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From Cogs to Connectivity: Fintech and the Industrial Revolution of Finance

Lihong Gao[1,a,*]
[1]School of Finance,Shanghai University of International Business and Economics, Shanghai, China
a. leon_gao2002@126.com
**corresponding author*

Abstract: This article provides an in-depth analysis of the profound impact that financial technology (Fintech) has had on the financing landscape for small and micro enterprises in China. Drawing from the insights of numerous reputable institutions and research findings, it underscores the pivotal role played by Fintech in facilitating the digital transformation of these enterprises. This transformative role encompasses a paradigm shift in credit delivery methods, heightened credit efficiency, and reduced default risks. Furthermore, the article delves into how Fintech actively fosters financial inclusion, leading to positive reforms within the financial market and enhancing the delivery of financial services. Nevertheless, the discussion does not shy away from addressing the potential technological and legal risks that accompany the rapid development of Fintech, particularly the challenges pertaining to network security and regulatory oversight. In essence, Fintech has injected newfound dynamism into China's financial sector while introducing a spectrum of prospective risks. With ongoing technological advancements and regulatory enhancements, Fintech is poised to sustain its pivotal role in China's financial landscape, propelling innovation and advancing financial services.

Keywords: Fintech, financing for SMEs, digital transformation, finance inclusion

1. Introduction

In recent years, the realm of financial technology, commonly known as Fintech, has undergone a profound and sweeping transformation. Fintech, a fusion of "financial" and "technology," epitomizes a dynamic industry that leverages cutting-edge technological advancements to redefine how financial services are delivered, consumed, and accessed. Its emergence and meteoric ascent have transcended geographical boundaries, setting in motion a disruptive wave that reverberates throughout the entire financial sector. Notably, this transformative wave has cast a spotlight on the realm of small and medium-sized enterprises (SMEs).

The origins of the Fintech revolution can be traced back to the aftermath of the global financial crisis in 2008, a pivotal period that gave birth to innovative startups and forward-thinking visionaries. These pioneers discerned the transformative potential of technology, recognizing it as the panacea to address the persistent inefficiencies that had long plagued traditional banking and financial institutions. This crucible of innovation paved the way for a proliferation of Fintech startups, introducing novel solutions that challenge established paradigms, promote financial inclusivity, and fuel the exponential growth of digital finance.

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Small and medium-sized enterprises (SMEs) represent the lifeblood of the global economy. As of the conclusion of 2022, China alone boasted an astounding 52 million small, medium, and micro enterprises, reflecting an astonishing 51% surge from the close of 2018.[1] SMEs have emerged as the largest and most dynamically evolving cohort of enterprises in China, serving as engines of job creation, catalysts for economic progress, and crucibles of innovation. They play a pivotal role in upholding industrial and supply chain stability and competitiveness, all while nurturing entrepreneurial talent. With their agility, SMEs adeptly navigate ever-shifting markets, seize emerging opportunities, and swiftly adapt to periods of economic growth. However, these enterprises have long grappled with formidable challenges, particularly in securing the financing needed to facilitate their expansion. Recognizing the instrumental role SMEs play within the economic ecosystem, the Chinese government has proactively championed Fintech development through a series of policy initiatives, envisioning it as the bridge to span these financing gaps.

As the intricate and symbiotic relationship between Fintech and SME financing deepens, the imperative for a comprehensive and illuminating examination of their interaction becomes paramount. This review endeavors to navigate the multifaceted terrain where Fintech and SME financing intersect, casting light on the potential for transformation and illuminating the accompanying challenges and opportunities that emerge from this convergence. Through systematically exploring key dimensions, this paper seeks to provide a nuanced and insightful understanding of this dynamic relationship.

The ensuing sections of this paper are structured as follows: Section 2 delves into the scrutiny of Fintech's profound impact on the accessibility, affordability, and efficacy of financial services for SMEs. In Section 3, this study explore the technological innovations within the realm of Fintech that have not only reshaped but also redefined the landscape of SME financing. Section 4 is dedicated to the identification and examination of the intricate challenges and the tantalizing opportunities that converge at the crossroads of Fintech and SME financing. Finally, in Section 5, this study draw insightful conclusions and cast a discerning gaze toward the future.

Hopefully, this paper offers a comprehensive, evidence-based, and insightful exploration of the profound impact of Fintech developments on SME financing, illuminating the transformative potential of such synergies not only for SMEs but also for the broader canvas of the global financial landscape.

