Development of Digital Inclusive Finance based on Blockchain Technology

Minghong Sun*

Dalian Neusoft Institute of Information, Dalian, 116023, Liaoning, China
**Corresponding author. Email: sunminghong@neusoft.edu.cn*

ABSTRACT
Inclusive finance aims to provide universal, beneficial and fair financial services for poor areas, small and medium enterprises (SMES), low-income groups and other vulnerable groups. After the epidemic, financing difficulties of SMES are prominent and shows new features. In this paper, the application of blockchain techniques as the breakthrough point to build new inclusive financial platform and financial industry regulatory mechanism. Thus it will promote the development of the digital inclusive financial industry and credit system, which solves the financing difficulties of SMES and to prevent systemic financial crisis. Inclusive financial products and service is provided equally and effectively for all social strata, which aims to accelerate impetus of economic growth.

Keywords: *digital inclusive finance, blockchain, SMES*

1. INTRODUCTION ON DIGITAL INCLUSIVE FINANCE

1.1. Definition of Digital Inclusive Finance

The financing plight of poor areas and small and medium-size business (SMES) has become the pivotal constraint of domestic economic development. Inclusive finance refers to provide appropriate and effective financial services at an affordable cost to all social strata and groups in need of financial services, especially for special groups such as small and micro enterprises, urban low-income groups, rural population and population in remote areas that are not covered by the existing financial system[1]. In addition, digital inclusive finance (DFI) is an inclusive finance system that takes advantage of today's digital technologies such as big data and blockchain to realizes sustainable financial development.

1.2. Features of Digital Inclusive Finance

With the strong support of national policies, the rapid development of blockchain and other digital technologies in China has brought inclusive finance into a new stage of development. Therefore, DFI mainly benefits from its four characteristics:

1.2.1. The Popularity of Digital Inclusive Finance

The popularization of DFI service is aimed at providing a wider range of financial services to all social strata, especially for the poor and SMES. It also aims to meet the growing financial needs of the people and provide reasonably priced, convenient and safe financial services [2].

1.2.2. Fairness and Equality of Business Financing Services

Supported by government policies and digital technology to reduce financing costs for vulnerable groups and SMES, and emphasize the equal rights of the general public in credit transactions.

1.2.3. Rapid Growth of Digitalization

According to data from Consulting and Qianzhan Industry Research Institute, 328 blockchain applications were implemented in China in 2020, among which financial blockchain applications accounted for the highest proportion of 29%, up 41% compared with that in 2019[3].

1.2.4. Sustainable Development

Through reasonable allocation of resources, while providing financing services for vulnerable groups, the financial needs of vulnerable groups are met, such as savings, loans, investment and other services, so as to achieve long-term sustainable development.

1.3. Application of Digital Inclusive Finance

Compared with the traditional financial service system, digital inclusive finance emphasizes more on the inclusiveness of service objects, the convenience of service methods, the comprehensiveness and uniformity of service content and the sustainability of business model. This kind of finance can effectively

alleviate the difficulties that rural low-income groups and SMES cannot obtain financial services under the current dual economic structure of China.

SMES account for half of China's economic development, driving a large number of domestic employment and technological innovation. The development of inclusive finance further provides effective financial services for small and medium-sized enterprises and promotes their sound development.

According to the government fiscal report, by the end of 2020, the outstanding loans of start-up guarantee had reached 221.6 billion yuan, up 53.7 percent year on year. In 2020, 160 billion yuan of loans will be issued, benefiting 1.4 million people. In 2021, 6.336 billion yuan of discount interest and incentive funds for venture guarantee loans were disbursed, up 65.9 percent year on year, accounting for 68.8 percent of the special funds for inclusive finance development [4].

