

# How Supply Chain Finance Helps SME Financing under Blockchain Technology

-- A Multi-Case Comparative Study Based on Manufacturing Industry

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**Abstract:** Financing difficulties have always been a fatal factor restricting the survival and development of small and medium-sized enterprises. With the continuous development of technology, in recent years, relying on blockchain technology to empower supply chain finance has become one of the effective methods for small and medium-sized enterprises to obtain operating funds. This article takes Shaanxi Sun Simiao High tech Pharmaceutical Co., Ltd. and Jiangxi Ganjiu Liquor Industry Co., Ltd. as examples to explore and analyze the innovation of financing loans based on traditional financing loans and blockchain technology. Through research, it has been found that blockchain technology not only solves the problem of risk control between banks and enterprises, but also expands the financing channels of small and medium-sized enterprises with the characteristics of distributed accounting, effectively improving financing efficiency and promoting business development. This article explores how blockchain technology can serve supply chain finance, and further proposes strategies and suggestions to assist small and medium-sized enterprises in financing.

**Keywords:** Blockchain technology; Supply chain finance; SMEs; Traditional credit; Impact factors.

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## 1. Introduction

In recent years, the registration of small and medium-sized enterprises (SMEs) has soared, and they have become an important pillar of our domestic economy. The source of their capital, in addition to the necessary investment of shareholders, is to borrow from banks. However, due to the influence of factors such as their own low credit and information asymmetry between banks and enterprises, enterprises have difficulties in the process of borrowing from banks, which plagues the development of enterprises and seriously affects the competitiveness of enterprises. In China's "14th Five-Year Plan" and 2035 Vision Outline, it is pointed out that blockchain, as a key industry in the economy, needs to "promote blockchain technological innovation such as smart contracts, distributed systems, and other blockchain innovations, develop blockchain service platforms and application solutions in the field of financial science and technology with a focus on the alliance chain, and improve the regulatory mechanism". Relying on the advantages of financial technology, supply chain platforms are rooted in serving enterprises. For example, in JingDong's "blockchain+supply chain finance" service, the application of blockchain technology makes the level of Jingdong's supply chain financial service greatly improved, and at the same time provides strong financial support for small and medium-sized micro-enterprises, which has become a model in the industry. It can be seen that the supply chain finance supported by blockchain technology can serve the enterprises more efficiently and make the enterprises in the chain develop synergistically. This paper selects two manufacturing enterprises with two very different financing methods, and analyses how blockchain technology empowers supply chain finance through comparison; and how it improves the financing efficiency compared with the

traditional financing mode.

Nowadays, due to the influence of the overall environment, the source of funds of enterprises can not be well guaranteed, and many small and medium-sized enterprises have abandoned the traditional financing mode, and have chosen the highly efficient financing mode, such as through the supply chain finance to raise funds. However, in the actual business, this financing mode also has big and small problems, such as the funds are not strictly supervised, but with the help of blockchain technology, most of these problems will be solved. Therefore, the topic of "how supply chain finance under blockchain technology can help SMEs" has been studied by many scholars at home and abroad.

With the deepening implementation of "Internet+" development strategy, supply chain finance relying on Internet technology is gradually becoming the main way of financing for small and medium-sized enterprises (SMEs), and the application of blockchain technology in supply chain finance is the inevitable way for the in-depth development of supply chain finance [1-2]. At present, in the supply chain finance based on blockchain technology, the method of asset-backed securitisation has been widely used [3]. Built on the practical background, blockchain finance achieves the transformation of centralised financial system to decentralised financial system through technical rules such as distributed ledger, consensus trust, smart contract, etc., taking core enterprises as the business conducting end, and using the data authenticity of blockchain technology to realise upstream and downstream enterprise financing [4-5]. At the same time, it is proposed that blockchain finance chooses the development mode of alliance chain, builds "blockchain+" ecosystem, credit guidance and other mechanisms, and increases the system modules such as real-time risk monitoring, dynamic credit assessment, and asset bidding adaptation, so that the financing constraints of science and technology-based small and medium-sized enterprises

