

# On Blockchain Technology Empowering the Development of the Real Economy under the Dual Cycle Development Pattern

## -- Taking the Yangtze River Delta Region as an Example

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### Abstract

As China's economy enters a dual cycle development pattern, the development of the real economy has become an important support for the national economic development. Blockchain technology, as an emerging technology with characteristics such as decentralization, high transparency, and tamper resistance, is considered to have enormous potential to empower the real economy. This article takes the Yangtze River Delta region as an example to study how blockchain technology can promote the development of the real economy in a dual cycle development pattern, and proposes corresponding policy recommendations.

### Keywords

Blockchain; The Yangtze River Delta Region; Real Economy.

## 1. Introduction

Against the backdrop of increasingly fierce global trade, China is actively building a new development pattern with domestic circulation as the main body and domestic and international dual circulation promoting each other. Blockchain technology originated in 2008, and its trust mechanism reconstructed through mathematical principles is changing the application scenarios and operational rules of multiple industries, attracting widespread global attention. With the arrival of the new development pattern of "dual circulation", many regions utilize the development advantages of blockchain technology to link capital trade, build industrial and supply chains, and achieve the goal of building a high-quality industrial ecosystem.

The Yangtze River Delta region is one of the regions with the most active economic development, the highest degree of openness, and the strongest innovation ability in China. It is also the first tier of blockchain development in the country at present. This project is based on the realization of the "dual circulation" goal and the need to build a high-level open pattern. Through literature review and on-site research, the current situation and factors affecting the development of the blockchain industry and the real economy in the Yangtze River Delta region are studied, Explore the combination mode of blockchain technology and the real economy, and propose feasible suggestions for the development of the blockchain industry and the real

economy through research and analysis. This is of great significance for promoting the development of the blockchain industry, economic and social development, and the construction of a new dual circulation development pattern in the Yangtze River Delta region.

## 2. Overview of Blockchain Technology

Blockchain technology is a decentralized distributed ledger technology that has attracted widespread attention and research in recent years. Its core concept is to link transaction records together in the form of blocks, forming an immutable chain structure. Blockchain technology disperses the power of data storage and transaction verification to various nodes in the network through decentralization, achieving higher security, credibility, and transparency. One of the main characteristics of blockchain technology is decentralization. Traditional centralized systems rely on central institutions or third parties to verify and manage transactions, while blockchain technology enables all participants to jointly verify and manage transactions through consensus algorithms and cryptographic mechanisms, eliminating single point failures and trust issues. Another important feature is tamper resistance. Each block in the blockchain contains the hash value of the previous block, so if someone tries to tamper with the data in a certain block, it will cause the hash value of subsequent blocks to change, which will be rejected by other nodes. This immutability makes blockchain a trusted data storage and transaction verification platform.

In addition, blockchain technology also has a high degree of transparency and security. Due to all transaction records being publicly recorded on the blockchain, and all participants being able to view and verify transactions, the blockchain has a high degree of transparency. Meanwhile, the transaction data in the blockchain is encrypted and distributed, making it highly secure and difficult to be attacked or tampered with by hackers.

The application fields of blockchain technology are very extensive. In addition to the representative application of Bitcoin in the field of digital currency, blockchain technology can also be applied to real economy fields such as supply chain management, logistics traceability, asset management, intellectual property protection, financial services, etc. By recording transaction and logistics information on the blockchain, transparency and traceability of the supply chain can be achieved; By recording the ownership and transactions of assets on the blockchain, decentralized management and transparent transactions of assets can be achieved; By recording intellectual property information such as copyrights and patents on the blockchain, the authenticity and immutability of intellectual property can be ensured; Through smart contracts and decentralized financial transactions, transaction costs can be reduced, transaction speed can be improved, and the transparency and credibility of financial transactions can be increased.

## 3. The Development Situation and Challenges of the Real Economy under the Dual Cycle Development Pattern

At present, under the dual cycle development pattern, the development of the real economy is at an important turning point. As China's economy enters a new stage of development, the real economy, as the foundation and support of the national economy, is facing new opportunities and challenges.

The real economy has shown some positive development trends under the overall dual cycle development pattern. On the one hand, the real economy has achieved a series of important results in technological innovation and industrial upgrading. By increasing investment in scientific and technological research and development, promoting technology transfer and transformation, real economy enterprises have continuously improved product quality and

technological content, promoting the optimization and upgrading of industrial structure. On the other hand, the real economy has made positive progress in market expansion and international cooperation. By strengthening marketing and brand building, real economy enterprises continuously expand their market share and enhance their competitiveness. At the same time, the real economy actively participates in international cooperation and exchanges, draws on advanced international experience, and enhances its own internationalization level. However, the development of the real economy under the dual cycle development pattern also faces some challenges and problems. Firstly, structural contradictions are prominent. In the process of transformation and upgrading of the real economy, there are still some structural contradictions, such as overcapacity and low-level redundant construction. These issues need to be addressed by strengthening supply side structural reform and promoting the optimization and upgrading of industrial structure. Secondly, there is a lack of innovation ability. The real economy still faces certain bottlenecks in technological innovation and innovation driven development. We need to increase investment in scientific and technological research and development to enhance the innovation ability and core competitiveness of enterprises. At the same time, it is also necessary to strengthen talent cultivation and introduction, and improve the quantity and quality of innovative talents. The third issue is insufficient financial support. In the development process of the real economy, it faces problems such as difficulty and high cost of financing. We need to increase financial support, provide more financing channels and financial products, and reduce the financing costs of the real economy.

