

# Impact of Digital Financial Inclusion on Small and Medium-Sized Enterprises

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**Abstract.** With the rapid development of digital technology, Digital Inclusive Finance (DIF) has emerged and gradually become an important part of financial services. DIF expands service coverage and financing channels through digital technology, bringing a new kind of development opportunity for Small and Medium-Sized Enterprises (SMEs). This paper analyses the enterprises broken down into different regional and different property rights systems in order to study the degree of impact of DIF on SMEs from the perspectives of financing constraints and transformation and upgrading. It then draws the conclusion that DIF has a facilitating effect on SMEs. It can alleviate the financing constraints and reduce the financing cost of SMEs through DIF, which can help to reduce the financing cost of SMEs and improve their development. financing constraints and reduce financing costs, thus promoting innovation and upgrading of SMEs. The effects of digital financial inclusion on SMEs vary depending on location and ownership structures. From a regional perspective, digital financial inclusion has a greater impact on SMEs in the central and western regions than it does on SMEs in the eastern regions. From the perspective of property rights, non-state-owned SMEs have a greater impact on digital financial inclusion than state-owned businesses.

**Keywords:** Digital Inclusive Finance, Small and Medium-Sized Enterprises, Financing Constraints, Innovation and Upgrading, Heterogeneity Analysis.

## 1. Introduction

Small and Medium-Sized Enterprises (SMEs) are the largest and most active market players in China, and an important force in China's national economy and social development, while "financing is difficult and expensive" has become a problem in the development of SMEs. The emergence of the digital economy has accelerated the deep integration of finance and digital technologies like big data, cloud computing, and blockchain, leading to the development of numerous new financial models, new avenues for financial inclusion, and China's multi-level capital market. In order to make inclusive finance a reality, Digital Inclusive Finance (DIF) overcomes the constraints of the traditional financial market, broadens the scope of traditional financial services, increases their variety, lowers their cost, increases the financing channels available to market participants, and, to a lesser extent, resolves the financing issues faced by SMEs [1]. In order to support the growth of SMEs and China's economic development, it is therefore of considerable theoretical and practical value to research the relationship between DIF and SMEs.

As a new mode of financial development, DIF provides a convenient digital path to effectively alleviate the financing problems of SMEs and promote transformation and upgrading. The efficient network information processing technology of DIF enhances its risk-pricing ability for different enterprises, the "blind zones" of traditional financial institutions are lifted, and the liquidity of long-tailed funds in the financial market can be released. This would help Chinese SMEs who struggle to get financing from traditional financial institutions because of their small size and poor capacity to manage risk. Traditional financial institutions have trouble providing financing because of their small size and poor capacity for risk management [2]. Although China vigorously advocates DIF to alleviate its financing problems and strives to utilize the "big data analysis" and inclusive features of DIF to break the "law of two or eight" of the traditional financial institutions' lending system, accurately match the financing needs of SMEs, and incentivize SMEs to make the best use of DIF to meet the financing needs of SMEs. It strives to utilize the "big data analysis" and inclusive features of DIF to break the "two-eight rule" of the traditional financial institutions' lending system, accurately match

the financing needs of SMEs, and incentivize SMEs to transform and upgrade. Does DIF benefit SMEs in different regions to the same extent and does it affect SMEs with different property rights differently?

This study examines the degree of the influence of DIF on SMEs from two perspectives—financial restrictions and innovation and upgrading of SMEs—in order to address the problems raised above. First off, it offers a useful starting point for solving the present issues SMEs are having with funding and digital transformation. In addition, it offers a remedy for how to enhance the inclusion of digital financial. Thirdly, the heterogeneity of DIF for SMEs is empirically evaluated from the geographical, ownership character, which offers experience for modifying distinct DIF policies to support the growth of SMEs.

