

The Research on Corporate Financial Based on Block-chain Technology

A Case Study of Ant Financial Services Group

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ABSTRACT

Narrow loan scopes and difficulties in investigating consumer credit information are two of the main existing problems in the function and transaction pattern of block-chain in financial service area. As one of the first enterprises applying block-chain technology, Ant Financial Services Group innovates the application of supply chain finance in emerging fields. This paper studied its application of block-chain technology in financial businesses. The research shows that the block-chain technology improves not only enterprises' transaction efficiency, reduces the transaction financing cost and ensures the transaction security but also their profitability. It helps to alleviate the difficulties in the application of small and medium-sized enterprises and provide a reference in the application of block-chain technology to them.

Keywords: Block-chain technology, Financial business, Ant Financial Services Group.

1. INTRODUCTION

Block-chain is a new type of distributed database with the characteristics of decentralization. Its practical application of data encryption and time stamp technology has become a new symbol of financial operation tools in recent years. Supply chain finance, with the decentralized and tamper-resistant characteristics of block-chain technology, integrates the supply chain of the upstream and downstream businesses so as to improve the timeliness, security, supervision of financial transactions and reduce transaction costs.

As one of the first enterprises applying block-chain technology, Ant Financial has superior application products and rich, transparent and representative financial data. On this base, the paper, taking Ant Financial as an example, puts forward the problems in the development of financial block-chain and feasible improvement measures in order to inspire related enterprises of the same type or those in transformation.

2. THEORETICAL ANALYSIS

2.1 Definition of Block-chain

Block-chain is a kind of chain data structure, which is formed by packing data into blocks or data blocks and connecting them in the right order. Its essence is a database, which can verify, save and update data. Combined with the principle of cryptography, it can ensure the security of data transmission in different blocks and can not be tampered with. With the innovation in sciences and technology and the application and experiment in different fields, block-chain technologies can reconstruct credit information system in various scenarios. The low cost and high efficiency of its transaction are of great significance in application.

The overall technical structure of block-chain is divided into network layer, data layer, consensus layer, control layer and application layer. Each node in the network layer shares resources and information to form a decentralized trust system. The data layer defines the connection mode and organization form of the data in each node to ensure that the data is difficult to be tampered. The consensus layer manages the same ledger data

through a specific protocol to ensure the consistency of node data. The control layer provides programmable intelligent contracts to realize the conversion of contract business into cross transaction. The application layer includes relevant application scenarios and actual cases.

According to different application scenarios, block-chain can be divided into three categories: public chain, private chain and alliance chain. The public chain is completely open, which means all nodes are free to go in and out and commonly recorded, without mutual trust. The private chain is limited decentralization. It needs authorization to enter or exit a node, which makes data protection and supervision stricter. The alliance chain needs to be maintained and operated by many parties. Its degree of decentralization is between the public chain and the private chain. Common applications include financial institutions and alliances of logistics industry.

2.2 Characteristics of Block-chain in the Application of Financial Business

The characteristics of block-chain in financial fields are mainly divided into three aspects: decentralization, smart contract and non tamper-ability.

The first one is decentralization. Centralization refers to the establishment of trust relationship with an individual organization. For example, in electronic payment, users must complete the process of identity verification and credit review through the bank information system. Decentralization refers to the establishment of trust relationship without an individual organization. The transfer of financial transaction data between nodes needs no trust but the transaction process is safe and open.

The second one is smart contracts. Each node of block-chain has a smart contract in the form of code, which is used to record the specific responsibilities, obligations and transaction conditions of the contract and so on, forming a complete process. In financial businesses, smart contract can quickly judge the matching of both sides of the transaction and the standard of terms, and ensure the security of the transaction and the authenticity and reliability of the information, so as to speed up the transaction process and promote the flow of capital in the financial market.

The third one is non tamper-ability. It stores the transaction information of both parties in an

encrypted way to ensure that the information will not be changed. In the block-chain system, each node can vote automatically in the system. After getting more than an half of the nodes voting authentication, the information will be stored. All the data sources have evidences to follow, which is conducive to the supervision of financial markets and the maintenance of an orderly trading environment.

3. RESEARCH LITERATURE OF BLOCK-CHAIN

In 2008, the concept of block-chain was introduced by Dorian P. Nakamoto, founder of Bitcoin. Since its launch, block-chain technology has been concerned by the world. In 2009, block-chain technology was introduced and implemented into the technology.

