Research of Financial Security Model based on Compliance Chain

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ABSTRACT

Due to the lack of compliance regulatory system in the overall popularity of internet finance times, financial chaos such as assets tampers and trade disavowing, and simultaneously mutual trust crisis, happen now and then. Based on this phenomenon, this paper draws into blockchain technology, strengthens its compliance, promotes its financial supervision and management tools function, and builds the underlying compliance chain platform to support the service and application of financial market from the technology, application and management three levels. The implementation effect simplifies that compliance chain will help to construct a safety and compliant trade environment, so as to a new ecological of financial security.

KEYWORDS
Finance regulatory, mutual crisis, tamper-resistant, non-repudiation, compliance, blockchain.

INTRODUCTION

As a rising financial model, and also a combination result of traditional finance with internet technology, Fintech totally invades public life, brings a lot of convenience to daily life, such as consumption, investment and financing. Meanwhile, in view of its huge customer base, large scale funds, fast spreading speed and wide influence, it has also brought new financial risk. i.e. beyond the virtual internet world, due to the lack of regulatory compliance system, speculation is gaining popularity. The other day ICO was halted by the PBC, CAC, MIIT, SAIC, CBRC, CSRC and CIRC just because it was suspected of illegal fund-raising. At the same time, financial chaos such as assets tampers to cheat loan, illegal offering loans and trade disavowing grows more and more, influences trader's confidence and also seriously disrupted the economic and financial order. The development of Fintech encounters unprecedented mutual trust crisis, moreover, severe security challenges.
The Chinese government pay high attention to financial health. On April 25th, 2017, general secretary Jinping Xi presided over the fortieth collective study of Political Bureau of the CPC Central Committee to safeguard national financial security, he stressed that financial security is an important component of national security, is an important foundation for the smooth and healthy development of the economy. The maintenance of financial security is a strategic and fundamental event related to the overall situation of China's economic and social development. In this May, the PBC established Fintech committee, clearly strengthened Reg Tech practice; also it demands plentiful technical means to enhance prevention ability of financial risk. In such a new age of internet plus, facing the novel economic format, the financial market regulation, financial risk prevention, financial order rectification, all these need innovation and application of new technology and new methods to deal with the perplexing economic and financial environment [1-2].

DEVELOPMENT OF BLOCKCHAIN

Blockchain technology originated from the foundation paper ‘Bitcoin: a peer to peer e-cash system, which was published by Satoshi Nakamoto in 2008, as the underlying technology of bitcoin, it has not yet been defined clearly [3]. In the narrow sense, blockchain is a chain data structure of data blocks to sequentially connected according to time sequence, and a Distributed accounting books which is tamper-resistant and un-forged within cryptology. While broadly speaking, blockchain technology is an entirely new distributed infrastructure and computing paradigm which is used to verify and store data with data blocks, generate and update data by use of distributed consensus algorithm, ensure data transmission and access security through cryptography, and last program and operate data that make use of smart contract composed of automated script code [4].

As an Innovating application model of computer technology such as distributed data storage, point-to-point transmission, consensus mechanism and encryption algorithm in such Internet era, the blockchain was considered a disruptive innovation of computing model that after mainframe, personal computer and internet, which based on existing technology and then combined of their original and innovative, therefore achieved previously unrealized functions. So far, the blockchain has roughly gone through three stages, as shown in figure 1:

Fig. 1. The evolution path of blockchain.
Nowadays, the application of blockchain gradually expands in financial technology as the representative field. Document [5] took financial payment as an example, elaborated the difference between traditional payment model and blockchain based payment model, put forward the essence of blockchain application in the financial field is to build a flat global clearing system. Document [6] analyzed the necessity and development constraints of blockchain in domestic bill market, put forward the overall general development trends and suggestion. Document [7] put forward the idea of using blockchain to settle accounts in multi-energy supplement system. Meanwhile, as a universal underlying technology framework, in addition to digital currency, block chain also brings profound changes to financial, economic, energy and other field [8], and then extends to IoT (Internet of things), intelligent manufacturing, supply chain management, digital asset transactions and other fields, builds an ecological application circle of blockchain.

COMPLIANCE CHAIN PRINCIPLE

From the application effect, blockchain does encounter some troubles within identity authentication, low performance, security risks, inadequate supervision, poor interoperability, etc. As a new technique, blockchain is neutral, but if some deficiencies being engaged in illegal activities, it will take a great harm to the society, so it is necessary to strengthen and standardize the compliance of blockchain, in order to play a positive role in the blockchain and avoid the negative effects [9], also assume regulatory functions to supervise other areas, especially the supervision of the financial field, i.e. build a compliance chain, which is aimed to make a stub, traceability, non-compliance supervision within Fintech field through blockchain technology from technique, application and management three aspects, so as to ensure a healthy development blockchain industry and financial markets, as shown in figure 2:

On the compliance chain,
1) Full consensus

All parties involved in the transaction, maintain transaction records together, supervise transactions behaviors mutually. The transaction process is oriented to the

Fig. 2. Technical Route of Compliance Chain Platform.
whole chain, which is tamper-resistant, open and transparent, so as to enhance transaction efficiency, solve the weak trust trouble, break the mutual crisis and effectively prevent transaction repudiation.