(SMEs), the traceability of automotive supply chain, and the automotive retail industry's cash flow to be solved effectively [6-10]. For banks, the emergence of blockchain technology, especially the combination with supply chain finance, effectively overcomes the shortcomings of the banking industry in carrying out supply chain finance business, and forms a more competitive "blockchain+supply chain finance" "dual-chain" mode, which enables banks to effectively control the risk in the case of Banks can provide financing services with high enough accessibility and low enough cost for enterprises in the supply chain under effective risk control, which has a positive effect on banks and lending enterprises [11-13]. Foreign scholars have conducted exploratory research based on blockchain platforms, analysed through qualitative and quantitative methods, and have evaluated the new supply chain and management through literature review and case studies to assess whether the new type of supply chain and management, can be improved in the supply chain based on blockchain technology [14-15].

Through a review of previous literature, it is clear that in the field of supply chain finance, the blockchain financing model has gradually replaced traditional financing models and become a hot topic due to the influence of technologies such as blockchain. However, currently domestic and foreign scholars mainly focus on empirical research and single case studies on supply chain finance under blockchain technology. This article takes two manufacturing enterprises as the research background, compares the financing models of the selected enterprises, and further understands how blockchain technology serves manufacturing enterprises.

## 2. Research Method

Exploratory case study method, refers to the combination of practical, from the grasp of the literature to take in materials, information, case as a material, to find things between the existence of the intrinsic connection, through specific analysis to seek solutions to the problem. Comparative research method is to arrange a group of objects or objects of different natures with certain similar factors together to carry out a control study, through a comprehensive comparison of their differences in the research method. This paper combines these two research methods to comparatively analyse how supply chain finance under blockchain technology serves enterprises, and how the combination of the two enables enterprises to avoid risks and improve the efficiency of enterprise financing.

## 3. Case Overview

### 3.1. Case Selection

In this paper, Shaanxi Sun Simiao High-Tech Pharmaceutical Co.Ltd (hereinafter referred to as "Shaanxi Sun Simiao") and Jiangxi Ganjiu Liquor Co.Ltd(hereinafter referred to as "Jiangxi Ganjiu")are selected as a case study.Among them, Shaanxi Sun Simiao Company adopts traditional credit method for financing, while Jiangxi Ganjiu Company cooperates with Jiangxi Bank and Firechain Technology, adopting supply chain finance under blockchain technology to help small and medium-sized liquor companies in Jiangxi.

Shaanxi Sun Simiao company is based on the production and operation and sales of traditional Chinese medicine, the development process of pharmaceutical enterprises compared to other manufacturing enterprises to be long, the output of

the finished product in addition to the required raw materials, packaging materials, etc., but also requires a large amount of research and development expenditures, and the listing of the drug must be certified by the pharmaceutical certification, therefore, the development of enterprises need a large amount of funds to support the development, in addition to relying on the shareholders of the registered capital of the present in addition to the other way of raising funds is to the Bank debt. Shaanxi Sun Simiao company used the traditional credit mode of financing, because it is a newly established enterprise, the company's own credibility can not be measured well, and the company's sales are low, the operating income can not be guaranteed, and at the same time, by the asset-liability ratio of higher and other unfavourable factors, the company is in the process of financing the difficulties, which seriously hindered the company's business development.

Established in 1953, Jiangxi Ganjiu Company in Xinguan County is a liquor enterprise integrating research and development, production and sales, with an annual liquor production capacity of 10,000 tonnes. In cooperation with Jiangxi Bank, Jiangxi Ganjiu Company has developed the "Chattel Digital Loan" project, which realises the function of real-time asset up-linking of base liquor and finished liquor, so that distributors can apply for a loan on the basis of the chattel corresponding to the order contract, i.e. the finished liquor, thus solving the problem of lack of credit and shortage of funds for distributors.