#### **4. Empirical Research Using the Yangtze River Delta Region as an Example**

As one of the regions with the most active economic development, the highest degree of openness, and the strongest innovation ability in China, the Yangtze River Delta region holds a pivotal strategic position in the overall situation of national modernization construction and comprehensive opening up pattern, and has certain research value. We take blockchain services for small and medium-sized physical enterprises as the starting point, and conduct a questionnaire survey on 132 small and medium-sized enterprises related to blockchain in the real economy field of the Parent Triangle to obtain data and materials. We empirically study the implementation path of blockchain empowering high-quality development of the real economy. Economic and technological innovation cannot be separated from the support of blockchain technology. As one of the most representative underlying support technologies, it has great application value in the real economy. But currently, blockchain technology is only applied in places with high levels of digitalization such as digital transactions and digital life, and the application of blockchain technology in the real economy, especially in small and medium-sized enterprises, still needs to be deepened. According to the survey results, blockchain ranks first among new technology technologies that enterprises hope to increase innovation and application, as shown in Table 1. There is a general consensus and high expectations in the industry regarding the development of blockchain finance to help solve the financing difficulties of small and medium-sized enterprises. At the same time, the application of artificial intelligence, big data, cloud computing and other technologies in financial technology has also been highly recognized, with average comprehensive scores ranking second, third, and fourth, respectively. Blockchain technology, as an important information infrastructure in the digital economy era, has good openness and autonomy. It can deeply integrate and innovate with technologies such as artificial intelligence, big data, and cloud computing, and even become an important cornerstone of the development of the metaverse and value internet. It promotes the construction of a new technology ecosystem, improves financial services and governance capabilities, and comprehensively empowers the high-quality development of the real economy.

**Table 1.** Survey results of new technology applications that enterprises hope to increase innovation

New technology	Score	Ranking
Blockchain	7.22	1
Artificial intelligence	7.03	2
Big data	6.69	3
Cloud computing	6.52	4
New supply chain technology	6.04	5
Information Management and Information Systems	5.93	6
Internet of Things	5.67	7
Virtual reality	4.11	8
Biometric recognition	3.74	9

Note: Calculation formula for average comprehensive score: evaluation comprehensive score = (Σ frequency × Weighted number / effective sample size. Among them, frequency refers to the number of enterprises that rank the option in a specific position; The weighted number is the value assigned based on the reverse order of the position, with the last weighted number being 1, the second to last weighted number being 2, and so on; The effective sample size is 132, as shown in Table 2.

**Table 2.** Investigation Results of the Problems Existing in the Application of Blockchain Technology by Small and Medium Enterprises

Existing problems	Score	Ranking
Technical challenges	6.98	1
Privacy and Information Security	6.77	2
Legal supervision	5.49	3
Cost effectiveness	5.02	4
Standardization and Interoperability	4.68	5
Related talents	4.24	6

Small and medium-sized enterprises are the living force that supports the high-quality development of the real economy, and are in the growth period of the enterprise life cycle. They generally have strong financial and technological needs, especially the urgent needs of physical enterprises. At present, in the integration and development of blockchain with the real economy, it still faces many problems such as technological difficulties, high costs, privacy security, and insufficient standardization. According to a survey of 132 parent triangle small and medium-sized enterprises, technical challenges and privacy security issues are the main challenges these enterprises face when using blockchain technology, as shown in Table 2. Technical challenges are a major challenge for enterprises when using blockchain technology. Blockchain technology is relatively new, and enterprises may face challenges in technology implementation and integration. For example, technical issues such as building and maintaining blockchain networks, ensuring network security and scalability need to be addressed. Privacy and security issues are also important issues that enterprises need to pay attention to when using blockchain technology. The transparency and openness of blockchain make all transactions and data visible to all participants. However, for some enterprises, protecting trade secrets and sensitive information is crucial. Therefore, enterprises need to carefully

consider how to protect privacy on the blockchain and take appropriate encryption and permission control measures. By actively addressing these issues and collaborating with professional institutions and experts in the industry, enterprises can fully utilize the potential of blockchain technology and promote the integration of technology and the real economy.

## **5. Practical Exploration of Promoting Blockchain Empowerment of the Real Economy**

In the current context of dual circular economy development, blockchain technology, as a brand new technology, is widely considered to have revolutionary potential and can bring huge opportunities for the development of the real economy. In order to promote the application and empowerment of blockchain technology in the real economy and reduce its inherent potential risks, practical exploration is needed to solve practical problems and promote innovative development of the real economy.