2) Quota quantification

It establishes a financial assets credit system for whole users, turns historical transaction data, personal credit records, financial assets, electronic protocol, documents and other key agreements into quantifiable, manageable and visual financial assets, sets a quota for each financial asset and records in compliance chain.

3) Compliance traceability

Through combination of relevant financial institutions, a unified protocol storage mechanism is formed, all the key assets files, such as assets documents, records, agreements, protocol, etc., will be up to compliance chain and then get a Hash flag, the only value on the chain, and a new but also unique Hash flag will be regenerated if some content of the key files changes, even a little change. Once the user’s trading behavior is suspicious and the authenticity of the transaction documents needs to be evaluated, the irregular trading behavior can be identified by comparing the hash value of the previous and the later transaction documents, i.e. records traceability, adopting the tamper-resistant characteristics of blockchain to avoid potential transaction risk and ensure the financial safety.

Using an underlying compliance chain platform, it effectively solves the mutual trust mechanism, transfer mechanism, tamper-resistant, non-repudiation and other troubles of financial transactions, break the severe security dilemma and mutual crisis, create a security and compliance trading environment, maintain a healthy financial order, finally create a prosperous financial ecology.

FINANCIAL SECURITY APPLICATION RESEARCH

Compliance chain platform creation

This paper focuses on supply chain finance, accumulated points, payment and clearing, credit investigation, product traceability, digital bills and other financial applications, considers distributed shared accounting books, consensus mechanism, password system, smart contract as the core technology, designs the service center, monitoring center and assets trading center three centers, then builds a compliance blockchain platform, while technology architecture as shown in figure 3.
Pilot application of compliance chain

(1) Accumulated points exchange

As a business model that enterprise absorbs users, accumulated points are issued separately by each enterprise itself, and can’t exchange with each other, it’s not a real exchange, even though a few enterprises can do. Through compliance chain technology adoption within accumulated points exchange, the credit and safety troubles between issuers and traders are solved, which is helpful for an integrated, safe and reliable accumulated points exchange platform:

◆ For enterprises

In the case of accumulated points issue, firstly, the issuers register an institutional account through points wallet, and generates a pair of accounts and private keys from the compliance chain. When enterprises get their own asset issuing account, they can issue accumulated points and send the points to the compliance chain. After a successful issue, the issuer can see the amount of points under his account. Through the points exchange between users, consumer records and asset balances will be recorded in real compliance chain book, and real-time clearing between enterprises.

◆ For users

As a trader, users exchange or donate some points with others through points wallet, which extremely reflects the convenience value of the accumulated points.

Nowadays, the unified accumulated points system of State Grid E-Commerce, Ltd has been released on the compliance chain, support some service functions such as exchange ratio settings, etc., between www.esgcc.com.cn and www.jd.com.

(2) Supply chain finance credit

The key information of user account and credit application is linked up to the compliance chain. While a new user is created in the supply chain platform, the corresponding compliance chain user is created on the compliance chain at the same time. The compliance chain uses the encryption rules to generate the corresponding public key and private key, and stores the public key information on the chain. When the supplier fills in the credit application, the compliance chain will link up the key information of the credit application.

(3) Financial safety guarding
Based on the financial assets inquiry function and joint of multi electronic services channels, all the key information of users, such as accounts, hash flag of record, documents, etc. can be linked up to the compliance chain, which is useful for important financial files evidence existing and authentication, so as to build a healthy and safe financial trading environment.

Application prospect

Besides accumulated points, supply chain finance credit and financial documents authentication, the compliance chain can also be used in other applications of ecological application circle of blockchain. A McKinsey’s report showed that if compliance chain is applied to the B2B cross-border payment and clearing, each transaction cost decreased from about $26 to $15, approximately 75% maintenance cost of transfer bank payment network and 25% compliance, error investigation and foreign exchange cost are saved [10], payment of the bank among the cross-border can be shortened from 2 to 6 working days to 8 seconds, more conducive to the realization of small cross-border payments and other financial inclusion.

Quota quantification of user assets can be applied to credit information and other business scenarios, to strong social credit system and promote the healthy development of the financial transaction order.

CONCLUSION

Based on the decentralized, distributed storage, consensus mechanism and other technical characteristics of blockchain, this paper researches and builds a underlying compliance chain platform, to support the financial market and application. The reflection of pilots on accumulated points, supply chain finance credit and financial documents authentication demonstrates that compliance chain is useful to crack the dilemma of tampering, repudiation and crisis risk, helpful to create a safety and compliant trading environment, also provide a new solution to financial security model innovation, financial transaction regulation and financial risk prevention.

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