Research on the Application of Block Chain Technology in Supply Chain Financial Business

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Abstract: At present, the key to the development of China's economy is in transition period, In order to promote the supply chain finance to get rid of hollowing out, realize the realization of getting rid of virtual and real, and enable the development of small and medium-sized enterprises, we must improve the method of financial information service in the real economy. With the rapid development of chain block technology, used in various scenarios of continuously made new breakthroughs in science and technology, and the block has a decentralized chain technology Traceability information cannot be tampered with the characteristics of the technology can effectively solve the existing problems in the application to supply chain finance Therefore, actively explore block chain technology in the application of supply chain finance has important practical significance.

1. Introduction

In recent years, China's supply chain finance has been developing with obvious advantages and playing an important role in dealing with accounts receivable and inventory backlogs. In daily operations, in order to speed up business processes and improve efficiency, credit sales have become the main transaction method, with downstream enterprises paying the core enterprises first and upstream enterprises pre-shipping to the core enterprises. This transaction method is prone to capital backlog and occupancy problems, and the excessive amount of accounts receivable and inventory affects the operation and turnover of the whole process.

Although blockchain technology has a promising future in supply chain finance, there are still some potential problems that need to be taken into account. The value of blockchain applications and applying the technology to capital markets can play an important role in many aspects[1]. However, the technology of blockchain itself is questioned, arguing that it has flaws, such as operational speed needs to be improved and occupying too much capacity, a series of problems that need to be addressed urgently.

This paper composes the application of blockchain technology in supply chain finance. Before elaborating the advantages of the application, this paper designs the model of supply chain finance applying blockchain technology by analyzing the operation mode of traditional supply chain finance and combining the characteristics of blockchain technology.

2. Supply Chain Finance and Blockchain Technology Development

2.1 Current Situation of Supply Chain Finance

The emergence of supply chain finance comes from the difficulties in the financing process of small-sized enterprises, including medium-sized companies. With the development of supply chain finance, it has been a relatively broad concept of financial services. The development of financial interaction is for the specific business of industrial supply chain, and its basis is the operation of industrial supply chain. On the one hand, finance serves for industrial activities, and on the other hand, different business characteristics of enterprises and different needs of participants will produce different value demands for the services of financial institutions[2].

In recent years, with the widespread existence of credit sales and receivables in international and domestic trade, the upstream enterprises of the supply chain generally face the dilemma of insufficient production vitality due to the lack of funds and the increase of accounting cycle. In addition, with the aggravation of market competition, the competition between individual enterprises has shifted from the local competition of supply chain to the competition between industrial chains, and the degree of interdependence among multiple parties in the same supply chain has also increased. In this case, the supply chain financial business presents a trend of rapid development.

Table 1. The scale of China's supply chain financial market

Time	2016	2017	2018	2019	2020
Supply chain financial market scale	12.51	13.08	13.7	14.33	14.98

2.2 Current Situation of Blockchain Technology

Blockchain is a decentralized distributed ledger in which data is generated and stored in blocks, and connected end to end in chronological order to form a chain structure. At the same time, it ensures that the data cannot be tampered with, forged and the data transmission and access security through cryptography. The basic principle of blockchain is that each contains a unique hash value calculated from the previous block content. Tampering with the characters of any block can lead to the mismatch between the calculated hash value and the next block record, which is easy to be detected by other nodes. Only by modifying the contents of all subsequent blocks on the blockchain one by one can the integrity of the blockchain be ensured. The current technology to complete the above tasks is a very high cost or impossible thing, which ensures the authenticity and non tamperability of the data.

Blockchain technology mainly relies on the decentralized deployment mode, through transaction records and follow-up tracking query for point-to-point accounting, and through encryption to achieve privacy protection, which has the characteristics of decentralized structure, data information cannot be tampered with, smart contract can be flexibly programmed, distributed accounting and storage. According to the degree of openness, blockchain technology can be divided into three main types: public chain, private chain and alliance chain.

2.3 The Value of Blockchain Technology in Supply Chain Finance

Supply chain finance is an asset transaction behavior between mutual distrust nodes. It is a credit behavior involving banks, platforms, logistics companies and more than three institutions. Complex transaction scenarios increase the difficulty of business landing, and put forward higher requirements for credit risk management and control. The application of blockchain technology in supply chain finance can reduce the complexity of business, improve the financing convenience, effectively reduce the financing cost, and make the supply chain financial services meet the market financing demand in a wider range. It has the application value of credit splitting to multi-level, expanding the scope of credit, reshaping the financial information flow of the supply chain, reducing the cost of risk control through real trade, and improving the operation efficiency through smart contracts[3].