## 2. Concepts Related to Digital Financial Inclusion

It is believed that digital financial inclusion evolved from financial inclusion because the phrase "digital financial inclusion," which made its debut at the G20 Hangzhou Summit in 2016, refers to all the actions that advance financial inclusion through digital technology. The White Paper on the Development of DIF (2019) defines DIF as being developed "under the premise of controllable costs and sustainable models." Since the existing financial system does not adequately cover certain special groups, such as low-income people in cities and towns, rural populations, and populations in remote areas, as well as small and microenterprises, effective, comprehensive, and convenient financial products and services are needed to ensure equal access to all segments of society. In conclusion, big data and other digital technologies enable digital financial inclusion.

Compared with traditional financial services, the advantages of digital financial inclusion are mainly manifested in the following three points. First, Internet technology breaks the time and space constraints, making online services possible, expanding the service coverage of traditional financial institutions, while providing customers with cross-regional, no-threshold financial products and services, and customers in remote areas can also enjoy the same services, which promotes the development of DIF. Secondly, it reduces service costs. Through the application of digital technology, many traditional financial services are carried out online, which reduces the laying of regional business outlets and the input of relevant personnel, greatly reducing service costs. Third, improve service efficiency. Digital financial inclusion relies on the advantages of the Internet, big data and artificial intelligence. That is, the collection and storage of a large amount of data and information for rapid and accurate screening and analysis, to identify customer needs and provide personalized financial services. Customers can conduct cross-regional transactions on the online platform at any time, thus reducing capital transaction time and improving service efficiency.

On the one hand, DIF has made good use of Internet technology to address the issues with "difficult financing" and "expensive financing" for SMEs. First, a fine portrait of SMEs is created using a combination of big data and algorithms to accurately acquire a lot of SMEs' information sources, which reduces the possibility of adverse selection, moral risk and other problems between financial institutions and SMEs due to asymmetric information. Second, utilizing IoT technology, tracking and positioning and real-time monitoring of dynamic assets can be carried out, providing solutions to promote the development of supply chain finance business. Third, artificial intelligence collects, organizes, and analyzes dynamic credit data of SMEs through deep learning to supervise SMEs' operation status in real time and provide effective solutions for managing SMEs after loans. In summary, the deep integration of inclusive finance and digital technology significantly reduces the financing cost of enterprises, accelerates the speed of capital flow, and to a certain extent increases the number of SMEs in the overall financial market, broadens their financing channels, and promotes the transformation and upgrading development of SMEs.

On the other hand, DIF can improve the openness of information access, ease SMEs' financial constraints, and support their growth. DIF is characterized by strong information analysis, and through the use of its technology, it can provide SMEs with information from suppliers, distributors,

enterprises and other levels, increasing the transparency of market participants' access to information so that they can make better judgments and decisions. Similar to how DIF may help SMEs grow, it can also increase the activity and liquidity of the technology and production factor markets, boost the level of market competition overall, and allow capital to flow into businesses with more development potential. DIF can also increase SMEs' access to funding, increase their financial efficiency, and lower their financing costs, alleviating their financial limitations and fostering development.

### **3. Degree of Impact**

With digital technology being used to reduce information asymmetry, lower financing costs, increase financing efficiency, and broaden the scope of financing, the emergence of DIF plays a significant role in the economic development of Chinese SMEs. This helps SMEs overcome their funding limitations and advance their development. Because Chinese SMEs are dispersed over different geographical areas and have various property rights frameworks, the impact of DIF on SMEs varies accordingly. This paper utilizes the literature research technique, the empirical analysis method, and the case study method in order to more thoroughly examine how DIF impacts SMEs differently. Prior to choosing either of the two perspectives—financial limitations or transformation and upgrading. It is important to first sort through the pertinent literature in the fields of DIF and enterprise management. Then, by using different regional and property rights regimes as a lens, you may analyze each perspective. Second, through the empirical analysis method, the impact of DIF on SMEs and its performance differences in different regions and different property rights systems are analyzed by using panel data from various regions in China. Finally, through the case study method, typical enterprises in different regions are selected for in-depth investigation to specifically analyze how DIF affects the development of SMEs and the extent of its impact in different regions and different property rights systems.