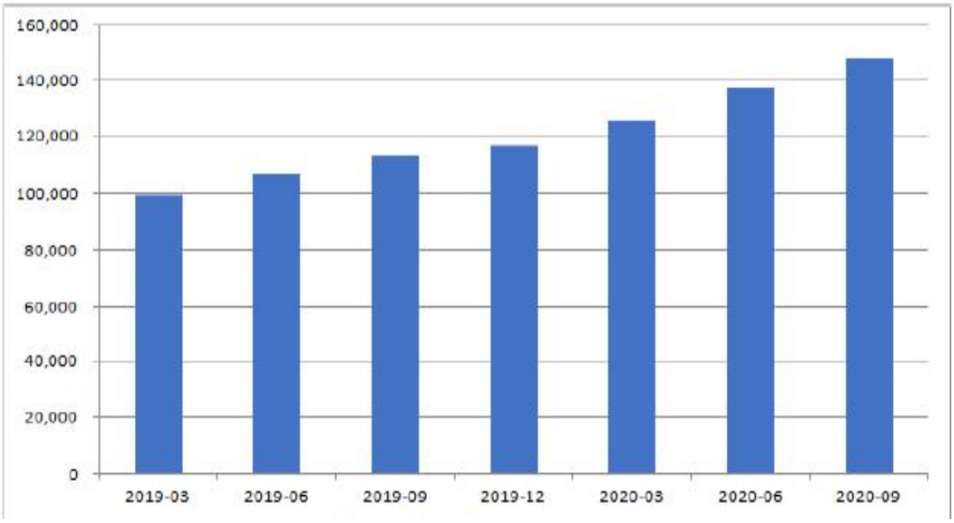

Figure 1. Loan balance of SEMS

Data from CBRC and Xinhua, as of September 2020, the coverage of inclusive financial services has significantly improved. As shown in Figure 1, the financing of SMES increased by 3 trillion yuan in the first three quarters of 2020, involving 31.28 million business entities. At the end of September, the balance of DFI loans to SMES was 14.8 trillion yuan, up 30.5 percent year on year[5].

2. CRUX IN CURRENT DIGITAL INCLUSIVE FINANCE SYSTEM

2.1. SMES' Financing Difficulties Under Epidemic

2.1.1. Under Epidemic, the Problems of SMES' Own Shortcomings are Prominent

SMES have imperfect management system, low management level, single product, small operation scale, poor financial management standardization, and weak ability to resist risks. Under the impact of the epidemic, according to the National Enterprise Bankruptcy and reorganization Case information network, from January 1, 2020 to June 5, there were 12,567 bankruptcy cases of all types, nearly double the number of 6,716 cases in the same period last year [6]. The epidemic caused the interruption of capital chain and caused financial risks that it was difficult to obtain financial support through inclusive finance channels.

2.1.2. Financing laws and regulations are ineffective for SMES

In recent years, laws and regulations have been issued frequently to ensure the financing of SMES, but the policies and guidelines are often superficial and difficult to be implemented, which cannot meet the personalized and diversified financing needs of SMES. At the same time, China's guarantee credit system is not perfect, poor service quality, lack of corresponding credit rating agencies and information sharing rating, industry supervision and other normative and legal support of laws and regulations. Therefore, in the face of the sudden outbreak of the epidemic and the policy uncertainty, SMES face increased financial risks and difficult to raise funds.

2.1.3. Development of SMES' Financial System is Not Perfect

Financial institutions issues loans to SMES generally based on the evaluation of historical accounting data and capital operation ability, which is regarded as biased and ignores the potential development ability of SMES. This result damages SMES' diversification and individuation development. At the same time, due to political regulations, banks have not been able to get rid of some administrative constraints. Under the tense situation of the epidemic,

the proportion of SMES facing bankruptcy is relatively high [7].

2.2. Difficulties in Digital Inclusive Finance

2.2.1. Credit Investigation System Cannot Support the "Universality" and "Benefit" of Digital Inclusive Finance

On the side of non-universality, China's credit system is difficult for evaluating customer of DFI while incomplete credit system, a vicious cycle will exclude these vulnerable groups from the service scope of financial institutions. On the other side of non-benefit, financial institutions aim at profit maximization, the cost of inefficient credit investigation system cannot match the income from vulnerable groups. The lack of effective risk identification and commercial diseconomy make financial institutions turn away the service object of inclusive finance.

