

A Review of Blockchain Finance Research in the Digital Economy

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Abstract—Blockchain technology is expected to become the next touchpoint to subvert people’s way of life. Research on the application of blockchain in the financial field, such as monetary system, payment system, credit information system, supply chain finance, can analyze the most cutting-edge research issues. Retrieve and list papers with keywords such as blockchain and finance, classify and summarize them, and intercept relevant research conclusions to show the current research and theoretical system in the field of blockchain finance in China. China’s blockchain finance is hot, but there is still a long way to go for the specific implementation of the application, and it is necessary to promote the development of blockchain finance by innovation.

Keywords—blockchain, digital finance, literature review

I. INTRODUCTION

Blockchain technology has a wide range of application prospects. As an emerging Internet technology, it has strong plasticity, universality and innovation, and can be integrated into government affairs, finance, people’s livelihood, business and other fields. It has a high strategic application value at the national level, so our government attaches great importance to this technology. Accelerate the innovation of core technologies and drive the development of corresponding industries. Aiming at the research on the development status of the integration of blockchain and the financial field, the general cognition of the development status of various fields of blockchain finance is obtained through the search, induction, extraction and refining of corresponding literature.

II. THE BASIC THEORY OF BLOCKCHAIN

A. The Definition of Blockchain

The specific concept of Block Chain first appeared in A 2008 article titled “BITCOIN:A Peer-to-Peer Electronic Cash System” (NAKAMOTOS, 2017). The author Nakamoto designed the Bitcoin monetary system based on the innovation of cryptography and described a complete peer-to-peer direct transaction mode of electronic money with a non-traditional indirect transaction mode (Lelarge and Bolot, 2008). Based on the complete peer-to-peer direct transaction mode, blockchain technology helps the Bitcoin monetary system and the corresponding electronic currency trading system establish and improve the underlying IT structure. At the same time, with the help of the distributed node consensus algorithm that can support the joint accounting endorsement of all users on the chain, the secret cryptography technology principle that can ensure multiple security such as information storage and access and data transmission, and the intelligent contract based on script code that can assist in the completion of transactions. It can ensure the consistency of

data storage content on each node, the security of transmission and the stability that cannot be changed at will (Christian and Roger, 2013).

However, at present, the academic community has not formed a unified voice for the definition of blockchain. Christian, a scholar who defined blockchain earlier, believes that the essence of blockchain is the derivative of distributed storage technology located in the underlying architecture of Bitcoin, and it is an open ledger system in which all members on the chain cooperate to record and use transaction information. IT is an innovative application of IT technologies such as mass data storage, decentralized structure of data and information transmission, and the use of cryptography to encrypt information (Melanie, 2015). Scholar Wang Yuandi believes that blockchain is a kind of distributed shared ledger with extremely low possibility of tampering and extremely high difficulty. The recording and preservation of data on the chain presents the characteristics of distributed, open and shared, which can get rid of the dependence on centralized organizations, which will change the way of credit generation on the network.

B. Advantages of Blockchain

Although the concept of blockchain gradually evolved with the emergence of Bitcoin, its technical value has gradually been discovered through the continuous in-depth study of experts and scholars. The unique attribute of blockchain technology is the use of mathematical methods to solve the trust problem, and its trust mechanism is based on mathematical principles (asymmetric cryptography). Many participants in transactions do not need to know the moral quality level of the transaction object, nor do they need to rely on third-party intermediaries to endorse the transaction, and only need to trust mathematical algorithms to establish mutual trust in transactions.

The advantages of blockchain technology can be summarized as follows: decentralized structure, extremely difficult to tamper with on-chain data, easy to trace data sources, high security and high credibility, and open database sharing. The decentralized structure can significantly improve the operation efficiency of the organization and reduce the operating cost. The open and transparent data information is convenient for query, supervision and traceability. The distributed ledger and storage technology ensure that the on-chain data cannot be tampered with, which ensures high security and high fault tolerance rate. The ability of all users to share and use a common database can theoretically broaden the reach of an organization’s business model.

III. THE COMBINATION OF BLOCKCHAIN AND FINANCE

Blockchain technology is applicable to the scenario of “multi-business entities, mutual distrust, and strong business

connection”, which can enable the basic system of financial institutions to better play a synergistic effect, establish a trust mechanism among multiple business entities that do not trust each other, and enable all parties involved to recognize the mutually confirmed transactions based on the principle of open and transparent consensus. For the financial industry, credit risk is an unavoidable problem, but the emergence of blockchain provides a perfect solution to solve the problem of credit risk, because blockchain ensures that the data on the chain cannot be tampered with, the data is completely open and transparent, and the data source is traceable, which provides great convenience for the trust establishment and credit verification of transaction participants.