### 3.2. Case Analysis

#### 3.2.1. Analysis of Traditional Financing Model

Fixed asset mortgage is to evaluate the fixed assets of an enterprise and then finance the loan based on the evaluation results. Shaanxi Sun Simiao Company was established in 2014, the initial stage of establishment, in addition to relying on the registered capital of shareholders, is the use of fixed assets for collateral and then from the bank financing, so as to promote the construction of the project and the company's business development. In the process of lending, the bank in addition to focusing on the enterprise's assets, but also focus on the enterprise's first source of repayment, their own credit and business income, etc., which is very unfavourable to the newly established small and medium-sized enterprises. The fixed asset loan process of Shaanxi Sun Simiao Company includes nine steps, such as customer application, bank acceptance, investigation and evaluation, as shown in Figure 1.

From Figure 1, it can be seen clearly and intuitively that the traditional fixed asset lending process is very cumbersome and complicated from customer application to post-credit management, and there are also many loopholes in the process of investigation and assessment, such as: information cannot be shared in a timely manner between the bank and enterprise, which affects the results of the assessment; the bank's review and approval process has a long cycle, and if the enterprise is in need of a loan urgently, the lender's release of the money will be delayed, which will have a negative impact on the enterprise. If the enterprise needs the loan urgently, it will delay the lender's release time, which will have a negative impact on the enterprise. If supply chain finance under the accounts receivable model is used for financing, then the company will be more efficient in financing. Its idealised financing model is to carry a supply chain finance platform and implement fund supervision, this financing method often

requires core enterprises as support, Shaanxi Pharmaceutical Holding Group Limited Liability Company as the largest shareholder of Shaanxi Sun Simiao Company, which acts as

a core enterprise, Shaanxi Sun Simiao Company will return the recovered payment as repayment back to the bank, and its model is shown in Figure 2.

