Research on the Application of Blockchain Technology in the Field of Financial Management in the Era of Big Data

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Abstract: With the development of science and technology, blockchain technology came into being in the era of data and information. The irreversible contract characteristics of blockchain are conducive to accurate and solidified financial information, so as to ensure that its financial management effect can be better played. The concept of blockchain has been widely used in the field of financial management. With the coming of big data era, the application of blockchain technology in the field of financial management will face new challenges. Based on this, this paper attempts to discuss and analyze the application of blockchain technology in the field of financial management.

1. Introduction

In the era of big data, informationization has become a necessity of development. Therefore, learning new technologies and technology research and development methods have become the necessity of improving the national economy as a whole. Blockchain technology was born in 2009, which was first used as the underlying recording technology of Bitcoin ledger, and is now gradually developing into a new distributed and decentralized technical solution. In the traditional financial management system, some enterprises are unable to obtain and transmit financial information in time due to the limitation of their own scale, and the use efficiency of their financial data is low [1]. Blockchain technology, with its characteristics of being difficult to tamper with and decentralized, has a certain positive impact on realizing the synchronization of enterprise financial information and improving supply chain management. At present, the application of blockchain technology in financial management is still in the development stage, and there are still many problems to be solved urgently. The main purpose of this paper is to briefly analyze the application of blockchain technology in the field of financial management.

2. Overview of Blockchain

Blockchain was first proposed by Nakamoto, which is a point-to-point distributed digital ledger based on the Internet. All participants who use this ledger are connected to the “nodes” in the blockchain. The transaction in blockchain consists of a series of data and information blocks marked with time stamps, and the front and back blocks are linked by “signature” or hash value, and added to the chain in chronological order.

When the transaction is authenticated and added to the blockchain, all participants in the blockchain will receive a copy of the entire blockchain transaction information. At this time, all transaction information is transparent and supervised. Unless more than 51% of the nodes in the blockchain change information, they cannot be revoked or changed, and the permanent “distributed” ledger of all transactions can be realized. This peer-to-peer interaction forms “disintermediation phenomenon”, that is, brokers are not needed in traditional industries [2]. The working principle of blockchain is shown in Figure 1.

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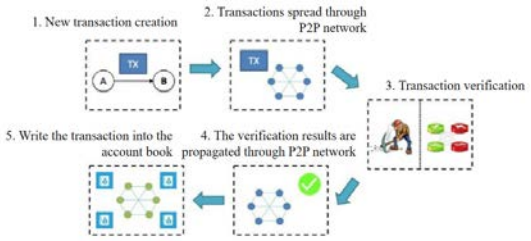

Fig.1 Working Principle of Blockchain

Blockchain has its unique advantages in the field of financial management [3-4]:

(1)Data security is guaranteed. Under the decentralized mechanism of blockchain, each node participant has a copy of blockchain information, and the data is safer and not easy to be tampered with under the encryption hash algorithm. This not only solves the problem of data security, but also solves the problem of transaction trust without middleman.

(2)The completeness of data is improved. In the blockchain mode, as long as there are nodes trading, their trading data will be broadcast to other nodes of the platform for verification and recording, and it is impossible to miss data.

(3)Data management costs are reduced. Compared with the traditional central database, blockchain, as a decentralized and shared distributed database technology, automatically identifies the authentication and record of transaction information of each node, and all nodes in the network participate in data maintenance collectively, thus greatly reducing the cost of data management compared with the central mechanism database.

3. Problems in Traditional Financial Management Mode

3.1 The Concept of Financial Management is Lagging Behind and Inefficient

In the traditional enterprise financial management, the financial department is often not taken seriously, which has a low status in the enterprise and lacks independence. Traditional financial management mainly focuses on the work that can be processed by machines, such as financial data collection, calculation, processing, etc., which leads to the inefficiency of financial management and can't keep up with the development of big data, and the lag of management concept also limits the development of enterprises.

3.2 Low Data Security

E-commerce enterprises rely on the network platform to operate in the process of operation and management. While developing through the Internet, it will inevitably bring many network security risks, which need to be paid attention to by all Internet enterprises. At this stage, many enterprises still adopt the traditional financial management mode, while the traditional financial management ignores the network security management of financial data, which adversely affects the security protection of financial data and information of e-commerce enterprises and increases great financial risks for enterprises [5]. If illegal elements steal customer information and financial data of e-commerce enterprises through network technology, it will directly affect the normal operation of e-commerce enterprises, reduce the safety and credit of enterprises, and even cause a fatal blow to the sustainable operation of enterprises.