In addition, the commonality and openness of blockchain technology as a database technology are highly compatible with the business model of the financial industry. Taking the settlement and clearing business of the financial industry as an example, the traditional centralized database requires all parties involved to independently maintain the database of their own business data, so in fact, all databases are independently isolated from each other. Therefore, manual reconciliation is required in the process of settlement and settlement due to mutual distrust, and this process consumes huge manpower. A set of shared databases that are jointly trusted by multiple parties built by blockchain technology can significantly reduce labor costs and improve the efficiency of clearing and settlement. Blockchain can complete the trustless transactions between nodes without the participation of intermediaries, so the popular application fields of blockchain in the financial industry in the future include monetary system, payment system, securities system, supply chain finance and other basic systems. The introduction of blockchain technology helps to strengthen the guarantee of customer information security, which in theory can effectively reduce the cost of financial supervision, inhibit the emergence of financial crimes, and improve transaction efficiency.

A. Blockchain and Monetary System

The 21st century is the digital information age. With the maturity of P2P (Point to Point) communication technology and blockchain technology, various blockchain currencies such as Bitcoin and Litecoin have sprung up. With the fierce competition among countries for the dominance of the financial system, countries may compete to issue blockchain currencies. The realization of “non-state money” with the support of the theory, the right to issue money may be transferred from the state and the government in the future. In terms of financial payment system, bank issuance and credit deposit currency based on the issuance and circulation of blockchain currency will be the main form of daily transactions for enterprises and institutions in the future, and blockchain currency will be transformed into monetary reserves and circulated in large non-real-time transactions.

B. Blockchain and Payment System

At present, the attention of the banking industry in the blockchain technology is mainly focused on the integration of blockchain technology and the payment field. At present, the payment systems of domestic banks mainly include the large payment system of the central bank, the small payment system of commercial banks, the core system of each bank and the UnionPay payment system, etc., and the inter-bank transaction cost is high, and the large transaction takes a long

time. If a system of the bank cannot be used normally, the transaction will fail.

If the use of blockchain technology to replace the original centralized structure of the business processing method, through the distributed ledger technology to achieve zero intermediary, to the third-party institutions of the management system, then all users can rely on the password real-time query transaction status, real-time clearing of funds. In addition, the banking system can use the unified blockchain to jointly create and maintain a shared ledger, achieve real-time fund clearing and real-time reconciliation functions, reduce the complexity of clearing and settlement of various institutions and departments, and improve processing efficiency. The application of blockchain technology can also ensure the reliability and security of transaction data in the banking system, enhance the liquidity of funds, improve the capital structure of financial institutions, and enhance customer service satisfaction.

C. Blockchain and Credit Information System

In the traditional credit information market, the flow of information is not smooth, and the value of data is difficult to reflect. The greatest value of blockchain lies in its realization of transaction as credit. Every node participating in activities on the chain has credit behavior and can disclose its own credit information.

Because the blockchain system automatically records credit information, and all nodes participate in confirmation and storage activities, it can effectively improve the pertinence and security of credit investigation. The benefits of blockchain for the credit investigation system are that on the one hand, it reduces the cost of credit investigation, and the exchange of data information based on blockchain is conducive to the rapid update of the credit information of enterprises, and timely docking and matching with the credit investigation system of financial institutions.

D. Blockchain and Supply Chain Finance

In the future, blockchain technology has broad practical prospects in China’s financial and other fields. Scholar Zhang Lu proved that in the basic architecture of blockchain, nodes can actively cooperate with Nash equilibrium for higher returns through the reasoning of repeated games, so as to maximize the rational consensus node and the overall return of blockchain. This inference indicates that the application of blockchain technology under supply chain conditions can maximize the interests of the supply chain as a whole and the interests of each member.

Supply chain finance plays an important role in solving the financing difficulties of smes caused by factors such as enterprise scale and credit risk. This is because under the supply chain model, core enterprises in the chain provide credit sharing and risk sharing for other smes, reducing the threshold required by banks and financial institutions for smes’ borrowing qualifications. The integration of blockchain technology and supply chain finance business is based on the important application value of information transmission, information security and information traceability in supply chain finance business.

IV. CONCLUSION

Blockchain can be integrated with the existing monetary system, payment system, securities system, supply chain finance and other basic systems in the financial field. In-depth

integration can promote the construction of an information service platform with high efficiency, low cost and high security. At the same time, it is of great significance to promote the openness and transparency of the financial market and maintain social fairness. In the process of the integration of blockchain and the financial field, there are a lot of opportunities and challenges. On the one hand, the enthusiasm of financial institutions and the continuous expansion of blockchain application space help financial institutions effectively reduce costs; On the other hand, the existing system needs to be adjusted to adapt to the new operation and management model of financial institutions under the blockchain. We should actively respond to the impact and challenges brought by blockchain technology, actively and steadily develop China's blockchain finance, adhere to innovation-driven, build a policy environment conducive to the research and development of blockchain financial technology and market operation, accelerate the research and innovation of the application of blockchain technology, and increase the research and development and promotion of blockchain financial products. Strengthen the institutional construction of blockchain in financial

supervision, and accelerate the legalization of blockchain finance.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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