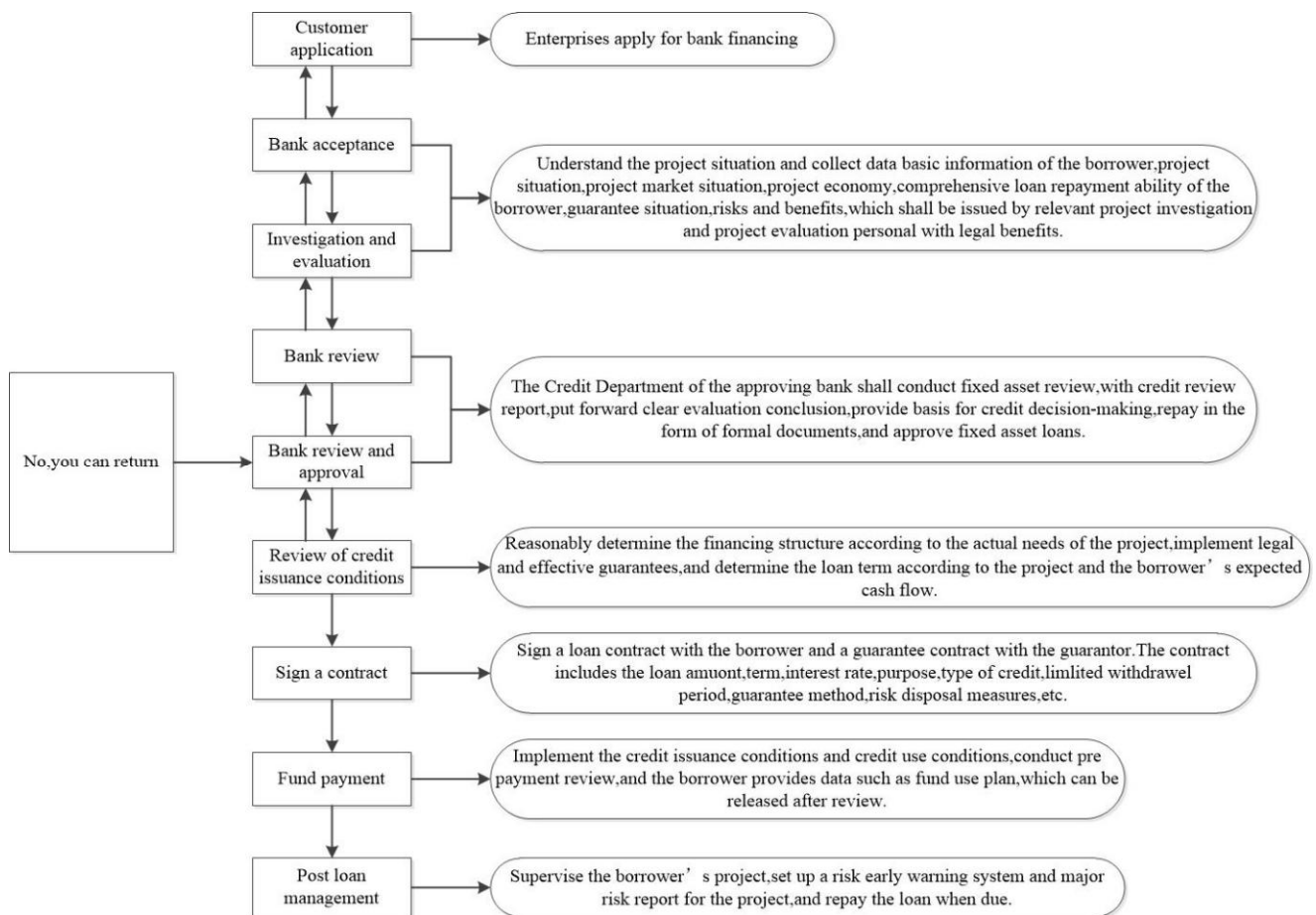


Figure 1. Shaanxi Sun Simiao's fixed asset loan process

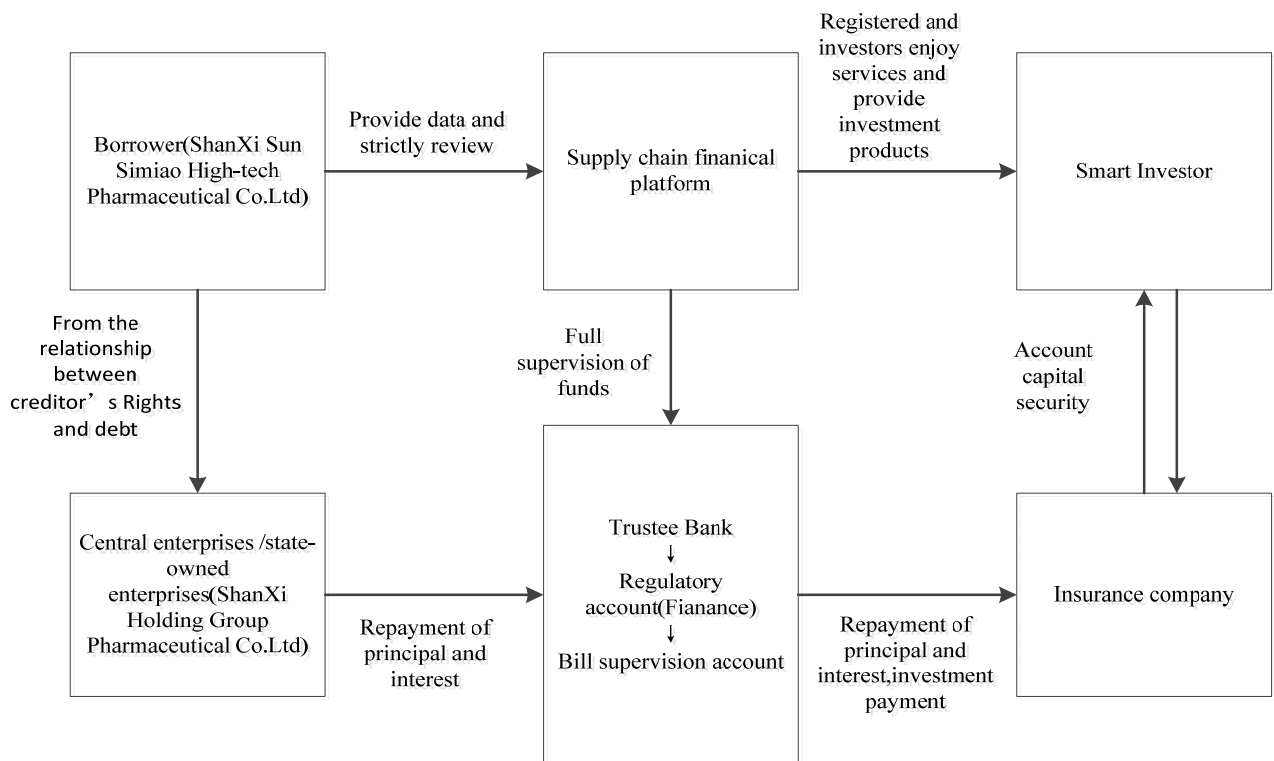


Figure 2. Shaanxi Sun Simiao Company Supply Chain Financial Services Process

As seen in Figure 2, the borrower needs to piggyback on a third-party supply chain finance platform for bank capital

supervision. Shaanxi Pharmaceutical Group, as a core enterprise, forms a debt relationship with the borrower, and makes payments based on receivables such as goods recovered by the borrower when repaying principal and interest. However, under this model Shaanxi Pharmaceutical Group will also consider the risks and rewards, due to the inability to obtain accurate data in a timely manner, so the supply chain finance under this model is not very active.

### 3.2.2. Analysis of financing models under blockchain technology

There are many distributors in the Jiangxi Gan Liquor chain, most of which are small and medium-sized micro-enterprises (SMEs), which operate on a small scale and have few fixed assets. Due to financing difficulties and low carrying capacity of the distributors, a large amount of Jiangxi Gan Liquor's production capacity has no place to be released, which puts Jiangxi Gan Liquor, as a leading enterprise, under great pressure and cannot fully drive the development of the local economy, but this problem is well diluted through the "Movable Property Digital Loan" platform. However, this problem has been well diluted through the "movable assets digital loan" platform.