2. Foundations

2.1. SMEs: Concept

According to the *Classification Method for Large, Medium, Small and Micro Enterprises in Statistics (2017)*[2], various legal entities or units established in accordance with Chinese laws will be divided into large, medium, small and micro enterprises based on indicators such as the number of employees, operating income, total assets or alternative indicators, combined with industry characteristics. For individual businesses, this method will also be applied.

Taking industry as an example, the criteria for delineation in the current method are as follows:

[1] See https://www.gov.cn/lianbo/bumen/202306/content_6887257.htm
[2] See http://www.stats.gov.cn/zs/tjws/tjbz/202301/t20230101_1903367.html

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Table 1: The criteria for delineation of industry.

Industry	*Metric*	*Unit of measure*	*Large businesses*	*Medium-sized businesses*	*Small businesses*	*Microenterprises*
Industry	*Practitioners(X)*	*Person*	*X≥1000*	*300≤X<1000*	*20≤X<300*	*X<20*
	Operating income(Y)	*ten thousand Yuan*	*Y≥4000*	*2000≤Y<4000*	*300≤Y<2000*	*Y<300*

Source: http://www.stats.gov.cn/zs/tjws/tjbz/202301/t20230101_1903367.html

2.2. SME Financing: Concept and Current Situations

2.2.1. Concept

According to *the 2021 Report on Financing Development for Small and Medium-sized Enterprises in China*, published by iResearch, the financing industry chain within the platform economy for Small and Medium-sized Enterprises (SMEs) encompasses four crucial participating entities: financial institutions, fintech companies, core platforms, and external data service providers. External data service providers supply financial institutions and fintech companies with external data pertinent to taxation and various other areas. Core platforms, on the other hand, furnish data resources related to SMEs to financial institutions and fintech companies. Fintech companies, in this ecosystem, hold a pivotal role, providing essential business capabilities, including anti-fraud detection, intelligent risk control, and user profiling to financial institutions. Furthermore, some fintech companies extend their support by providing data related to SMEs, often through interactions or collaborations with SMEs and core platforms. Financial institutions, relying on the data and business capabilities offered by fintech companies and core platforms, deliver loan services to SMEs.

It is noteworthy that these key participating entities do not operate in isolation; instead, there is a certain degree of interaction and overlap among them. For instance, specific financial institutions may assume multiple roles, functioning both as a fintech company and a core platform. This comprehensive collaborative effect plays a pivotal role in the SME financing domain, enhancing the overall efficiency and sustainability of the financial market. This intricate and coordinated network of relationships constitutes a central element within the SME financing ecosystem, opening up more financing avenues for SMEs and delivering more intelligent financial services.

2.2.2. Current Situation

The financing landscape for micro, small, and medium-sized enterprises (SMEs) in China is beset by a multitude of challenges. Firstly, SMEs encounter substantial hurdles when pursuing traditional bank loans. Meeting the collateral and guarantee requirements of bank loans proves to be arduous, rendering banks more risk-averse when considering loan approvals. Simultaneously, banks face restrictions in loan disbursement capacity, which dampens their willingness to actively engage in financing SMEs [1].

Secondly, SMEs frequently contend with low creditworthiness. Relevant data reveals a consistent year-on-year increase in the bad debt rate among China's SMEs, significantly surpassing the bad debt rate of small and medium-sized enterprises in mature market economies. Consequently, traditional financial institutions exercise greater caution in granting loans to SMEs [1, 2].

Due to limitations such as inadequate collateral capacity and limited creditworthiness, SMEs often encounter difficulties when seeking financing from traditional financial institutions, leading them to rely on commercial credit and informal financial channels like private lending, which offer more formalized alternatives.

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Additionally, SMEs typically have smaller-scale operations, limited capital, higher risk profiles, constrained fundraising capabilities, and narrower funding sources [2-4]. These factors increase the likelihood of encountering challenges in capital turnover. Furthermore, deficiencies and loopholes in SME management and operational methods can lead to a detrimental cycle. The absence of robust financial systems and talent further hampers SMEs' ability to secure financial support.

Overall, SME financing in China grapples with multiple challenges encompassing creditworthiness, collateral requirements, loan accessibility, and management. While the Chinese government has implemented a series of policy measures to support SME financing, more proactive efforts are imperative to enhance the situation. According to the 2021 China Small and Medium-sized Micro Enterprises Financing Development Report by iResearch, the past few years have witnessed a significant expansion in the scale of loans granted to China's small and micro enterprises. The loan balance grew from 27.7 trillion yuan in 2016 to 43.2 trillion yuan in 2020, reflecting a compound annual growth rate of 12.2%. This growth is expected to persist in the coming years. Nevertheless, it is essential to remain attuned to and address the financing challenges confronted by SMEs.