#### **3.1. Digital Financial Inclusion, Financing Constraints and SME Development**

##### **3.1.1. Digital financial inclusion, SME development and financing constraints in different regions**

The east, middle, and west of China all experience different rates and levels of economic development, and there are also differences in the degree to which DIF has developed, which will also affect how DIF affects the financial limitations faced by SMEs. In other words, depending on DIF, the extent of the financial advantages of SMEs in various regions varies. Although from the standpoint of the Chinese market as a whole, DIF can lower the cost of financing for SMEs and increase their financing efficiency. According to Liu's regression analysis and conclusion, DIF development alleviates the financing constraints of SMEs in the eastern region of China more than in the central and western regions [3].

The reasons for this analysis are twofold: first, there are regional differences in digital infrastructure development and financial development, with the relevant resources being richer in eastern China; and second, because SMEs in eastern China utilize DIF more efficiently than those in central and western China.

##### **3.1.2. Digital financial inclusion, development of enterprises under different ownership and financing constraints**

Businesses with various ownership arrangements also profit in different ways from DIF financing. State-owned companies have traditionally benefited from the financial and policy assistance of state-owned banks or governments at all levels. They are also able to acquire some credit tilt from conventional financial institutions and are more adept at raising money through legal channels like banks. While private SMEs are prone to information asymmetry that causes moral hazard and other problems, and are prone to "financing discrimination" that makes enterprises with different property rights compete unfairly to a certain extent. The nature of the enterprise in a certain degree of unfair

competition, the existence of "credit discrimination" makes the private SMEs to obtain loans for a period of time significantly shorter than that obtained by state-owned enterprises [4]. As a result, private SMEs find it challenging to secure finance through established channels like banks. DIF reduces the possibility of a series of risk problems caused by information asymmetry through the use of digital technology, so private SMEs have a greater demand for it. To measure the degree of corporate financing constraints, Xiong also uses Almeida's cash-cash flow sensitivity model; thus, the level of corporate financing constraints, which is reflected in the enterprise's cash holdings, serves as the explanatory variable [5]. It is demonstrated that DIF is more effective in easing the financing limitations of private SMEs than state-owned enterprises by analyzing the change in the quantity of cash held by the enterprise, expressed as Cash.

Analyzing the reasons, there are the following three points: First, state-owned SMEs are characterized by government financing policies and higher credit, relying on banks and other formal channels for financing, and lack the motivation to use DIF as a new financing channel; second, DIF is more suitable for private SMEs in terms of the service model as well as the product innovation in terms of the financing needs of the private SMEs. Third, in terms of management system, private SMEs are more flexible, which is to some extent more conducive to the use of DIF channels for financing.

### **3.2. Digital Financial Inclusion, Innovation and Upgrading, and SME Development**

#### **3.2.1. Digital financial inclusion, SMEs in different regions and innovation upgrading**

There are obvious regional differences in China's financial development, with resource endowments and economic development varying greatly between regions. The eastern coastal regions have a higher degree of DIF development due to their developed economies and technological facilities, while the central and western regions are relatively lagging behind. With the development of DIF, this difference may also have a significant impact on enterprises in different regions in terms of innovation and upgrading. The development of DIF allows SMEs to access financial services and thus obtain funds to support their innovation and upgrading. Liu takes SMEs' R&D investment and R&D output as indicators of SMEs' innovation, uses the DIF index at the level of each prefecture-level city in the Peking University DIF Index (2011-2020) to measure the level of DIF development [3]. She also introduces the region where SMEs are located as a moderating variable, and draws on the study of Jia et al. to construct a time-industry two-way fixed-effects model to study the regional heterogeneity of the impact of DIF on SME innovation [6]. The regression analysis concludes that DIF has a more prominent role in promoting SME innovation in central and western China.