By using this platform, Jiangxi Bank can accurately access the dealer's inventory information, sales volume information, payback information and other data, and the dealer's true repayment ability can also be accurately judged. By accurately tracking the product inventory and approving the

financing amount in a timely manner, the risk of bad debt is reduced, and the whole line of Jiangxi Gan's business is better developed while better serving the loan financing business of SMEs.

Firechain Technology has developed a blockchain platform for Jiangxi Gan Liquor & Wine Co., Ltd. financial services, in which the participants include manufacturers, warehouses, vendors, etc. The platform covers all the key processes from manufacturing, warehousing, logistics, distributors to consumers, and all the parties in the supply chain-such as the original factory of making liquor uploading the production volume and other information of the liquor production, and the preparatory factory uploading the stock quantity situation, Distributors upload goods orders and sales information, etc. Through blockchain technology, product information is stored on the platform, and all data and information can be updated in real time.

In the supply chain financial service under blockchain technology, there is a guarantor in the upstream and downstream enterprises and the core enterprise, the downstream micro and small enterprises first apply for the funding line, the core enterprise does the guarantee, the bank lends the funds to the core enterprise, the core enterprise monitors the data information in real time through the relevant blockchain platform, and finally, the upstream and downstream enterprises return the funds to the bank with the recovered payment for the goods. The specific process is shown in Figure 3.