According to the Online Survey of Micro, Small and Medium-sized Enterprises: Quarterly Report (2023Q1) and Confidence Index (2023Q2), jointly released by Peking University Enterprise Research Center, Peking University Institute of Social Sciences, Ant Group Research Institute, and MYbank in May 2023, Chinese small and micro business operators have embarked on digital transformation. This transformation is evident in various aspects: (1) a growing proportion of small and micro operators now engage in online sales; (2) there has been a slight decrease in the proportion of small and micro operators conducting both online and offline sales operations compared to the previous quarter; (3) the proportion of operators operating on multiple platforms is gradually increasing; (4) the utilization rate of electronic information systems among small and micro operators continues to rise [5].

2.3. Fintech: Concept and Benefits

2.3.1. Concept

The definition of FinTech, broadly embraced by regulatory and professional bodies such as the Financial Stability Board and the Basel Committee on Banking Supervision, is articulated as follows:

"Technologically enabled financial innovation that may lead to the emergence of new business models, applications, processes, or products, exerting a substantial impact on financial markets and institutions, as well as the delivery of financial services..."

2.3.2. Benefits

In the era of rapid financial technology development, the collection and analysis of financial market data are poised to become more convenient, further diminishing information imbalances [6, 7]. By leveraging trading and investment strategies supported by artificial intelligence and big data[3], the price discovery mechanism of financial markets will undergo a significant redefinition, accompanied by a substantial enhancement in transaction speed. These transformative changes are expected to boost the liquidity, efficiency, and stability of financial markets, offering regulators more efficient tools for analyzing, warning, and responding to systemic risks in these markets [6].

A burgeoning area of research underscores the pivotal role of fintech in propelling financial inclusion, particularly in terms of enhancing the availability and equitable access to financial services [8]. Online platforms have immense potential to champion financial inclusion, with numerous studies substantiating the capacity of fintech services such as mobile money, digital payment solutions, and

[3] See http://theory.people.com.cn/n1/2018/1120/c40531-30410288.html

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digital lending platforms to extend financial services to individuals lacking bank accounts [9]. Additional research underscores that the widespread adoption of fintech can lead to a reduction in income inequality of up to 23% [8]. In sum, the research underscores the positive impact of fintech on financial inclusion, with the magnitude of this impact contingent on the relevant infrastructure and policies.

Governments and international organizations are now recognizing the imperative of fintech in promoting financial inclusion. The G20 High-Level Principles for Digital Financial Inclusion, for instance, underscores the significance of fostering financial inclusion through fintech to mitigate global income inequality. Additionally, the United Nations (UN) 2030 Agenda for Sustainable Development exhorts harnessing fintech innovation and development to stimulate economic growth in emerging and developing countries [10].

3. Some Issues

3.1. Fintech's Profound Impact on the Accessibility, Affordability, and Efficacy of Financial Services for SMEs

As per *the Financial Inclusion Development of Fintech Services report* released by the China Institute for Inclusive Finance (CAFI) in 2020[4], Fintech has wielded a profound influence in enhancing the accessibility, affordability, and efficiency of financial services for micro, small, and medium-sized enterprises (SMEs). The persistent issue of information asymmetry between traditional financial institutions and MSMEs has historically posed a significant barrier to SME financing. Nevertheless, in recent years, Fintech has emerged as a potent tool in ameliorating this challenge.

The advent and proactive implementation of financial technology have empowered financial institutions to harness the capabilities of the Internet, Internet of Things, big data, cloud computing, blockchain, artificial intelligence, and other technologies to effectively mitigate the issue of information asymmetry with small and medium-sized enterprises. This advancement has reduced costs associated with information collection and exchange, customer transaction expenses, and labor costs. Moreover, it has expanded the scope of services provided by financial institutions, extending the benefits to a broader array of small and micro enterprises.

In this transformative landscape, the establishment of a robust risk control system assumes pivotal importance, with fintech playing a central role in risk assessment. In order to furnish users with cost-effective and appropriate financing options, financial institutions must possess a comprehensive understanding of user information. This involves evaluating their capacity and willingness to repay, scrutinizing their creditworthiness, predicting default probabilities, and implementing corresponding risk mitigation measures. Fintech technologies, especially cloud computing, big data, and artificial intelligence, play a pivotal role in this multifaceted process.

