprises.

D. Conclusion

This study highlights the critical role of fintech innovation in addressing the financing challenges faced by small and medium-sized enterprises (SMEs) in China. By leveraging technologies such as mobile Internet, cloud computing, and big data, fintech has reshaped traditional financial products and services, enabling SMEs to overcome structural barriers to financing. The analysis confirms a significant positive correlation between fintech innovation and the financing scale of SMEs, as evidenced by empirical results at a 0.01 significance level. Additionally, the study finds that factors such as profitability and an improved external financing environment significantly promote SME financing. In contrast, traditional metrics like the asset-liability ratio, enterprise scale, and financing channels have limited impact. These findings underscore fintech's ability to reduce information asymmetry through data-driven credit profiling, providing previously underserved SMEs with enhanced access to financial resources.

Several policy and strategic measures are recommended to further amplify the benefits of fintech innovation for SME financing. Policymakers should strengthen regulatory frameworks to support the growth of fintech companies while ensuring data security and consumer protection. Efforts to integrate fintech solutions with traditional financial institutions, such as commercial banks, should be enhanced to streamline financing processes and reduce costs. Additionally, SMEs should be encouraged to adopt digital platforms and technologies to improve their credit visibility and operational efficiency. Lastly, further research should explore the long-term impact of fintech innovation on SME growth and its potential to drive inclusive economic development, ensuring that fintech continues to empower SMEs and foster sustainable economic progress in China.

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