The lack of adequate financial services in the central and western regions relative to the eastern regions is one of the causes, which is why these regions rely more on the two DIF characteristics of "digital" and "inclusive" to boost the innovation vitality of SMEs there. The central and western regions' SMEs' commitment to innovation. The total number of inventive patents issued in the year under consideration in Yu's article was chosen by Li as the proxy variable for the small business upgrading process [7, 8]. The DIF index at the municipal level in China, which was published by the Digital Finance Centre of Peking University, as the explanatory variable, among other things. They then built an econometric model and used the Baron and Kenny methodology, which is the most significant one in the research of DIF [9]. Wen's mediation effect test model of the two paths of financial constraints and business risks is put to the test, and the results show that by offering supply chain financial services, DIF helps SMEs with their financial constraints and business risks, which in turn encourages them to upgrade [10]. DIF boosts SMEs in both the central and eastern regions, according to the heterogeneity test, however the central and western regions benefit more than the eastern region.

### 3.2.2. Digital financial inclusion, innovation and upgrading and the development of SMEs with different property rights systems

The market is crucial to the socialist system with Chinese characteristics, and the government is in charge. In the process of financing, state-owned enterprises usually have an implicit guarantee from the government, and from the analysis of the above article. State-owned firms have a lower funding barrier than non-state-owned businesses, hence there is a difference between the financing restrictions that both types of businesses face. This demonstrates that the degree to which the development of DIF has affected the innovative activities of state-owned firms and non-state-owned enterprises varies.

Xie et al. selected the "Peking University DIF Index (2011-2020)" released by Peking University's Digital Finance Research Center to measure the degree of development of DIF [11]. In the regression analysis, they chose the ratio of the total enterprise R&D expenditures to the end-of-year revenue as the index to measure the enterprise's investment in technological innovation and concluded that DIF has a positive effect on the technological innovation of SMEs. After regression analysis, it is concluded that DIF has a positive effect on the technological innovation of SMEs, and can be realized through the two paths of "alleviating financing constraints" and "reducing financing costs", but cannot promote the technological innovation of SMEs by improving the financing efficiency of SMEs. Meanwhile, after the heterogeneity test, it is found that compared with state-owned enterprises, non-state-owned SMEs are better able to promote their technological innovation by alleviating financing constraints through DIF. DIF can better compensate for the problem of "ownership discrimination" of traditional financial institutions against SMEs, help non-state-owned SMEs get rid of financing difficulties, and promote innovation incentives.

In the above article, the analysis of Liu et al. concludes that digital financial inclusion has a very limited effect on the upgrading of state-owned medium-sized enterprises (SMEs), while it has a more pronounced effect on the upgrading of non-state-owned SMEs [12].

## 4. Recommendations

It can be concluded from existing research that digital financial inclusion has a positive impact on the development of SMEs, however, how this impact can be more targeted and effective, especially for enterprises in different regions and with different ownership, etc., still needs to be explored in depth. The following are relevant recommendations on the above issues.

First, establishing a sound inclusive financial system and strengthening the development of digital financial technology innovation. DIF can alleviate the financing constraints of SMEs, and has a positive impact on the development of SMEs. Chinese SMEs are widely distributed, with differences in size and type, etc. In order to better target DIF to serve SMEs, the construction of a diversified financial system should be improved, and the development of DIF should be vigorously promoted to expand the scope of coverage, expand the service channels, innovate the form of service, and promote the diversified development of financial services. Digital financial institutions must constantly maintain information systems and use digital technology to provide specialized services, so they should increase their investment in research and development of digital financial technology and make the network sharing platform more complete, so as to achieve the sustainable development of DIF.

Second, rational allocation of digital inclusive financial resources to promote coordinated regional development. According to the results of the study, whether it is to alleviate financing constraints or to promote innovation and upgrading, the development of DIF is more effective for SMEs in the central and western regions than for SMEs in the central region and is more effective for non-State-owned SMEs than for State-owned SMEs. Therefore, it is necessary to improve the imbalance of financial resources in the region, break the problem of "ownership discrimination", and promote digital inclusive financial services in favor of SMEs in the central and western regions and non-State-owned SMEs. At the same time, the breadth and depth of coverage of DIF in each region should be improved. In the process of developing DIF, attention needs to be paid to the differences between