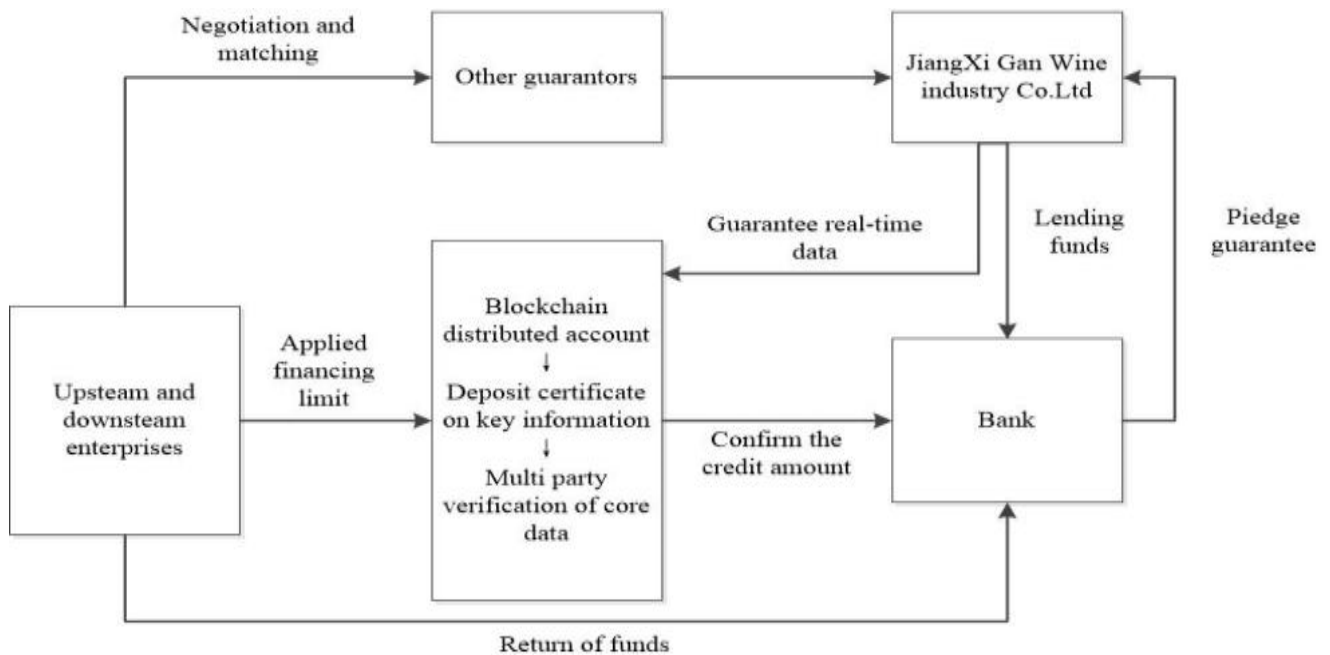


Figure 3. Blockchain technology services under the supply chain financial services process

As seen in Figure 3, under the service of blockchain technology, supply chain finance can complete real-time interoperability of enterprise information on the chain, no longer needing point-to-point checking and greatly improving productivity: the safety and reliability of the information on the chain benefits from the advantages of blockchain technology's non-tampering and traceability, which greatly facilitates the auditing of the funders and regulators.

## 4. Discussion

### 4.1. Case Summary

It can be clearly seen from the above case study process that the financing methods chosen by the two enterprises are different. The financing methods chosen by the two enterprises are now summarised and analysed as shown in Table 1.

**Table 1.** Comparison of supply chain finance financing methods between the two companies

Projects Company name	Shaanxi Sun Simiao High-Tech Pharmaceutical Co.Ltd.	Micro and small enterprises under Jiangxi Ganjiu Wine Co.Ltd
Financing options	Conventional fixed asset mortgages	Supply Chain Finance with Blockchain Technology
Access to finance	The Agricultural Bank of China	Jiangxi Bank
Financial guarantors	Shaanxi Pharmaceutical Holding Group Co.Ltd.	Jiangxi Ganjiu Wine Co.Ltd.
The financing process	Apply to the bank, the bank accepts the application, conducts an assessment and investigation, the bank examines the eligibility criteria and then signs a contract to make a loan	A "blockchain technology" platform that covers the entire process and allows banks and guarantors to share data and information in real time
Bank data sources	Self-provided by the company	Data sharing between banks, guarantors and SMEs
The first source of repayment	Shaanxi Sun Simiao Enterprise (all financial flows including payment for goods)	Loans to all small and medium-sized enterprises in the supply chain of Jiangxi Ganjiu