2.2.2. Information Barrier and Data Isolation

China's credit data generally come from three main sectors, government, credit institutes and internet firms. With the continuous progress of technology and the improvement of credit information system, each sector has accumulated a large amount of credit data. However, such information is not publicly shared in the social credit link, and Internet companies and third-party credit investigation agencies only use credit information internally from the perspective of group interests, resulting in severe fragmentation of credit data, which causes the formation of big data isolation. Therefore the credit popularization and utilization of digital inclusive finance is difficult to develop [8].

2.2.3. Regional Gap in Digital Inclusive Finance System

Cities in the south of China, has invested large volume of subsidies to support construction of DFI. While the comprehensive economic development of northeast China has shown a slowing economic trend, with the decline of fiscal revenue and the increase risk of bad debt. Thus, the support role of inclusive finance for SMES has been weakening. On the other way, inclusive financial system has not realized diversified development. For example, financial resources in Dalian show uneven distribution between urban and rural areas [9].

3. BOOST THE DEVELOPMENT OF DIGITAL INCLUSIVE FINANCE INDUSTRY WITH THE SUPPORT OF BLOCKCHAIN TECHNOLOGY

3.1. Technical Architecture of Digital Inclusive Finance Based on Blockchain

Blockchain technology is the technical basis for improving the credit investigation mechanism of digital inclusive finance industry. First, due to the characteristics tamper-resistance for blockchain, it can create credit and maintain the openness and transparency of information. Secondly, because of the distributed memory for blockchain, there is no single centralized management by hardware or institutions in traditional technology, and the rights and obligations of any accounting storage node are equal. Third, the blockchain algorithm is fixed, the code is automatically executed based on consistent norms and protocols, and transactions cannot be interfered by others without real name, which improves the efficiency and reliability of transactions. Finally, the public chain of blockchain is open to all, and the shared query of information reduces the cost of obtaining credit information, which can help financial institutions achieve the goal of controlling the risk of lending and transaction costs. In addition, the integration of blockchain technology and finance has yet to be developed and integrated. Blockchain technology will be the core driving force of the financial field in the future.

As shown in Figure 2, the framework of DFI credit system is established according to the blockchain technology architecture. The blockchain technology architecture is divided into three modules and six layers. The basic module of the bottom layer includes the data layer rubbing against the physical data infrastructure, which is mainly used for digital credit information storage and can ensure the authenticity of information related to the sharing economy through the traceability technology.