Within the credit business model, the anti-fraud model and the credit risk model occupy the core of operations. The anti-fraud model primarily confirms the genuine relationships between users, devices, and bank cards through an array of technical methods, while the credit risk model assesses the creditworthiness of individuals or enterprises through diverse data dimensions, enabling the formulation of judicious pricing strategies. These two modules are frequently employed in tandem to enhance the efficiency of risk management. For instance, in the context of social relationships, a user with close associations with blacklisted users or multiple cross-relationships with blacklisted users is deemed to carry a relatively higher credit risk.

Furthermore, financial technology isn't only applicable to the pre-loan and in-loan stages; it also extends to the post-loan phase. This is especially pertinent in the context of debt collection, where

[4] See https://zhuanlan.zhihu.com/p/226003539

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integrating big data and artificial intelligence technology enables the intelligent grouping of customers. Subsequently, collection robots adopt distinct strategies and methods tailored to the various stages of the collection process. In summation, the infusion of financial technology augments collection management efficiency, curtails labor expenses, and enhances the capacity to address intricate cases that may involve complexity or extended durations.

3.2. Fintech Innovations to Reshape and Redefine SME Financing

3.2.1. Change the Credit Delivery Model

Transforming the credit delivery paradigm is not solely the linchpin for resolving the financing quandaries of small and micro enterprises; it is also an indispensable prerequisite for accommodating the financial requirements of burgeoning economic entities. Fintech, the amalgamation of technology and finance, serves as the catalyst for seismic shifts in credit delivery models, playing a pivotal role in surmounting financing challenges [11].

The conventional credit delivery model predominantly stems from the incapacity to construct a scientific and efficacious risk assessment framework grounded in comprehensive information. However, the infusion of financial technology markedly enhances the information acquisition and processing capabilities of financial institutions. This, in turn, diminishes the information asymmetry between commercial banks and economic entities, permitting a return to the essence of credit: evaluating credit investments by scrutinizing the actual default probabilities and capital costs of economic subjects. The advancement of fintech underscores the significance of information collection and processing in risk pricing, catalyzing a paradigm shift in the conventional credit delivery model.

Consequently, the proportion of credit contingent on credit analysis is slated to progressively escalate. Small and micro enterprises boasting limited assets, robust operational performance, and a resolute willingness to meet their repayment obligations will undergo risk reevaluation by financial institutions. This recalibration will empower them with an enhanced capacity and augmented opportunities to secure financial resources.

3.2.2. Improve the Efficiency of Credit Issuance

Leveraging financial technology, commercial banks can achieve online credit approvals, curbing the time expenditures required for screening credit applicants and streamlining the approval workflow. In juxtaposition to the conventional procedures, fintech advancements expedite the credit approval cycle and alleviate the credit accessibility challenges confronting small and micro enterprises. By embracing inventive risk assessment techniques like big data analysis, cloud computing, and blockchain technology, the approval workflow stands poised for continuous enhancements, building upon existing processes to ensure a more efficient and agile system [11].

3.2.3. Reduce the Risk of Default

Fintech is adept at handling extensive datasets and crafting sophisticated, efficient credit evaluation models. It facilitates the creation of comprehensive customer risk profiles and enables the dynamic monitoring of potential risks, thereby deterring and increasing the costs of deliberate defaults [11]. As artificial intelligence continues to advance, these models gain the capability to automate their processes, serving as a formidable deterrent to businesses seeking to engage in malicious defaults and debt evasion.

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This multifaceted approach contributes to the overall improvement of the credit environment, bolstering the confidence of financial institutions in extending credit. Consequently, it amplifies the prospects for small and micro enterprises to secure financial resources.

3.3. Challenges and Opportunities at the Crossroads of Fintech and SME Financing

3.3.1. Challenges

(1) Technical Risks of Financing

While the ascent of Fintech has bestowed numerous advantages upon SMEs, it has concurrently ushered in technological risks [7]. Fintech's ongoing technological evolution demands increased sophistication in financial and network technology. To support Fintech's operations, corresponding platforms must be established and maintained, necessitating proficient platform functionality and active enterprise participation. However, this introduction of advanced technologies has amplified technical risks to a certain degree. For small and medium-sized enterprises, network technology stability is paramount when relying on these platforms for financing support. Technical risks, such as hacking attacks or platform system failures, can lead to unforeseen losses. These events not only jeopardize the internal integrity of the enterprise but also pose substantial challenges to customer relations, potentially disrupting the bond between the company and its clientele. These challenges introduce new complexities to technological innovation.