3.3 High Transaction Cost

When financial management is launched to raise investment activities, it has higher transaction costs, because intermediary agencies need to operate in the middle during the process of trading activities, which also makes the financial management work increase a lot of expenses in the actual process. In addition, when the financial management work is carried out, information asymmetry often occurs, which leads to the increase of information inquiry and information search in the financial management activities of enterprises, which makes the cost increase.

4. Feasibility Analysis of Applying Blockchain Technology to Financial Management in the Era of Big Data

4.1 Blockchain Technology and Enterprise Financial Management Have a High Degree of Fit

The financial requirements of modern enterprises are no longer limited to simply accounting income and registering account books. Modern enterprise financial management is an adjustment activity that provides the possibility for various demands within an organization based on a certain overall goal. The decentralized distributed encryption ledger provided by blockchain can protect the security of data information and realize the information synchronization of all nodes, thus solving the problem of information asymmetry. In addition, intelligent contracts based on blockchain can draw up contracts and place orders automatically according to the actual business, thus ensuring the synchronous processing of finance and business.

4.2 It is Cost-Effective to Introduce Blockchain Technology into Financial Management

As to whether blockchain technology can be popularized in enterprises of different scales, besides the advantages and disadvantages of blockchain itself, we also need to consider the important factor of cost. Blockchain, a new technology, has many problems in practice, such as long research and development time, high use cost and difficulty in later maintenance. For enterprises, if the input and output of blockchain technology is relatively high, enterprises are willing to bear high costs.

5. Application Strategy of Blockchain Technology in Financial Management Field

5.1 Fine Classification Management of Financial Information

Under the application background of blockchain technology at present, it is quite different from the traditional single center to confirm and manage financial information. The distributed account books of blockchain are jointly booked by the whole network participants, and are fair together, thus finally forming an accurate information data management database without repeated records in the whole network. In the process of applying the information data management library, the public management of information data can be better realized, which improves the management efficiency and accuracy of information data to a great extent, thus forming a shared ledger.

In the process of practical application, shared books often change the traditional financial management mode [6]. The repeatability of accounting information is reduced, and the possibility of financial management loopholes is reduced, which will be of great help to the actual development of financial management in various large enterprises in China. At the same time, the application of the shared ledger mode also makes the reconciliation and cost correction work of both parties achieve better results in the actual development process. In addition, the application of distributed account books also greatly reduces the possibility of evading responsibility in financial management, and avoids the record deviation caused by single accounting staff in the process of data recording.

5.2 System Cohesion

(1)Financial system convergence

The connection of financial system has been nearly completed in the organizational preparation stage, which mainly tests the comprehensiveness and fluency of financial management, and urges financial personnel to gradually adapt to this system in practical work. Users can choose intelligent contracts to automatically execute multi-party transactions and organize multi-level supply chain relationships among enterprises. When the business happens, the intelligent contract will automatically generate and issue an order in the blockchain, and then the electronic tokens generated synchronously in the blockchain will be transferred along with the physical data. Finally, the intelligent contract supervisor will generate relevant documents according to the coding of the electronic tokens and automatically deduct money according to the contract terms, thus completing the whole business process.

(2)Business unit coordination

In terms of coordination with business departments, enterprises need to consider how to embed electronic tokens and smart contracts into their supply chain or Internet of Things systems and negotiation processes, so as to fully embed financial management into business processes and realize the automation of standard business processes. In the above example, the financial department should coordinate with the business and legal departments, and pre-set the generation conditions of smart contracts, the production process of products and the order order, so as to ensure smooth and efficient business activities.

5.3 Enterprise Budget Management

Budget management is one of the important contents of the application guidelines in the field of financial management. Strengthening enterprise budget management can promote the functions of enterprise planning, decision-making, allocation, supervision and other activities. At present, compared with the traditional budget management, it advocates the establishment of enterprise comprehensive budget management which is controlled before, during and after the event, namely budget preparation system, budget execution system and budget evaluation system.

First, the budgeting system should construct the budget target according to the business management target of the enterprise. In the era of big data, multi-dimensional analysis of the internal and external environment of enterprises by using the data platform can make the budget management more accurate and complete on the premise of meeting the strategic objectives of enterprises. Secondly, enterprise budgeting relies on enterprise global data, and the amount of information increases greatly after the application of big data technology, but the integrity and authenticity of the data need to be identified.

Budget execution is the core link of budget management. Real-time collection and data update of big data technology enable budget departments to observe and monitor budget implementation in real time [7]. According to the budget execution process shown in Figure 2, big data and blockchain are embedded into budget execution, and corresponding departmental blockchain is set between budget management department and each budget execution department to ensure timely communication between departments on the peer-to-peer interactive network, thus reducing the low frequency and lag of data update.