Table 1 shows that Shaanxi Sun Simiao Company and Jiangxi Gan Liquor Company have the same financing methods, which are the following two points: (1) Both enterprises choose to co-operate with financial institutions-banks; Shaanxi Sun Simiao Company signed an agreement with Agricultural Bank of China to obtain financial support from the bank; Jiangxi Gan Liquor Company chose to join hands with the local Jiangxi Bank to create a third-party platform to help the enterprise. (2) Both have strong guarantee enterprises. The former's guarantor is Shaanxi Pharmaceutical Group, a pharmaceutical state-owned enterprise with strong financial strength in Shaanxi Province; Jiangxi Gan Liquor Company, a small and medium-sized enterprise in the supply chain of Jiangxi Gan Liquor, acts as a guarantor to ensure sufficient capital flow. At the same time, the financing methods of the two enterprises are also quite different, the differences are as follows: (1) the repayment methods are different, Shaanxi Sun Simiao Company is mortgaged with the fixed assets of the enterprise, and the source of its repayment is all the cash flow of the enterprise; SMEs in the supply chain of Jiangxi Gan Liquor are repaid with the payment received. (2) The financing process is different, the former adopts the traditional loan financing method, the bank accepts the investigation, there are usually problems such as the data transmission between the enterprise and the bank is not timely, but also due to human and other subjective factors affecting the assessment results, which is extremely unfavourable to the loan results; Jiangxi Gan Liquor Company adopts the supply chain finance under the blockchain technology to carry out the financing, and the distributed ledger of the blockchain ensures that the data are real-time updating of data, reduces operational risks and simplifies the financing process and transaction procedures of enterprises, reduces the waiting time for financing of upstream and downstream enterprises, greatly reduces the financing time cost of small and medium-sized enterprises in the supply chain of Jiangxi Gan Liquor, and ensures the timeliness of funds.

## 4.2. Current problems

The development of blockchain technology has enhanced the trust between core enterprises and MSMEs, and also solved the risk control problem that has always existed in

supply chain finance. It can also accurately determine the repayment ability of MSMEs and reduce the risk of bad debts by obtaining the inventory information of distributors and other information in a timely manner through the platform. In traditional supply chain finance, because it is difficult to determine the trade background and authenticity of the order data of the MSMEs in the chain, it is difficult for financial institutions and core enterprises to establish a trusting partnership with the small enterprises at the end, and the different nodes generated by the blockchain data are able to provide distributed bookkeeping and peer-to-peer transmission, which can expand the scope of credit granted by the financial institutions to the enterprises, and broaden the supply chain MSMEs' financing channels.

Even though blockchain-enabled supply chain finance has certain applications in practice, there are still problems in the following aspects:

### (1) Low willingness of core enterprises to participate

Although blockchain technology makes it impossible to tamper with the data and information in the supply chain, the premise of obtaining financing and loans for small and micro-enterprises must be endorsed by the core enterprises. The core enterprise itself has strong financing ability, for example, the core enterprise in the chain of Shaanxi Sun Simiao Company is Shaanxi Pharmaceutical Group, and Shaanxi Pharmaceutical Group itself has strong financial strength, so the willingness to participate in "blockchain+supply chain finance" is not very high for the core enterprise.

### (2) Blockchain financial laws and regulations need to be improved

Blockchain technology, as a new science and technology, is still in the exploratory stage, and the related laws and regulations should be improved. While blockchain technology empowers SMEs to finance, it may also bring new risks and hidden dangers, including the ambiguity of the legal effect of smart contracts, the risk of information security, and the problem of regulatory arbitrage. The openness and cross-border integration of blockchain makes government financial regulators usher in brand new challenges.

### (3) Lack of Composite Talents for Blockchain and Microfinance

Blockchain technology is popular in recent years and is a cutting-edge technology, and there are few talents in related fields. And the microfinance industry is not an important

strategic direction for traditional financial institutions, so there are very few people in this area. In order to vigorously promote the supply chain financial services under blockchain technology, it is indispensable to have composite talents who understand both blockchain technology and supply chain financial business, and combine technology and business in order to give full play to the characteristics of blockchain-enabled supply chain finance.