Concerning the research of block-chain technology, Liang Shenghui et. al.(2016) proposed four technological innovations: distributed ledger, asymmetric encryption technology, algorithm consensus and smart contract. Mokhtalian (2018) pointed out that highly encrypted currencies were not regulated by the traditional financial system and put forward regulatory suggestions by comparing the differences in liquidity and stability of the traditional securities market that used block-chain technology.

Huang Zhongyi (2019) divided the industry chain of block-chain into three parts: upstream, midstream and downstream. The upstream is mainly at the basic technology level; the midstream focuses on expanding block-chain application and technological innovation; and the downstream focuses on end users, such as individuals, companies and governments, mainly oriented to the fields of energy, supply chain management, medicine, finance and so on. Hao Lina and Zhang Meili (2020) summarized the application of block-chain in cross-border payment, insurance claims, securities trading and invoice in the financial fields.

Concerning the research of block-chain business model, Scott (2016) discussed the potential of block-chain technology in promoting remittance, financial inclusion, cooperation structure and micro insurance. Ma Chaoqun and others (2020) believed that block-chain technology accelerated the collaboration with the information technology of next generation (such as Internet of things, big data and artificial intelligence), and helps to improve the competitiveness and value of financial products.

In the above-mentioned applications of block-chain in the financial area, the relevant data and information are not perfect and many applications in the financial field are still in the theoretical stage. According to the above literature, the paper analyzes the block-chain technology in the case study of Ant Financial.

4. A CASE STUDY OF ANT FINANCIAL

4.1 Introduction of Block-chain Financial Platform of Ant Financial

Ant Financial, fully named Ant Financial Services Group, established in 2014, is dedicated to serving small and micro enterprises. It has such business sectors as payment, financing, securities and so on. Based on block-chain technology, it has created a charity donation tracking project, cross-border block-chain remittance service and overseas cross-border commodity traceability. It has also set up a transparent and shared financial service platform, enabling 80% of those consumers who are difficult to obtain traditional financial services and small and enabling micro enterprises to receive inclusive financial services.

4.2 Operation Mode of Block-chain Platform of Ant Financial Services

4.2.1 Network Security Strategy of BASIC

In 2017, Ant Financial launched BASIC strategy (initials of block-chain, artificial intelligence, security, Internet of things and cloud computing) to promote the comprehensive openness of block-chain finance. In the digital era, the difficulty of adapting to the digital environment, the lag of risk control and the slow digital process lead to many obstacles for traditional financial institutes. Under the digital environment, it tries to understand and recognize its customers and practices highly efficient financial services, strives to achieve inclusive finance and provides reference to other financial institutes.

Taking the payment scenario as an example, each node of transmission has a model of risk prevention and control from its users' registration, login to transfer. The reliable use of data is a prerequisite for the development of financial businesses. Security is one of the five main strategies of BASIC. Ant Financial has gradually established a multi-level closed-loop risk control

system based on artificial intelligence algorithm and biometric authentication. The coverage rate of the system model has reached 80%. Intelligent prevention and control are implemented in the application.

4.2.2 Establishment of Information Sharing Platform of Financial Business

For the Internet financial companies, the advantages and disadvantages of information sharing platform greatly affect the formation of financial ecosystem. The technology and data of the platform are the key competitiveness of enterprises. Business model is the foundation of their sustainable operation. Their innovation ability determines the upgrading speed of products and services. Ant Financial has many technologies and customer information. Adhering to the concept of openness, it actively cooperates with traditional financial institutes, integrates social resources and establishes a financial ecosystem, so as to realize information resource sharing and win-win value. In December 2016, it started a comprehensive strategic cooperation with China Postal Savings Bank by equity investment to jointly improve the financial service experience of the public. For those enterprises and consumers whose are difficult to obtain relevant financial data from the traditional financial platforms, it analyzes their consumption, production, daily life and other behaviors and then integrates them into a personal data database to facilitate accurate positioning of customer groups and provide them better services. According to the statistics in its official website, in the past five years, its MYbank has provided loans of RMB 800 billion to more than 6.5 million small and micro enterprises, creating more financing opportunities for their survival and development.

4.2.3 Specific Application Scenarios of Block-chain Technology

In June 2018, Alipay HK and G Cash, an e-wallet in Philippine jointly launched the cross-border block-chain remittance service, creating a precedent for the use of block-chain technology in cross-border payment. The traditional cross-border payment requires the remitter to remit through the cross-border e-commerce platform. After the remittance information is sent to the hierarchical agent bank and approved by SWIFT, the receiving bank settles and pays to the payee. This transfer method has the problems of information leakage, poor payment efficiency and high payment costs.