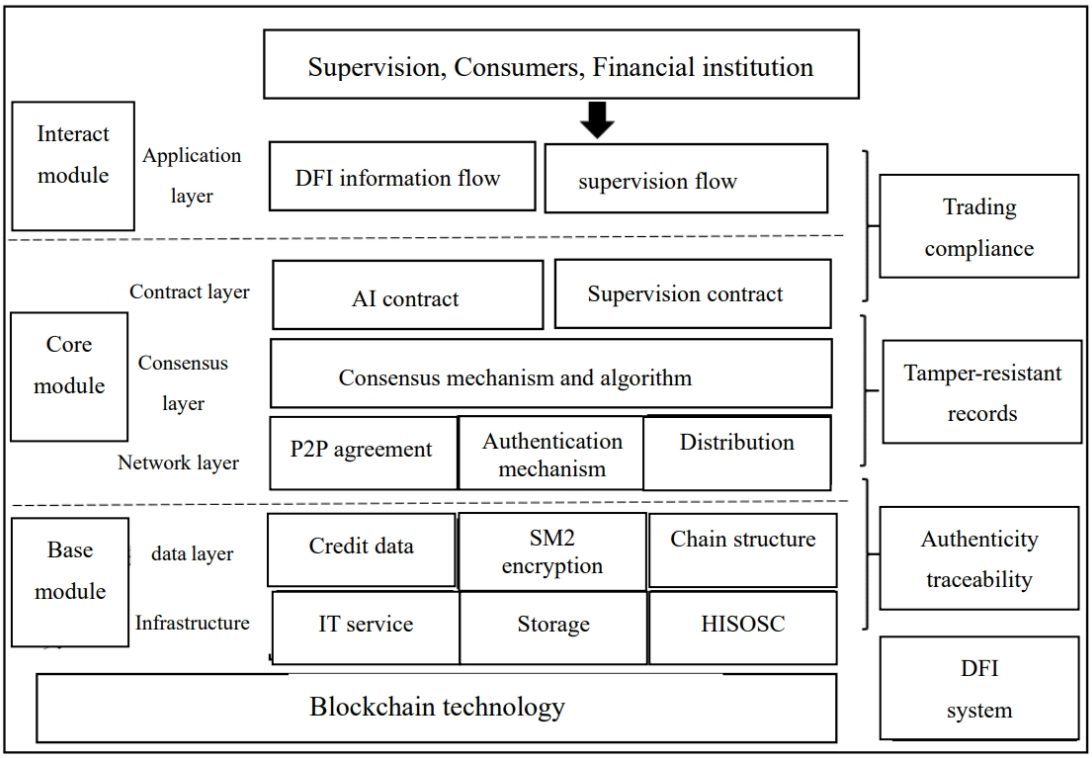

Figure 2. Technical architecture of DFI supported by blockchain technology

The intermediate core modules include network layer, consensus layer and contract layer. On the network layer, information is timely point-to-point transmitted. The consensus algorithm of the consensus layer ensures the consistency of each node, based on which the blockchain ledger is established to solve the problem of credit record tampering. The contract layer deploys the contract by code to realize the automatic execution of the smart contract, which can solve the problems of credit asymmetry and default in the transaction process through the smart contract. Finally, the surface application layer, government regulators, credit institutions and digital economy consumers can feedback information data through the application layer, improve the efficiency of information processing, reduce transaction costs, expand the target of credit investigation service, and create a more dynamic, competitive and diversified credit industrial system.

3.2. Innovation in Government Regulation

The construction of DFI regulatory system has three layers: first, make the inclusive financial market self-regulatory mechanism works. Under the regulation of the market price mechanism, the self-correction and restraint mechanism of the market can maximize the full utilization of resources and quickly release signals to the market. Second, use the self-discipline mechanism of industry association. With the support of blockchain technology, the information sharing is enhanced. Timely disclosure of information can not only make the regulatory authorities respond in time, but also give play to the power of industry associations. The self-discipline of the industry can reduce the cost of government intervention and strengthen the warning role of the industry. Finally, digital inclusive finance is an emerging field compared with traditional finance, and supervision needs to use digital technology to gradually change from post-feedback to pre-warning [10]. In the process of data detection, we should pay attention to the value of unstructured data, and meanwhile pay attention to the data security of computer network, and strengthen the data security of government information network will be the top priority.

3.3. Focus on DFI Consumers

The risk awareness of consumers in DFI industry should be enhanced. Consumers' right to know about product risks, right to privacy and right to fair trade should be clarified, and information disclosure system should guarantee consumers' information security. A win-win pattern should be achieved among financial institutions, non-financial institutions, the government and consumers. Financial institutions and non-financial institutions should communicate on business model, risk management, product characteristics and other issues. Besides, the industry associations should play an active role to strengthen the self-discipline of the industry, and jointly protect the rights and interests of consumers and safeguard the interests of all parties.

4. CONCLUSION

Blockchain technology has great potential in the field of inclusive finance. The crux is to balance technological innovation and financial risks to upgrade digital services in payment, risk control and other financial fields. To make better use of blockchain, it is significant to make up for the shortcomings and possible failures of digital inclusive finance, and better realize complementary mutual interactions of DFI. It is required to strengthen the risk management of digital inclusive finance, prevent and control the behavior of infringing financial consumers' rights and interests, such as algorithmic discrimination, induced improper marketing and information abuse, which may be brought about by the application of digital technology. It is great prospects to foster a sound ecosystem of digital inclusive finance.

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