

# Financial application scenarios and regulatory challenges of blockchain technology

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**Abstract.** The combination of the financial industry and technology is conducive to enhancing its ability to serve the real economy, in which blockchain technology plays an important role. The application of blockchain in financial services is mainly reflected in supply chain finance, cross-border payment, credit collection and digital currency. This paper predicts the possible risks and hidden dangers of China's future blockchain financial industry, analyzes the challenges encountered by the regulator in blockchain management, and proposes the directions the regulator needs to work on in the future.

**Keywords:** Blockchain technology, Supply chain finance, Digital currency.

## 1 Introduction

In recent years, financial industry is in urgent need of technology upgrade thanks for the rapid development of Internet finance and financial technology, on top of this trend, the blockchain technology is inevitably playing a pivotal role. Firstly, blockchain will play an important core technology role in upgrading financial infrastructure; Secondly, blockchain's secure computing platform can better facilitate the sharing between data, realize the strengthening of algorithms and models, and help financial intelligence ideas get off the ground; finally, blockchain can improve the problem of high cost and low efficiency of traditional financial collaboration<sup>[1]</sup>.

## 2 Typical application scenarios of blockchain

The most suitable scenarios for blockchain technology are often those industries with low trust between participants and high requirements for security and integrity of transaction scenarios, therefore, blockchain is applied faster than other industries in the financial sector. The application scenarios of blockchain technology in the financial field are mainly reflected as follows:

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## **2.1 The application of blockchain in supply chain finance**

Compared with traditional supply chain finance, blockchain technology can achieve multi-party cooperation. Through blockchain technology, commercial banks and technology companies can further deepen cooperation to achieve complementary advantages, thus significantly improving work efficiency<sup>[2]</sup>. In addition, blockchain also makes it difficult to tamper with electronic documents because of its technical characteristics, so that the documents in each link of the supply chain can share information on the local area network, thus avoiding the risk of forgery in the traditional supply chain process. Blockchain technology can also promote the convenience of supply chain financing if it can be unfolded in the supply chain, making the liquidity of capital increase and promoting the financial efficiency of the supply chain.

## **2.2 The application of blockchain in cross-border payment**

Once cross-border payments are combined with blockchain technology, many intermediate transaction links will be eliminated, solving the problems of high cost and time consuming caused by traditional cross-border payments and improving the efficiency of cross-border settlement and clearing. In addition, it can also make the security of cross-border payment greatly improved. At present, with the further development of economic globalization, the cross-border payment brought by trade is also increasing, and various international trade financing methods. Blockchain technology has typical decentralized features and information sharing characteristics, thus reducing the risk of fraud; blockchain technology can also indicate the status of trade finance in a view and promote information transparency, which provides great convenience for better management by financial institutions and thus reduces management costs<sup>[3]</sup>.

## **2.3 Digital currency**

The core features of digital currency can effectively overcome certain defects that exist in the current original currency. Since digital currencies are generated by algorithm calculation while the number of algorithm solutions is certain, therefore, the number of digital currencies is fixed, which overcomes the defect that original currencies are easily issued in excess and lead to inflation; in the process of digital currency transactions, each node on the network needs to approve the transaction, so the transaction process is more secure compared to original currencies; the openness of digital currency algorithms makes it impossible to control its issuance by any institution or individual, so it is difficult to see the fluctuations caused by the artificiality of the original currency. It is this set of advantages of digital currencies that has led to their acceptance to some extent.

# **3 Regulatory challenges brought by blockchain technology and their response**

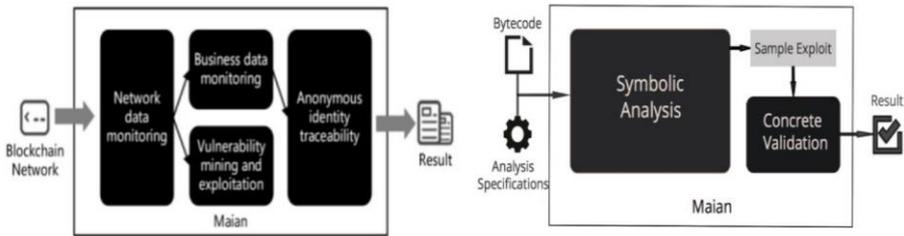
## **3.1 Cross-border risks**

Blockchain finance is first of all a cross-border product of technology and finance, which is a great challenge to the regulators. The current financial industry in China is still regulated by separate industries, while the application of blockchain will bring cross-border integration, such as the mutual integration between computers, banks, securities and insurance. In terms of business identification, the existing public chain system not only

supports digital token trading business, but also extends the scope to pan-financial business, which provides a hidden space for malicious acts such as illegal fund raising. In terms of identity traceability, attackers in public chain systems will adopt one-time address strategies and mixed coin strategies to hide identity information, leading to the failure of identity traceability mechanisms based on traditional financial censorship policies. The current financial system is still centralized, with one settlement system and one central bank, while blockchain is a decentralized platform, which will require continuous reform of our regulation.