Due to the complex process of cross-border remittance and the circulation of customer information in multiple intermediate links, the transaction risk is high. If the transaction security awareness is not strong, hackers are easy to steal transaction information for fraud. In addition, the capital loss caused by currency conversion and exchange rate changes also increases the transaction risk. With the cooperation between Alipay and Philippines e-wallet based on block-chain, the transaction data of each cross-border payment is repeatedly verified in the block and stored in the block-chain to avoid the risk of data tampering in the transaction process.

4.3 Analysis on Supply Chain Financial Operation of Small and Medium-sized Enterprises of Ant Financial

4.3.1 Analysis on the Principle of Supply Chain Finance

Supply chain finance is a financing mode connecting core enterprises and upstream and downstream enterprises. The core enterprise is the primary object for banks to provide loans, including financing loans, settlement and financial services. Meanwhile, banks also provide credit loans, prepayment and inventory financing services to other suppliers. In the traditional supply chain financing mode, although SMEs have a stronger demand for funds, due to their scale and credit problems, it is difficult for financial institutes to verify their real background, pledge and remittance control. Therefore, their financing conditions are difficult and the financing cost is high.

With the block-chain technology of Ant Financial, important suppliers are considered as core enterprises and the financing of small and medium-sized suppliers who are originally outside the supply chain is also included in banks' financing objects. Through the application of distributed ledger, time stamp and smart contract technology, downstream small and medium-sized suppliers can enjoy the credit endorsement of core enterprises. Meanwhile, upstream suppliers and financial institutes can quickly obtain reliable information through the block-chain supply chain, effectively solve the trust problem of the supply chain, facilitate the cooperation and financing of SMEs, promote the development of the real economy and reduce transaction costs.

4.3.2 Introduction of Financing Products for Small and Medium-sized Enterprises of Ant Financial

The micro loan platform of Ant Financial serves consumers and SMEs efficiently with low financing threshold. The platform provides credit loans and traditional orders to obtain funds. Credit loan means that Ant Financial collects and analyzes the daily transaction data of businesses by using the model, and calculates the amount that SMEs can borrow at any time and the loan interest they can bear. The traditional order method is to calculate their required financing amount and financing period according to the specific conditions of daily orders.

According to different credit conditions and financing needs of SMEs, it has developed a unique "310 Mode". It takes only 3 minutes for SMEs to fill in loan application materials online and they can get the loan in 1 second. There is 0 manual intervention in the whole process, which saves labor costs, improves transaction efficiency, helps to better assess basic risks and credit status of small and micro enterprises financing and improves financial service experience.

4.3.3 Analysis on the Achievement of Financing Products for Small and Medium-sized Enterprises of Ant Financial

According to the above analysis on the principle of supply chain and the introduction of financing products for SMEs, this paper analyzes the application achievement of the products from four dimensions: operation mode, revenue structure, profitability sustainability and growth.

4.3.3.1 Operation Mode

The operation mode of Ant Financial can be summarized as "flow introduction — flow realization — deepening realization". In order to maintain it, the company improves its operation ability by solving the credit problems among users through technology, diversified small and micro loans and cooperation with other institutes. Relying on R&D and the application of block-chain technology and supply chain technology, it creates a good financial ecological environment, which is its core competitiveness.

4.3.3.2 Income Composition

The revenue of Ant Financial comes from business services, financial technology and innovation businesses. Among them, the financial technology is its main business, shown in "Figure 1" below. The income from small and micro loans accounted for the largest proportion of profits and income from 2017 to 2020. The revenue growth of the technology sector is most closely related to

small and micro loans. Generally, the income of small and micro loans has maintained a high growth rate, from RMB16.1 billion to RMB 41.8 billion in 2017, indicating that the flow acquisition and liquidity of small and micro loan services using block-chain technology in SMEs have increased, and the increase number of users and their actively use makes Ant Financial get more income and profits.