(4) SMEs in the supply chain still face high financial risks. Financial risks will affect the financing ability of SMEs. First of all, as a link in the chain, SMEs will encounter bad debt risks in the transaction process, which will affect their business conditions. As there may be mismatches between upstream and downstream SMEs in terms of accounts receivable turnover days and inventory turnover days, the optimal amount of cash held may deviate, affecting financial indicators such as total asset turnover. Secondly, SMEs in the supply chain may also face investment risks and blindly invest to expand their business scale. If the return on investment cannot cover the cost of investment, it may lead to a break in the capital chain affecting, for example, the continued operation of the SME.

## 5. Recommendations

Blockchain-enabled supply chain finance makes SME financing more efficient, but there are also many problems, based on the above problems this paper gives the corresponding suggestions and measures, so as to help the majority of SMEs efficient and high-quality financing.

(1) Establish an incentive mechanism so that the core enterprises can improve their willingness to participate.

The digital platform under the blockchain can establish corresponding incentive mechanisms to achieve the improvement of supply chain collaboration network efficiency and the distribution of economic incentives between core enterprises and micro and small enterprises empowered by the blockchain. One can improve the willingness of core enterprises to participate, and the other can extend the account period of core enterprises, so that the accounts payable of core enterprises can be postponed. For some large core enterprises with more upstream and downstream enterprises, they can cooperate with more financial institutions to achieve a win-win situation.

(2) Improve relevant laws and regulations and increase R&D investment

With the in-depth application of blockchain technology in supply chain finance, the corresponding laws and regulations should be further improved to enhance the effectiveness and pertinence of supervision, ensure the healthy development of the "blockchain + supply chain finance" model, and reduce potential risks. At the same time, it is necessary to improve the market-oriented social credit system and the government sharing mechanism of credit risk for financing of small and medium-sized enterprises, and make it easier for small and medium-sized enterprises to obtain financing through the strong combination of the government, financial institutions and technology companies.

(3) Cultivate Composite Talents to Better Serve Enterprises. Financial platform institutions and universities can be guided to cooperate and jointly set up research and study objectives, etc., to increase the cultivation of composite talents for blockchain and small and micro enterprises, strengthen the application of blockchain in practice in view of the characteristics of the industry's development, enhance the

technology, and provide a corresponding platform for high-end composite talents. Colleges and universities should also have a long-term vision to integrate the financial profession with related professions to increase the reserve of composite talents. Supply chain financial platform enterprises should further play an advantage, improve the composite talent training mechanism, and provide human resources support for the development of digital innovation.

(4) Improve the financial management system and reduce financial risks

Reasonable and scientific methods should be used to manage reserve stocks and reduce the inventory costs of enterprises; optimise enterprise production and inventory management according to market demand. By improving enterprise financial management, one can prevent and control financial risks, and the other can improve operational efficiency, making the cash flow of the whole chain healthier and more liquid, thus improving financial indicators such as embedded rate of return, net present value and present value index, improving the financing ability of small and micro enterprises, and reducing the financing risk.

Through the comparative study of the two enterprises, this paper intuitively shows that supply chain finance relying on the blockchain platform can serve enterprises more efficiently, and traditional financing and lending will inevitably be replaced, and puts forward corresponding improvement initiatives based on the current problems. This not only helps us explore how supply chain finance under blockchain technology can serve enterprises, but also helps us carry out supply chain finance business supported by blockchain technology in a more targeted way in the future, which is of great practical significance and practical significance.

## 6. Author Introduction

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## 7. Fund Projects

Ministry of Education Humanities and Social Sciences Research Western and Border Region Project (20XJA630001); Shaanxi Province Soft Science Research Program Project (2023-CX-RKX-015); Xi'an Science and Technology Plan Soft Science Project (23RKYJ0029).

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