3. The Practice of Combining Supply Chain Finance with Blockchain Development

3.1 Practical Operation of Blockchain in Supply Chain Financial Business

When it comes to practical operation, applying blockchain technology to supply chain finance, from the perspective of architecture, the whole process can be divided into three levels: intelligent terminal layer, blockchain layer and application layer. And the core part is in the second level - blockchain layer.

3.1.1 The Intelligent Terminal Layer Records the Product Production Information

The intelligent terminal layer is supported by radio frequency identification technology, two-dimensional code scanning technology and satellite positioning technology. It is composed of various IOT sensing terminals, mainly to obtain all the information in the process of product production, transportation and sales. RFID technology is equivalent to electronic tags. In the production of products, RFID technology tags are pasted on raw materials or finished products to automatically record product specifications, quantity, person in charge, time and other information, which is convenient for readers to read; in the logistics link, product location is obtained by relying on satellite positioning technology; when sold to the public, consumers can scan the secondary information Dimensional code queries the information of related products stored in the blockchain to ensure the quality of products[4].

3.1.2 Data Entering Blockchain Layer is Recorded in Nodes

Since each block in the blockchain records all transactions during the creation time, this level is the key link to realize the information storage and management of the supply chain. Data is transmitted to nodes, and nodes use consensus mechanism to generate new area blocks. The nodes in the new area block first complete calculation obtain bookkeeping rights, and then transmit information to the whole network. After receiving the data, each node verifies it, and then it can be added to the end of the blockchain through verification.

3.1.3 Users can Query Product Information by themselves at the Application Level

Application layer is a link that consumers can operate on its own. The application layer can be connected to the blockchain layer through interface program by using mobile app or special management software. Consumers want to query products at the application level, or enterprises must connect to the blockchain layer to manage the supply chain. The data in the block is transmitted from the blockchain layer to the application layer. The information is displayed in the special management software. Users can download the mobile app to query the product information they want to know. The supply chain with block chain technology can provide market information for all participants and is conducive to business development.

4. Blockchain Solutions for Supply Chain Financial Pain Points

4.1 Smart Contract Technology Reduces the Operational Risk of Supply Chain Finance

Supply chain finance mainly relies on the social credit degree of enterprises when screening and analyzing projects or enterprises that need financing loans, and mainly relies on manual audit when examining and approving projects. However, the work of various departments is transparent and mutual supervision, so as to avoid financial fraud such as favoritism and fraud, and the commercial banks themselves will release funds according to their own investment policies Credit experience, credit system, enterprise qualification, credit and so on are reviewed. The intelligent contract technology codes the manual operation of the established process and stores it on the blockchain network in a distributed way. Through the intelligent contract, the data interaction rules between different system nodes are formulated to realize the automatic process execution, which greatly improves the security and time efficiency of the manual operation.

4.2 Decentralization to Improve the Efficiency of Supply Chain Financial Clearing

The decentralized and distributed storage structure of the blockchain platform has a great impact on today's online payment software app. Due to the Internet of things technology of the blockchain platform, in the valuation of inventory pledge or collateral, the intermediate auction house and other valuation institutions can be directly omitted, and the big data system can calculate the direct valuation. Moreover, through the above-mentioned intelligent contract management system, the, Data can be encrypted in time to save time and cost. In cross-border transactions and inter-bank transactions, currency exchange can also be saved. In the process of opening an account in other banks, direct access can be made, which can effectively reduce the settlement cycle, reduce the time cost and facilitate the flow of capital chain. When solving payment and settlement, blockchain

completely subverts the traditional way of transaction, and adopts a new type of point-to-point transaction, without the execution of intermediary institutions.

4.3 Distributed Technology Reduces Supply Chain Financial Project Risk

The supply chain financial service platform integrated with blockchain technology can effectively prevent financial fraud such as loan fraud. In the blockchain network, the transaction data among financing enterprises, core enterprises and upstream and downstream enterprises in the supply chain are encrypted and distributed stored on different nodes, which ensures the security and authenticity of data information at the data level; at the protocol level, the smart contract signed based on the transaction contract of both sides can effectively control the capital flow of financing enterprises, When the specific conditions are met, the corresponding transfer terms are automatically triggered, which not only improves the operation efficiency of the project, but also eliminates the risk of financing enterprises transferring funds through other channels. The essence of supply chain finance is that financing enterprises obtain loans from commercial banks by undertaking the credit value transferred by core enterprises. Therefore, the credit of financing enterprises and core enterprises is organically related. When one party has credit problems, the other party will also be affected. Considering the complexity of the system, commercial banks are bound to make more strict control on project risk and compliance.