### 3.2 How to adapt to the development of blockchain

The emergence and application of blockchain technology is bound to bring about the emergence of laws and regulations and the reform of regulation methods and approaches. But how to implement the appropriate regulatory strength and methods to maximize the effective protection of blockchain technology application standardization and rationalization is a major challenge facing the regulation. Taking public chains for instance, research work can be carried out in three aspects: the framework of public chain monitoring system, the mechanism model of common monitoring and trace ability services, and the method of quantitative security assessment mechanism. This research aims to design a multi-dimensional, multi-level and full-coverage public chain monitoring system framework to realize the situational awareness of mainstream public chain networks from a new perspective of combining monitoring and protection. Construct a common monitoring and trace ability service mechanism model for public chains, and realize efficient monitoring and accurate trace ability for public chain systems by combining on-chain data and off-chain traffic from three stages: environment deployment, data acquisition and data analysis.

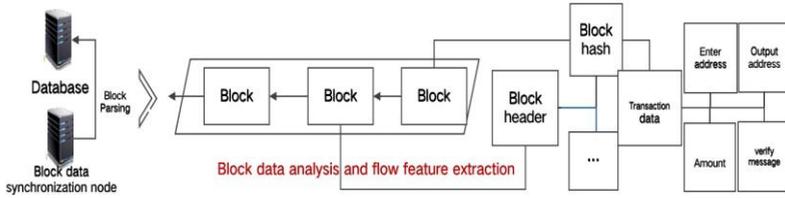


**Fig. 1.** Public chain monitoring system framework.

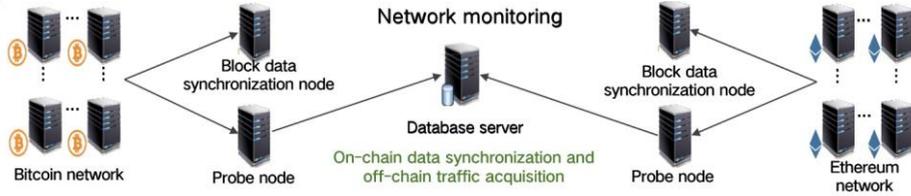
### 3.3 Immaturity of regulatory technology

As a newly emerged technology, blockchain is technically more complex, and regulators will face the challenges of both technical reserve and technical implementation to effectively regulate the application of this technology.

The public chain network adopts a decentralized structure, and there is no organizational structure and traffic transmission hub node, so it is difficult to accurately grasp the network topology and traffic status information. In terms of topology detection, nodes in the public chain network can join and exit the network freely, and the network topology is in the process of continuous dynamic change. It is necessary to design the node detection and topology restoration mechanism suitable for the centerless network according to the characteristics of public chain network construction.



**Fig. 2.** Node detection and topology reduction mechanisms.



**Fig. 3.** Public chain traffic monitoring mechanism.

In terms of traffic monitoring, the public chain network has more traffic types, large scale and scattered transmission paths, and the above features make it difficult to achieve accurate monitoring of network traffic. Therefore, there is an urgent need to study the traffic capture mechanism, feature extraction mechanism and analysis and identification mechanism of the centralized network to realize the swift monitoring capability that traffic data can be comprehensively acquired, traffic types can be accurately identified, and abnormal traffic status can be discovered in real time.

## 4 Conclusion

The combination of blockchain technology and the financial sector will bring about leapfrog development in the financial industry, bring efficiency improvement in information transmission, industry cooperation and inclusive development, and promote the technological renewal and iteration of finance. However, it also brings more challenges to top management team; it also requires the regulatory level to grasp the risk trend in time and provide more accurate and effective regulatory suggestions to the decision-making level; in terms of regulatory methods and regulatory technology, there are more complex and difficult technologies waiting for excavation and innovation.

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## References

1. Iresearch. China blockchain financial Industry research Report. 2020.01.
2. Zhang Hefan. Discussion on the application of blockchain technology in the financial field. Finance, 2020 (01).
3. Wang Zihan. Application analysis and prospect discussion of blockchain in global financial field. Modern Marketing, 2019 (10).