(2) Legal Risks of Financing

Under the conventional financing model, a relatively robust legal oversight system exists. However, in the emergent realm of Fintech, China's legal supervision remains a work in progress [7]. The legal oversight of the Fintech industry is currently evolving. Insufficient risk management can heighten the risks confronting Fintech platforms. Should policy or legal risks materialize, platform operations may be disrupted or even compelled to cease providing financial support to small and medium-sized enterprises. This abrupt discontinuation can deprive the company of its funding source, plunging it into dire straits. When SMEs opt for Fintech-based financing, they must bear more significant legal risks than traditional financing approaches.

3.3.2. Opportunities

(1) Promote the Stable Development of Bank Credit Business:

The swift ascent of financial technology once posed a competitive threat to traditional banking, particularly with the rapid emergence of internet-based financial enterprises impacting traditional bank credit operations. To safeguard market share and profitability, commercial banks expanded their business footprint. However, this expansion also heightened the risk of non-performing loans, challenging the sustainable growth of commercial banks. As financial technology becomes more deeply ingrained in commercial banking practices, it offers effective risk control mechanisms through tools like customer profiling and anti-fraud platforms. This, in turn, mitigates credit risk for commercial banks, elevates their risk management standards, and bolsters the overall stability of the financial system [6].

(2) Improve the Quality of Bank Credit Assets:

In fintech's early development phases, challenges such as market disorder and inadequate supervision arose, affecting the high-quality management of bank assets. Over time, however, commercial banks have progressively increased their investment in financial technology R&D. Through intelligent risk control platforms and similar tools, they have honed their capacity to identify high-quality credit resources and curtail operational risks. This has led to a reduction in non-performing loan (NPL) rates and NPL growth rates, diminishing the risks associated with credit defaults and fraud. The application of financial technology contributes to lowered bankruptcy risks for commercial banks, reduces credit risk, and concurrently benefits small and medium-sized enterprise financing [12].

(3) Expand Bank Credit Service Scenarios:

The rapid proliferation of fintech has intensified competition among banks. Consequently, commercial banks must continually broaden their credit service horizons to attract a larger customer base. The widespread use of financial technology alleviates information asymmetry between loan customers and commercial banks, granting an array of long-tail customers access to services and adjusting the credit structure of banks. This makes financial services more inclusive, fosters a more comprehensive impact, meets the diverse financing needs of small and medium-sized enterprises, and propels the growth of the financial sector.

4. Summary

The global ascent of financial technology (Fintech) has sparked a profound financial revolution, significantly impacting financial markets and service delivery. In China, Fintech has emerged as a vital solution for small and micro enterprises' financing challenges, facilitating financial inclusion, and enhancing service efficiency. Leveraging various technologies, Fintech is reshaping credit delivery models, streamlining credit issuance, and reducing default risks. Consequently, it bolsters financial market liquidity, enhancing overall efficiency and stability. Fintech's growth has also led to the redefinition of price discovery mechanisms, accelerated transaction speeds, mitigated information disparities, and expanded financing opportunities for small and medium-sized enterprises.

Fueled by Fintech, traditional financial institutions are better equipped to understand customer information, fortify risk management, streamline approval processes, alleviate credit hurdles, and optimize capital allocation efficiency. This, in turn, augments the credit market's quality and efficiency. Moreover, Fintech's wide-ranging applications broaden credit services' scope, making financial services more inclusive, catering to the diverse financing needs of small and medium-sized enterprises, and fostering comprehensive financial industry development. The development of Fintech also contributes to reducing credit business risks for banks, upholding financial system stability.

Nonetheless, Fintech's rise brings forth technical and legal risks. Technical risks encompass cybersecurity vulnerabilities that can result in losses for financial institutions and customers in case of technical failures or hacking attacks. Legal risks revolve around regulatory gaps and policy uncertainties, which may introduce unpredictability for Fintech platforms and SMEs. Consequently, the prudent development of Fintech requires meticulous technical and legal oversight to ensure its sustainable and stable progress.

5. Conclusion

This article underscores the profound impact that fintech has already made on the financing and financial markets for micro, small, and medium-sized enterprises in China. It has injected new vitality into the nation's financial system, all while acknowledging the array of risks that accompany fintech's advent. Fintech is actively reshaping the landscape of financial markets, bolstering the efficiency and accessibility of financial services, and broadening the avenues for SME financing. As technology continues to evolve and regulatory oversight becomes more refined, fintech will persist in its pivotal role in China's financial sector, driving innovation and fostering the advancement of financial services. Moreover, an intriguing avenue for future research lies in the exploration of the relationship between fintech and economic crises, seeking to ascertain whether fintech contributes to or mitigates financial contagion during such turbulent times.

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