5. Suggestions for Promoting the Application of Blockchain Technology in Supply Chain Finance

5.1 Actively Respond to the Changes Brought by New Technology to Supply Chain Finance

In order to fully meet the arrival of the blockchain technology era, all participants in supply chain finance should adapt to the block as soon as possible

The application of chain technology, thus promoting the application of new technology in supply chain finance, can be prepared from the following aspects.

5.1.1 The Government Promotes the Development of Supply Chain Finance Applying Blockchain Technology

In order to help the trading users in the market accept the supply chain finance with blockchain technology as early as possible, the government needs to take the lead in this time, fully weigh the advantages and disadvantages, lead all to see the change with a positive attitude and guide the market to accept the supply chain finance under this mode.

5.1.2 Financial Institutions Actively Develop and Apply Supply Chain Financial Products or Platforms of Blockchain

Under the active guidance and support of the government, financial institutions should actively promote new ideas, devote themselves to research and develop relevant innovative products or platforms of supply chain finance applying blockchain technology, and call on other financial institutions to turn to innovative supply chain finance together by their own influence.

Financial institutions actively develop blockchain supply chain financial products or platforms. On the one hand, it is conducive to the financial institutions to expand their own business, enhance the competitive power of enterprises, innovate products or technologies to help develop customer resources, and directly promote the supply chain financial business under this mode for customers; on the other hand, financial institutions compete with each other to innovate the relevant platforms or products of supply chain finance in this mode, and indirectly promote blockchain technology in the financial market The application in the financial business of supply chain, which makes more users understand and use it, is helpful to the popularization of the application.

5.2 Speed up the Cultivation of Professional Talents and Technological Innovation

The biggest factor hindering the large-scale application of blockchain technology is the technical barrier. Only by strengthening technological innovation and constantly improving the technical

loopholes in the application, can we ensure the security and stability of the application of blockchain technology in supply chain finance, which is conducive to the general promotion of the supply chain mode in the financial market[5].

5.2.1 Strengthen Technical Innovation and Solve Technical Problems in Time

When the blockchain technology is put into practical application in supply chain finance, the practical technical problems should be solved in time, the possible situations should be analyzed, and the specific problems should be solved in the technical improvement. For example, blockchain systems need to design more sophisticated cryptographic algorithms to prevent hackers from breaking through More than 51% of the nodes tamper with the data in the block; build a comprehensive verification code to strengthen the network to interface connection, users need to verify their real identity when connecting, and can enter only after authorization, so as to prevent traders with public key password from reading irrelevant information arbitrarily; when blockchain uses intelligent contract, it is necessary to strengthen the fault tolerance mechanism and prevent system attacks caused by dead cycle, etc.

5.2.2 Strengthen the Construction of Blockchain Technology Team and Cultivate Professional Talents

In order to improve the security and stability of blockchain technology, ensure that there are no errors in the application, and make it easy for transaction users to use at ease, it is necessary to continuously improve the technology and refine the data algorithm. The technology R & D team is the key. It is necessary to strengthen the team building of blockchain technology as soon as possible, cultivate professional talents, and builds the team. On the whole, we should strengthen the ability of the team, divide the technical departments specialized in blockchain research, select professionals with high comprehensive quality to join the team, and learn from experienced companies to work together. With professional talents as a technical reserve, we can lay a solid foundation for the team, which is believed to be of great help for the future technical update.

References

[1] Kevin Bieler, Daniel Chiarella, Helmut Heidegger, Matthew Ramelle, Akash Lal, Jared Moon, Yan Dong, Dan Dong. Application of blockchain technology in capital market[J]. Financial Market Research, 2016(02):110-120.

[2]Alok Raj, Indranil Biswas, Samir K. Srivastava. Designing supply contracts for the sustainable supply chain using game theory [J]. Journal of Cleaner Production, 2018, 185.

[3]Obeidat Ramy,Ispas Adrian,Aleodor Vasile. Blockchain Technology—Applicability in the Traceability of a Product Throughout the Supply Chain[J]. Macromolecular Symposia, 2021,396(1).

[4]Upadhyay Arvind,Mukhuty Sumona,Kumar Vikas,Kazancoglu Yigit. Blockchain technology and the circular economy: Implications for sustainability and social responsibility[J]. Journal of Cleaner Production,2021, 293.

[5]Francisco K, Swanson D.2018.The Supply Chain Has No Clothes: Technology Adoption of Block Chain for Supply Chain Transparency[M].Logistics,2(1),Springer International Publishing.