SMEs in various regions. For SMEs in the central and western regions, efforts should be made to improve the breadth of coverage of DIF and provide financial services to more SMEs. For SMEs in the western region, it is necessary to focus on the in-depth development of DIF to meet the digital needs of SMEs in different industries and of different sizes. Optimize the products and services of DIF. For SMEs with different ownership, formulated digital inclusive financial products and services can be provided. For example, more stable financial support should be provided to state-owned enterprises to provide them with long-term, low-cost sources of capital; more flexible and convenient financial services should be provided to non-state-owned enterprises to meet their short-term, high-efficiency financing needs.

Third, strengthening digital financial regulation to prevent new types of financial risks. The government should establish a sound regulatory system for DIF, and institutionalize corresponding regulatory policies and regulations to ensure the legal and compliant application of DIF. In the development of DIF, accompanied by the occurrence of risks, the government should strengthen risk supervision to strictly control the credit risk, market risk, technical risk, etc. of DIF. At the same time, analysis management and internal control of financial institutions should be strengthened to ensure the safety and stability of DIF. Society should actively participate in the development of DIF, enhance financial literacy and risk awareness, and jointly promote the healthy development of DIF.

Fourth, promoting the digital transformation of SMEs and facilitating their innovative development. In the era of advanced information technology, at the same time, SMEs, as the main body of innovation and vitality in the Chinese market, must actively carry out digital transformation, comprehensively apply digital technology to enterprise activities, and actively participate in the development of DIF. First, SMEs can leverage big data analysis, artificial intelligence and other technologies to deeply explore customer needs, optimize products and services, and expand new market space. Secondly, SMEs should accelerate the development of a perfect enterprise operation and financial management system, strengthen information transparency, improve the degree of understanding of the outside world, and alleviate the financing constraints of SMEs. At the same time, make full use of digital inclusive financial resources, improve the efficiency of capital use, more funds for the process of promoting enterprise innovation and development, improve the core competitiveness of enterprises, so that DIF is deeply integrated into the development process of SMEs.

## 5. Conclusion

The deep integration of financial inclusion and digital technology has given rise to the emergence of DIF, whose two main features, "digital" and "inclusive", have a positive impact in promoting the development of SMEs. This paper studies the degree of impact of DIF on SMEs, i.e., does DIF really affect the development of SMEs? In order to analyze it in depth, this paper chooses two perspectives: "financing constraints" and "innovation and upgrading" for the study. Because China's economic development is regional and characterized by a socialist economic system, in order to accurately analyze the degree of impact of DIF on SMEs, SMEs are divided into different regions and different ownership systems for research, and the following conclusions are drawn.

Firstly, DIF has a catalytic effect on SME development. Second, DIF can alleviate the financing constraints of SMEs. And there are differences between SMEs in different regions and ownership systems, while DIF can alleviate the financing constraints of SMEs in the central and western regions and non-state-owned SMEs more significantly. Third, DIF can also promote innovation and upgrading of SMEs through "alleviating financing constraints" and "reducing risk costs", while according to the research, DIF cannot promote innovation and upgrading of SMEs by improving financing efficiency, and DIF can help SMEs in the central and western regions and non-state-owned SMEs to improve their financing efficiency. At the same time, it is found that DIF does not promote innovation and upgrading of SMEs by improving financing efficiency, while the effect of DIF on innovation and upgrading of SMEs in central and western regions and non-state-owned SMEs is more obvious.

Although DIF is constantly innovating and practicing, it is undeniable that the problems of "difficult financing" and "expensive financing" of SMEs have not been completely solved, so in the future, on the one hand, it is necessary to increase the practice of digital inclusive financial services for SMEs to meet the personalized needs of SMEs. In the future, on the one hand, it is necessary to increase the practice of digital inclusive financial services for SMEs to meet the personalized needs of SMEs, and on the other hand, the regulatory authorities should also strengthen the risk management in the development of DIF, and formulate corresponding regulatory measures to avoid the phenomenon of "deconstruction to emptiness".

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