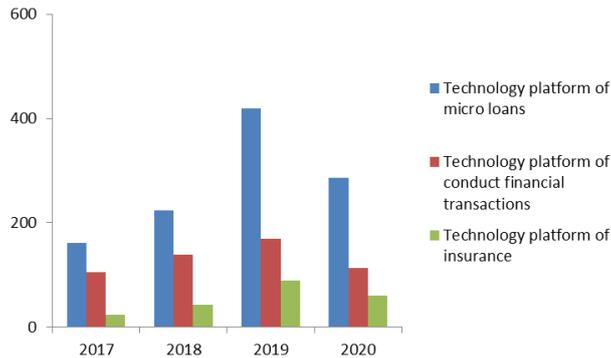


Figure 1 Revenue of Three Sub-business of Financial Technology Sector (RMB 100 Million).

a Source: the Listing Prospectus of the Ant Group, Evergrande Research Institute

From the specific source, its main products are Ant Credit Pay, Ant Cash Now and MYBank. In 2019, the net profits of Ant Credit Pay and Ant Cash Now were RMB 1.58 billion and RMB 1.20 billion, accounting for 8.7% and 6.6% respectively; and the net profit of MYBank is RMB 1.256 billion, accounting for 6.9%. The growth of users and the scale of payment are important factors for the revenue increase. At present, the credit balance of Ant Financial is more than RMB 2.1 trillion, indicating that investing institutes and consumer users recognize the service quality of its small and micro loan platform.

Table 1. Ratio of non-performing bank loans in 2019(%)

Name of Banks	Ratio of Non-performing Loans
MYBank	1.30%
WeBank	1.24%
Industrial and Commercial Bank of China	1.55%
Agricultural Bank of China	1.52%
Bank of China	1.48%
China Construction Bank	1.53%

4.3.3.3 Sustainability of Profitability

The supply chain of the Ant Financial, based on block-chain technology, creates a good financial ecosystem and realizes stable operation of enterprises. Taking the security in the BASIC strategy as an example, the credit risks of SMEs is mainly reflected whether customers repay the loans on time. The paper uses the non-performing loan ratio index to describe the risk control level of each bank (as shown in "Table 1") by comparing China's four state-owned banks with two commercial banks (MYBank and WeBank, the first ones to use block-chain technology).

"Table 1" shows that MY Bank has better risk control with a non-performing loan ratio of 1.3%, second only to the earliest developed WeBank (1.24%), lower than those of four major traditional banks. It also shows that block-chain technology can lead to higher accuracy of credit rating and risk assessment of SMEs, and therefore can effectively manage the operation of supply chain finance and make their profit models maintain superior sustainability.

4.3.3.4 Growth of Profitability

At present, the economics is in transformation. Due to the imperfect internal mechanism and lack of financing channels, there are different degrees of bottlenecks in the survival and development of SMEs. Although the state has issued policies to promote transformation and upgrading, the strength of bank credit loans to small, medium and micro enterprises is still low, and there is still much room for future market development. According to the scale of China's supply chain financial market from

2016 to 2019, the paper has the growth rate of market scale 15.7% by using compound growth rate formula. From the perspective of the supply chain financial market scale in the next five years (as shown in "Figure 2" below), the market scale in 2025 will be 2.5 times larger than that in 2019. A large number of small, medium and micro enterprises will realize rapid financing in it. Ant Financial will further grow and improve its profitability with efficient and convenient services and low financing costs.

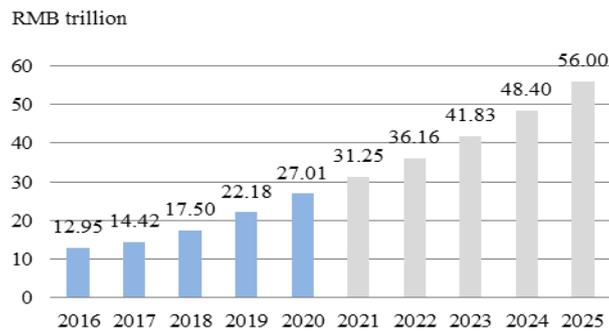


Figure 2 Scale and Forecast of China's Supply Chain Financial Market from 2016 to 2025.

5. CONCLUSION

Taking Ant Financial as an example, the paper introduces the background of its platform and the operation mode of block-chain, discusses its application practices of supply chain finance and analyzes the achievements of its financial products applying block-chain technology. The analysis shows that block-chain technology can reduce the financing cost of transactions and enhance enterprises' profitability. From the research of Ant Financial, we can fully understand the application of the open financial platform based on block-chain technology. BASIC, a network security strategy strengthens transaction security and creates good user experience through risk control model. Ant Financial strengthens cooperation with leading enterprises to jointly build a block-chain financial platform, which provides a guarantee for the establishment of a block-chain ecosystem. More and more enterprises will benefit from its block-chain technology. At present, it is actively implementing relevant technological R&D to further promote the application and development of supply chain finance. The paper will provide some reference for enterprises that are about to or are using block-chain technology.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Yu Wu.

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