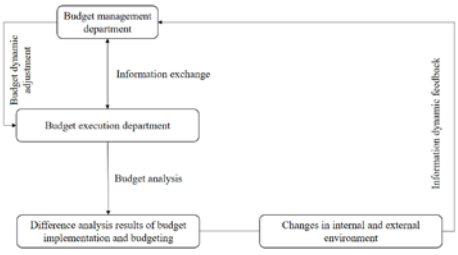

Fig.2 Budget Execution Flow Chart Based on “Big Data+Blockchain”

All budget execution data and budget targets are stored on the blockchain platform. By comparing and analyzing the budget standards with the actual situation of budget execution in real time, the reasons for the differences are fed back to the budget management department in real time. At the same time, if there are unexpected situations in the enterprise or the market environment changes, the blockchain data center will feed back these unexpected information to the budget management and execution departments in time, and make real-time adjustments according to the situation, so as to make the control more flexible and scientific.

6. Challenge and Innovation of Blockchain Technology to Enterprise Financial System

6.1 Enterprise Intelligent Contract and the Promotion of Supply Chain Financing

Smart contract is a computer protocol, which aims to negotiate, verify and execute contracts digitally. Blockchain guarantees the reading, execution and supervision of smart contracts, which are highly transparent, traceable and unchangeable. Therefore, some people think that the most

revolutionary representative of blockchain application is smart contract. When the pre-set conditions are met, the payment behavior and the transfer behavior of money or other assets will be automatically carried out.

Not only commercial activities, but also enterprises have experienced this practical project of self-executing contract in financial financing, commercial banking and digital rights management. In the aspect of supply chain finance, the supply chain financial platform based on blockchain technology can guarantee the multi-participants in different links to obtain and trace the whole chain information, and enterprises, financial institutions, warehousing and logistics, insurance, etc. in the upstream and downstream of the supply chain can enjoy high-quality financial services in real time. In the aspect of vouchers, blockchain technology is helpful for the unification and realization of general vouchers, which can be the digital unification of traditional paper documents or the electronic realization of enterprise contracts.

6.2 Externalization of Enterprise Financial Decision Information Base

In the traditional enterprise financial management, there is a lack of effective information communication and sharing between the financial department and other departments, and the information transmission among various departments of the enterprise lags behind seriously. However, in the blockchain system, all departments of the enterprise will exist as a node, and each node will write data into the block at the first time when it gets information. The complete ledger and copies formed by each node will effectively guarantee the timeliness and accuracy of information transmission among various departments of the enterprise and the efficiency of each department's work.

Externally, blockchain technology bypasses cumbersome intermediaries such as banks and directly realizes point-to-point currency transactions. According to the open database in the blockchain, we will conduct efficient price discussion and negotiation, complete various transactions and business processing in an open and transparent environment, and accept the supervision of various stakeholders. Therefore, the distributed bookkeeping feature and intelligent contract function of blockchain technology will reconstruct the enterprise financial management information system, and realize the docking between internal financial information and external transaction information.

6.3 Strengthening Financial Risk Management

The main ways to solve the risk management and control problem of enterprise financial management by using blockchain technology are as follows: First, the traditional centralized data structure will become decentralized distributed storage structure, and the synchronization of each node ensures the real-time data sharing, and the distributed ledger also allows all participants to see consistent data; Secondly, the chain structure of each node ensures the traceability of data source.

In addition, blockchain can ensure that the generation of intelligent contracts and the automatic execution status without intermediary participation are monitored in real time, thus effectively avoiding the problem that enterprises cannot recover the funds on credit to customers in time. Therefore, the application of blockchain technology can not only play the role of checks and balances between enterprises, but also ensure the authenticity and reliability of financial information.

Of course, due to the introduction of blockchain technology, the financial management and control system will be accompanied by decentralized information processing, which will also increase the pressure on enterprise risk prevention and control information screening. In addition, the information and risk transmission speed under blockchain is much faster than the existing network system, which makes it difficult for the current risk monitoring system to adapt to the systemic risks caused by blockchain technology, especially the disclosure of blockchain information, whose technical anonymity requires peer-to-peer transactions and encryption. If there is a problem with an anonymous transaction.

7. Conclusion

As a new network technology, blockchain has brought business innovation to financial management: intelligent contract technology has improved the timeliness of financial operation; By taking advantage of the unique advantages of distributed account books of blockchain, such as decentralization and unchangeable, the center is discretized to ensure the security and credibility of enterprise financial information. Under the current big data background, it has brought new solutions to the financial management of major enterprises. However, due to the limitation of blockchain's own technical factors, there are some problems in the field of financial management in the process of concrete application, which need long-term unremitting exploration and optimization by relevant researchers in the industry.

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