### **5.1. Promote the Development and Promotion of Blockchain Entity Application Scenarios**

The core value of blockchain lies in deep integration with various real economic fields to create value. Therefore, various application scenarios and infrastructure are important ways to iterate and upgrade blockchain technology and improve the blockchain industry ecosystem. The government should quickly formulate policies for the application of blockchain technology in blockchain, and select suitable fields for blockchain technology application based on the characteristics and needs of the real economy, such as supply chain management, logistics traceability, intellectual property protection, etc. By combining blockchain technology with existing business processes through scenarios related to the real economy, we can improve efficiency, reduce costs, and enhance trust, thereby promoting the development of the real economy.

### **5.2. Establishing a Good Cooperation Mechanism**

The application of blockchain technology often involves collaboration and cooperation among multiple participants. Therefore, in the process of promoting blockchain empowerment of the real economy, it is necessary to establish a multi-party cooperation mechanism, including the active participation of governments, enterprises, technology providers, and other parties. By jointly formulating rules and establishing trust mechanisms, information sharing and collaboration can be achieved, and the application of blockchain technology in the real economy can be promoted.

### **5.3. Provide Legal and Regulatory Support**

Practical exploration requires addressing technical and legal risks. The application of blockchain technology also faces some technical and legal challenges in practice. For example, there is a technical need to address issues such as scalability and privacy protection; Legally, issues such as data privacy and compliance need to be addressed. Therefore, in practical exploration, it is necessary to strengthen technological research and innovation, and cooperate with relevant departments and institutions to develop laws, regulations, and policies that adapt to the application of blockchain technology, providing a good environment and guarantee for empowering the real economy with blockchain.

### **5.4. Increase the Research and Innovation of Blockchain Basic Technology**

Strengthening the research and innovation of blockchain technology is also an important means to promote the empowerment of the real economy through blockchain. By continuously promoting innovation in blockchain technology, its performance, scalability, and security can

be improved, meeting the needs of the real economy for efficient and reliable blockchain services. At the same time, it is also necessary to strengthen the integration of blockchain technology with other cutting-edge technologies, such as artificial intelligence and the Internet of Things, to further enhance the application effect of blockchain technology in the real economy.

### 5.5. Strengthen Investment and Construction of Blockchain Infrastructure

The scale of investment in blockchain infrastructure is large and has strong economic externalities. Currently, domestic micro market entities have insufficient enthusiasm for investing in blockchain infrastructure construction. However, these infrastructure are important foundations for the deep integration of blockchain technology and the real economy, and the government needs to play a good role as a provider of blockchain public goods and services. And establishing appropriate blockchain infrastructure is the key to promoting blockchain empowerment of the real economy. This includes building an efficient and scalable blockchain network, ensuring data security and privacy protection, and providing functions such as smart contracts. By establishing a sound infrastructure, reliable, efficient, and secure blockchain services can be provided for the real economy, promoting the digital transformation of the real economy.

## 6. Conclusion and Outlook

In summary, blockchain technology, as an emerging distributed technology, has important application value in the dual cycle development pattern. This study explores the application of blockchain technology in the real economy and conducts empirical research using the Yangtze River Delta region as an example, aiming to provide reference and inspiration for promoting dual cycle development and high-quality development of the real economy. In future research, it is necessary to further explore the application of blockchain technology in different industries and fields, and further study its potential risks and challenges, in order to promote the greater role and benefits of blockchain technology in the real economy.

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## References

- [1] Sun Lingxia, Pang Rui. Research on Empowering the Real Economy with "Blockchain+Technology Finance" [J]. Collaborative Economy and Technology, 2022 (16): 46-48.
- [2] Li Yang, Zhu Liang. Research on the Application of Big Data and Blockchain Technology in Financial Support of the Real Economy [J]. Jilin Financial Research, 2020 (09): 43-45
- [3] Zeng Yuting, Kang Ling. Research on the Application Scenarios of Blockchain Technology - Taking Commercial Banks as an Example [J]. Marketing, 2023 (10): 167-169.
- [4] Zhang Bing. Digital Innovation in Cross border Trade under the Background of Blockchain [J]. Statistical Theory and Practice, 2020 (02): 33-39.
- [5] Zhou Shiyi, Ye Xueping. Research on the Mode and Path of Deep Integration of Blockchain Technology and China's Real Economy [J]. Contemporary Economy, 2020 (05): 17-19.
- [6] Fan Qingyu, Yang Shan. Spatial Structure Evolution and Optimization of the Yangtze River Delta Urban Agglomeration from a Coordinated Perspective [J]. Journal of Natural Resources, 2019,34 (08): 1581-1592.

- [7] Lin Yongmin, Zhao Xin, Zhang Zhenshan. The mechanism path of blockchain empowering the service-oriented transformation of manufacturing industry - based on the perspective of transaction costs [J]. Value Engineering, 2022,41 (22): 1-3.
- [8] Wang Chunxia, Yu Haiyang, Sun Xiaoqin. Comparative study on the development layout of blockchain in Suzhou, Beijing, Shanghai, Guangdong, Zhejiang [J]. Modern Management Science, 2021 (01): 97-108.